No 3

8

305
14

THE

Pharmaceutical Journal

AND

Transactions.

8

THE

Pharmaceutical Journal

AND

Transactions.

THIRD SERIES.

VOLUME V.

1874-75.

LONDON:

J. & A. CHURCHILL, NEW BURLINGTON STREET;

MACLACHLAN & STEWART, EDINBURGH; FANNIN & Co., DUBLIN.

TWIETMEYER, LEIPZIG.

1875.

PRINTED BY STEVENS AND RICHARDSON,
5, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, W.C

The
Pharmaceutical Journal
AND
Transactions.

VOL. V.—JULY 4, 1874.

PRESUMED HYBRID BETWEEN CINCHONA CALISAYA AND C. SUCCIRUBRA.

BY JOHN ELIOT HOWARD, F.R.S., ETC.

In the Pharmaceutical Journal of July 12th of last year, and subsequently in a communication to the Linnean Society, "On the Genus Cinchona,"* I gave some account of the produce obtained from seed sent me by Mr. Broughton, "from two trees of the same red-under-leaved variety of Calisaya." In the latter treatise I have discussed the question as to the probability of the variable aspect of the plants having been the result of hybridization or otherwise. I have since obtained some fresh light on the subject, which it may be well to place on record.

Towards the close of the third week in May of this year, when the plants were just two years old, I cut down five of them, leaving some inches of the stem to sprout again. From the remainder I peeled the bark, which weighed, when fully dried, 880 grains. One of the stems I forward, to show the size and growth of the plants. On subjecting the bark to chemical examination, I found to my surprise, that I had to do with a substance partaking, in something like equal proportions, of the qualities of red bark and of Calisaya bark. I obtained a crystallization of mixed sulphate of quinine and sulphate of cinchonine, the latter existing in true Calisaya in very minute proportion, if at all. By recrystallization (with precautions), the sulphate of quinine was brought into a state of pure and white crystals, justifying the Calisaya character of the parent trees from which the seed was obtained. On the other hand the residuary alkaloid was, as usual from the *C. succirubra*, largely impure or uncrystallizable.

Certain peculiarities in the products, led me to search for quinamine, and after precipitation† of the residuary alkaloids by potassic sulphocyanide, I obtained, by precipitation and resolution in pure ether, a substance which certainly had a close resemblance to the quinamine of Hesse, crystallizing by spontaneous evaporation in long needles, forming a peculiar tracery on the sides of the glass vessel.

In my description of the bark of *Cinchona succirubra*, I have said,‡ that "the characteristic peculiarity of red bark is, that it ordinarily contains the alkaloids quinine, cinchonine, cinchonidine, quinicine (?) and aricine (?)." This result of my researches was published in 1862, and some ten years before *Quinamine* had been determined. I have no hesitation in saying that the recent examination of the bark of my five trees has given me again the same results; thus still more strongly indicating the effect of hybridism, than even by the large amount of cinchonine contained.

As nearly as I could ascertain, the bark of these five trees produced:—

Sulph. quinine	0·170
Sulph. cinchonine	0·170
Cinchonine	0·170
Quinamine (?)	0·100
Amorphous alkaloids	0·700

The plants themselves partake of the same intermediate character, as I have been able more fully to ascertain since I have had the pleasure of showing them to Mr. Broughton, who is now in England, and has kindly presented me with a collection of eighteen specimens of Calisaya from the plantation of Nediwuttum. Amongst these considerably diverging varieties is a pressed specimen of the No. V. sort, from which all of mine spring. Some of mine resemble this parent, others have so much more the character of *C. succirubra* as to be taken at first sight by Mr. B. for that variety; but whilst in form * and general appearance they resemble the *C. succirubra*, they are distinguished by the peculiar gloss or *reflet* which marks the Calisaya, and which is entirely absent from the *C. succirubra*.

On the whole I think that we may safely conclude that there has been an interference in this case of the pollen of the *C. succirubra*, growing as Mr. Broughton informs me in the immediate neighbourhood. I am the more confirmed in this view, since it accords with observations made by Dr. de Vrij on a hybrid sort in Java. But if such be the case, we are led to curious reflections in connection with vegetable physiology. Through the mixture of the two *essentiæ*, brought about by pollen so nearly similar, a change must have been wrought in the chemistry of each cell of the inner bark; if (as I suppose) it is in these, that the alkaloids are elaborated. I would bring into relationship with this fact the following observations of the skilful chemist attached to the Dutch Plantations of cinchona. M. Moens gives me the following information† (under date 5th. Dec., 1873):—"Some years ago, M. v. Gorkom had grafted two Calisayas upon two Pahudianas. The grafts succeeded very well, and I have recently taken the barks for examination. This showed that the Calisayas as well as the Pahudianas kept their alkaloids as if they had grown

* Linnean Society's Journal, Botany, Vol. XIV.

† See De Vrij on Quinamine, PHARM. JOURN. Vol. IV. p. 609.

‡ Illus. Nueva Quin. sub voce C. succirubrum, p. 13.

* I have some regularly ovate leaves, measuring fifteen by ten and a half inches.

† My correspondent will pardon some rectifications in expression, needed to convey his meaning clearly.

separately. The latter contained no quinine, or cinchonidine, but quinidine (Pasteur) and amorphous alkaloids. The former gave quinine, cinchonidine (much), no quinidine, chichonine, and amorphous alkaloids. I think this is an experiment of considerable interest, and shall repeat it, if possible, with *C. micrantha* and *C. Calisaya* (Ledger). I think the result most agrees with your idea, that the alkaloids are formed in the cellular tissue of the bark."

For the rest, it would seem that, in Cinchonæ at least, the effect of hybridism tends only to degeneration.

Through the courtesy of my friends in Java, I have just received the Report of the Plantations there for the first quarter of the present year. From this I learn that nine specimens of *C. Ledgeriana* have given equal to 10·03 to 14·82 sulph. quinine, whilst four trees, which (if I understand aright) are reckoned under Ledgerianas, give either no quinine at all, or this alkaloid in comparatively small quantity; and quinidine and (in one case) amorphous alkaloid, in suspicious amounts. Are not these trees also hybrids? These careful cultivators take great precautions to propagate only the true *C. Ledgeriana*, and I hope will be successful in guarding against the injury resulting from the pollen of inferior species.

LIQUOR FERRI PHOSPHATIS CUM QUINIÂ ET STRYCHNIÂ.

In a recent note on Syrupus Ferri Phosphatis, by Mr. Blackett (before, p. 890) he recommended the keeping of a solution of ferrous phosphate with the alkaloid in it for the preparation of a syrup of phosphate of iron, quinine and strychnine, as it may be required. He now writes respecting this suggestion:—

"I have since found that this method does not apply to the 'phosphate of iron, quinine, and strychnine liquor.' The strychnine does not exert any decomposing action, but the quinine does most rapidly cause a decided change of colour. I find that it is very easy to keep a solution of phosphate of iron and strychnine ready, and then add one grain of phosphate of quinine for each drachm of syrup required. Any one can try my suggestions, and calculate out the quantities that may be convenient."

THE APPENDICES OF THE BRITISH PHARMACOPŒIA.

BY WALTER G. SMITH, M.D., DUBLIN,

Fellow and Censor K. and Q. C. P. I.; Examiner in Materia Medica, Q. U. I.; Assistant Physician to the Adelaide Hospital.

(Continued from vol. iv. p. 996.)

APPENDIX II.

SOLUTION OF ACETATE OF COPPER. $Cu\ 2\ C_2H_3O_2 \cdot H_2O$.—Test for butyric acid in Zinci Valerianas: butyric acid precipitates the acetate of copper immediately.

SOLUTION OF ACETATE OF POTASH. $KC_2H_3O_2$.—Test for Acidum Tartaricum: distinguishes it from Acidum Citricum.

SOLUTION OF ACETATE OF SODA. $NaC_2H_3O_2.\ 3\,H_2O$.—Testing Calcis Phosph. Præcip. for iron; to neutralize the excess of the nitric acid employed.

SOLUTION OF ALBUMEN.—Test for metaphosphoric acid (HPO_3) in Acidum Phosph. Dil.; test for Acidum Carbolicum and for Creasotum.

SOLUTION OF AMMONIO-NITRATE OF SILVER. $AgNO_3.\ 2\,NH_3$.—Test for Acidum Arseniosum, and Acidum Phosphoricum; yellow precipitate with each.

SOLUTION OF AMMONIO-SULPHATE OF COPPER. $CuSO_4.\ 4\,NH_3$.—Test for sulphide of ammonium in Liq. Ammoniæ Fortior; gives black precipitate.

SOLUTION OF AMMONIO-SULPHATE OF MAGNESIA.—Test for phosphoric acid in Ammoniæ Phosphas and Ferri Phosphas; gives white precipitate of triple phosphate, $MgNH_4PO_4$.

SOLUTION OF BORACIC ACID.—To detect the adulteration of rhubarb with turmeric. Alkalies could not be used for this purpose, as they act on rhubarb similarly to turmeric.

SOLUTION OF BROMINE. Br.—Test for iodine in bromides of ammonium and potassium.

SOLUTION OF CARBONATE OF AMMONIA. $N_4H_{16}C_3O_8$.—Test for Bismuthum Purificatum; Zinci Carb., Zinci Oxidum.

SOLUTION OF CHLORIDE OF AMMONIUM. NH_4Cl.—In testing for magnesian salts to prevent the premature precipitation of magnesia by ammonia. Triple phosphate is insoluble in chloride of ammonium.

SOLUTION OF CHLORIDE OF BARIUM.—Test for sulphuric acid or a soluble sulphate.

SOLUTION OF CHLORIDE OF CALCIUM. $CaCl_2$.—Test for citric acid in Potassæ Citras; for arsenic acid in Sodæ Arsenias.

SOLUTION (SATURATED) OF CHLORIDE OF CALCIUM.—Test for percentage of nitrous ether in Spiritus Ætheris Nitrosi.

SOLUTION OF CHLORIDE OF GOLD. $AuCl_3$.—Test for atropia.

SOLUTION OF CHLORIDE OF TIN. $SnCl_2$.—Test for Hydrargyrum Ammoniatum.

NOTE.—Stannic chloride, $SnCl_4$, could not be formed in the presence of nascent hydrogen.

SOLUTION OF GELATIN.—Test for Acidum Tannicum; Ulmi Cortex.

NOTE.—Should be termed solution of isinglass, which is introduced into App. I. for this purpose.

SOLUTION OF IODATE OF POTASH. KIO_3.—Should be expunged from the Appendix as it is no longer recognized as a test. In the first edition of the Pharmacopœia it was used as a test for sulphurous acid in Acidum Aceticum.

SOLUTION OF IODIDE OF POTASSIUM. KI.—Test for lead. (See lead salts *passim.*)

SOLUTION OF OXALATE OF AMMONIA. $(NH_4)_2C_2O_4$.—Test for lime. (See calcium salts *passim.*)

SOLUTION OF PERCHLORIDE OF PLATINUM. $PtCl_4$.—Test for potash (see potassium salts *passim*); for nicotia in Tabaci Folia.

SOLUTION OF PHOSPHATE OF SODA. Na_2HPO_4.—Test for magnesia. (See magnesium salts *passim.*)

SOLUTION OF RED PRUSSIATE OF POTASH. $K_6Fe_2Cy_{12}$.—Test for *ferrous* salts. (See salts of iron *passim*).

SOLUTION OF SULPHATE OF INDIGO (Sulphindigotic Acid). $HC_8H_4NSO_4$.—Test for Liq. Chlori; and for nitric acid in Bismuthi Carbonas.

SOLUTION OF SULPHATE OF IRON. $FeSO_4$.—Test for Acidum Hydrocyanicum; and for nitric acid in Acidum Phosphoricum, Liq. Ferri Pernitratis; and for nitrous acid in Spiritus Ætheris Nitrosi.

SOLUTION OF SULPHATE OF LIME. $CaSO_4$.—Test for oxalic acid in Acidum Tartaricum.

SOLUTION OF SULPHIDE OF AMMONIUM. $(NH_4)_2S$. Preparation: see sulphuretted hydrogen, App. I. Test for copper or lead in Liq. Ammon. Fort., and Pot. Acet.; test for zinc (see zinc salts *passim*); and for cadmium (see Cadmii Iodidum).

NOTE.—Sulphydrate of ammonium, NH_4HS, is also frequently used in the laboratory.

SOLUTION OF TARTARIC ACID. $H_2C_4H_4O_6$.—Test for potassium (See Pot. Acet.) and, generally, to distinguish potassium from sodium salts: to prevent precipitation of oxide of iron in testing Ferri Phosph. for phosphoric acid.

SOLUTION OF YELLOW PRUSSIATE OF POTASH. K_4FeCy_6.—Test for *ferric* salts (see salts of iron *passim*); and for copper salts (see Cupri Sulphas).

APPENDIX III.

This Appendix, as has already been remarked, deals with quantitative analysis, which is effected upon one or other of two principles.

1. Analysis by weight—gravimetric, *i.e.*, the precipitation of a body in the free state or in some definite combination, which is then weighed, and so the quantity of the body ascertained by a simple calculation. The requisite operations for this mode of procedure are troublesome, and involve much expenditure of time, and it is unnecessary in this place to allude to them further. But many chemical assays are now more simply effected by—

2. Analysis by measure, *i.e.*, volumetric—with which alone we are now concerned. Briefly, this method consists in noting the volume or bulk of a test-liquid of known strength required to be added to a substance before a given chemical effect is produced upon a known quantity of the substance under examination. Or, as it may otherwise be expressed, it estimates the quantity of a body by converting it from a certain definite state to another equally definite state by means of a fluid of accurately known power of action, and under circumstances which permit of the rigorous determination of the exact point when the conversion is accomplished. For example, the amount of iron in a given amount of a ferrous solution can be easily determined by observing how much of a known solution of the purple potassic permanganate will be decolorized by the ferrous solution. The advantages which the volumetric method offers are rapidity, accuracy, and simplicity of manipulation. An analysis can often be completed in as many minutes volumetrically as it would take hours gravimetrically.

The basis upon which the practical application of this method rests is fourfold.

(*a*) The fundamental decomposition, or initial reaction, of the analysis in question must be fixed and invariable, else no certain results can be attained. Not a few proposed processes have broken down under this requirement.

(*b*) It is necessary to have standard (volumetric or titrated) test solutions, *i.e.*, simply solutions of accurately known strength. These solutions are prepared either (1) by dissolving a weighed quantity of the reagent in a definite volume of water, *e.g.*, all the official solutions, except the volumetric solution of soda, and hyposulphite of soda; or, (2) by first preparing a suitably concentrated solution, determining its exact strength by a series of experiments, and then diluting it to the proper volume, *e.g.*, the volumetric solution of soda.

(*c*) A graduated delivery tube, or burette, for measuring the volume of the test liquid required in a particular operation. Of the different kinds, Mohr's clamp burette is very convenient, and is now in general use. The burette is usually constructed to hold 1000 grain-measures of the solution up to the zero mark. A grain-measure is the volume of a grain of distilled water.

(*d*) We must know the final reaction, or indicator, *i.e.*, the evidence of the completion of the intended decomposition. This always consists in some *visible* change, and is manifested (i.) as a change of colour, *e.g.*, action of acids and alkalies on litmus; (ii.) by the cessation of the formation of a precipitate, *e.g.*, estimation of bromide of potassium and arseniate of sodium by nitrate of silver; (iii.) by incipient precipitation, *e.g.*, estimation of hydrocyanic acid by nitrate of silver; and (iv.) by the use of particular reagents, *e.g.*, in the estimation of ferrous salts by bichromate of potassium red prussiate of potash is employed as the indicator.

The different volumetric methods are conveniently grouped under three heads:—

I. Analysis by saturation or neutralization, *i.e.*, in which the quantity of a base (alkalimetry) or an acid (acidimetry) is measured by the quantity of acid or base which is necessary to convert it into a neutral salt. The indicator used in this case is litmus, and the general method of procedure is as follows:—Weigh or measure the necessary quantity of the substance, dilute, add a sufficient amount of litmus, and run in the acid (or alkaline) test-solution from the burette until a permanent red (or blue) tinge begins to appear.

II. Analysis by oxidation or reduction, *i.e.*, a substance which will take up oxygen is brought into solution and estimated with a substance of known oxidizing power, or *vice versâ*. In other words, the quantity of the substance to be determined is found by the quantity of chlorine, iodine, or oxygen to which it is equivalent as an oxidant, or which it requires to pass from a lower to a higher stage of oxidation, *e.g.*, action of iodine on sulphurous and arsenious acids.

III. Analysis by precipitation, the principle of which is either:—

(*a*) Add the test-solution until no further precipitate occurs, *e.g.*, estimation of bromide of potassium by nitrate of silver, or,

(*b*) Add the test-solution until a permanent precipitate begins to form, *e.g.*, estimation of hydrocyanic acid by nitrate of silver.

The following general statement will explain the simple calculation required in any given case:—

If $n =$ the number of grain-measures of the test solution used in a particular experiment, and $a =$ the weight of the substance tested which corresponds to 1000 grain-measures of the standard solution—always a known quantity—then, by simple proportion,

$$1000 : n :: a : x \text{ (the quantity sought).}$$

With this introduction the special uses of the different official solutions will now be briefly explained, and an illustrative example of each process worked out.

(*To be continued*).

SOLUBLE STARCH.*

BY M. MUSCULUS.

Chemists are not in accord as to what is to be understood by "soluble starch." Some consider as such the matter coloured blue by iodine, which can be removed from starch by means of water, and which Vaegeli has called "granulose." Others think that the substance coloured violet by iodine, which Béchamp obtained by treating

* Abstract of paper read before the French Academy (*Comptes Rendus*, vol. lxxviii., p. 1413).

starch with sulphuric acid, to be the true soluble starch. But the author has found that granulose, although it passes readily through a filter, is not really soluble in water, for it can be separated by evaporation in a state completely insoluble even in boiling water. Also that the soluble starch of Béchamp is a mixture in which may be found granulose, soluble starch, and the products of decomposition of starch (dextrine, glucose, or glucosine), which are always formed with sulphuric acid.

The author has previously made known under the name of "*dextrine globulisée*,"* a body insoluble in cold water, which he obtained by dissolving starch in boiling acidulated water, and evaporating after saturation of the acid and filtration, to the consistence of a syrup. This deposits an abundance of granules, insoluble in cold water and soluble only at 50°C., a property that allows of their being washed and separated from the dextrine and glucose by which they are accompanied; further treatment with alcohol will remove a little granulose still adhering, and there will then be left what the author considers to be true soluble starch; the granules composing it being grains of starch deprived of their organization.

The author enumerates the following properties of this product to substantiate his assertion. When dried in the air it is white and resembles starch. Freshly washed, it is insoluble in cold water and does not reduce salts of copper; but if it be left for some time in contact with water, it dissolves perceptibly and there is at the same time a little sugar formed. Its rotatory power is nearly quadruple that of dehydrated glucose. It dissolves entirely in water at 50°C., and is not precipitated upon cooling; by evaporation, however, a residue is obtained which has recovered its insolubility in cold water. To redissolve it, it is necessary to heat it to boiling, or allow it to digest for half an hour in a water-bath at 100°C. Alcohol precipitates it and also restores it to its insoluble state. The same result is obtained by congealing the solution in a freezing mixture, in being found when the ice is melted as a white precipitate at the bottom of the vessel. When this substance is mixed with dextrine and glucose, as in the mother liquor wherein these granules are formed, all these properties disappear.

These artificial starch granules give with iodine all the colour reactions obtained with the natural granules as well as those given by dextrine, according to the disposition of their molecules, the result being variable at will. Thus, a dilute solution takes a pure red colour; but when it is concentrated to saturation, iodine gives rise to a violet colour. If iodine be added to a solution moderately diluted, so as to produce a deep red brown colour, and the solution be allowed to evaporate in the open air, it will gradually grow more and more purple; and eventually, when sufficiently concentrated, become of a magnificent pure blue colour. If water be added, the violet colour reappears and in its turn gives place to a pure red.

If, instead of concentrating the red liquid by evaporation, a neutral salt having an affinity for water, such as chloride of calcium, be added, the result is the same. If the blue solution be allowed to stand for twenty-four hours, it deposits a blue-black substance, which is not dissolved by cold water. This precipitate, however, appears to dissolve in water; it does not affect its transparency, and passes readily through a filter, but after a very short time it is again deposited. This is characteristic also of the iodized granulose; from which the author concludes that in both bodies the disposition of the molecules is the same, and that they do not differ in degree of cohesion.

The iodized artificial granulose can, in fact, be destroyed, by a slight elevation of temperature; it enters into solution in the water in which it was suspended, and is then only coloured red with iodine, whilst natural granulose resists a boiling temperature and continues to be coloured blue with iodine. The artificial granules resemble also natural grains of starch, in not being coloured by a small quantity of iodine, the blue only appearing when it is in excess; but if they be triturated in a mortar with a small quantity of iodine, a mass of a pure blue colour is produced.

When starch is incompletely dissolved, either with diastase or boiling acetic acid, the fragments which resist the longest are no longer coloured blue with iodine, but take a tint which varies from yellow to orange-red. The artificial granules give the same colours if their cohesion be augmented, which may be done by dissolving in water and evaporating to dryness.

Diastase decomposes soluble starch in the same manner as natural starch, but much more easily and completely. According to the observations of Payen, Schwarzer, Schulze, and the author, when diastase is caused to act upon starch, all colouration with iodine disappears when the degree of saccharification reaches one-fourth; then, by augmenting the diastase, the saccharification may be increased to one-half, a point that is not passed to any sensible extent; in fact, by his earlier experiments, the author was led to think that it was not possible to saccharify more than one-third of a given quantity of starch by means of diastase. With soluble starch, however, the stoppage of the saccharification at one-third does not occur. The reaction with iodine disappears when it reaches one-fourth; then, if more diastase be added, the production of sugar goes on rapidly until it reaches one-half, when it ceases, as with natural starch.

A widely diffused opinion, introduced into science by Vaegeli regards starch as essentially composed of cellulose mixed with a little granulose. Béchamp has found that dextrine obtained from cellulose has less rotatory power than dextrine from starch. The author prepared dextrine from cellulose by dissolving cotton in strong sulphuric acid. This dextrine was afterwards saccharified with boiling acidulated water, and it was found that during this transformation the rotatory power was not changed. Starch, treated in the same manner, yielded, on the contrary, a dextrine of which the rotatory power had been lowered more than one-half by the saccharification. It follows that the dextrine from cellulose has the same rotatory power as the sugar which is derived from it, which is not the case with that from starch. The author further remarks that all the dextrines of starch sugar have a rotatory power at least double that of the sugar itself.

It is known that glucose freshly dissolved, and especially dehydrated glucose, has a rotatory power at least double that of glucose that has been some time dissolved in a small quantity of water; but this property is not persistent. The author has prepared a dextrine from glucose, by treating that sugar with concentrated sulphuric acid and then with 95° alcohol. This anhydride has also a rotatory power double that of the glucose, and this power is persistent.

The author has not yet obtained sugar from cellulose sufficiently pure to be able to compare it with sugar from starch; but he feels certain that there is no great difference between their rotatory powers; so that their isomerism would not be manifested so clearly as in their dextrines.

The author proposes to investigate whether other sugars which are regarded as identical with glucose—the glucoses of honey and of fruits, diabetic sugar, etc.—present the same kind of isomerism.

* *Comptes Rendus*, vol. lxv., p. 857.

THE OBJECT AND NECESSITY OF A PHARMACEUTICAL EDUCATION.

The following remarks upon the object and necessity of the special education of the Pharmacist are taken from an introductory address, delivered by Professor John M. Maisch, before the Students in the Philadelphia College of Pharmacy, at the commencement of the session, October 1st, 1873:—

Pharmacy has long since been called an art and a science, and this two-fold character becomes more and more evident as the rapid advancement of science determines the equally rapid progress of pharmacy in common with all the industrial arts. The basis of every exact science is *observation;* the experience gained thereby leads, through *ratiocination* on the one hand, to the establishment of fundamental principles, and on the other hand to the generalization of scientific truths; it is a guide to *synthesis* as well as to the opposite method of investigation, *analysis.* Science, therefore, is knowledge obtained by observation and deduction; while art is the practical application of this knowledge, and implies likewise the requisite skill, mental as well as manual, for applying the knowledge correctly and efficiently.

The selection of all medicinal substances of unexceptional purity; the recognition of all adulterations and impurities; the making of chemical and pharmaceutical preparations by the formulas of the Pharmacopœia; the collection, drying, and preservation of all crude drugs; their proper comminution and exhaustion by maceration or displacement; the compounding of physicians' prescriptions with correctness and nicety: all this belongs to the *art* in pharmacy; while the knowledge of the reasons why a prescription should be prepared in a particular way; of the causes which affect the success of percolation; of the influence of heat, moisture, atmosphere, age, etc., upon drugs; of the development in plants and their parts, of the active principle or principles; of the causes of success or failure in carring out any process or manipulation connected with pharmacy, properly belong to *science* in its bearings upon pharmacy.

It is a well known fact that the odour of fresh valerian differs essentially from that which it acquires by age on exposure to the air; this fact is easily explained by chemistry, which has proven that the volatile oil of valerian is gradually converted by the oxygen of the atmosphere into valerianic acid, which possesses a peculiar, strong cheesy odour, the development of which replaces the much milder and different odour of the volatile oil. To detect the grosser adulterations in opium, such as stones, lead bullets and the like, requires no scientific attainments; but to ascertain the true quality of commercial opium, aside from such coarse sophistications, we invoke the aid of analytical chemistry, separate the most important principle, morphia, and determine its exact proportion in the sample before us. Bismuth, in its native state, is found associated with other metals, particularly with silver and arsenic, which are not easily completely separated by the processes adopted for the preparation of this metal on a large scale; chemistry proves the presence of the one by the precipitate occurring in acid solutions with muriatic acid, and the most minute quantities of the other are detected by the formation with nascent hydrogen of gaseous arseniuretted hydrogen, which, under certain precautions, is reduced by heat to the metallic state.

The barks of the different species of cinchona resemble each other in ther chemical constitution, and the bark of the same species is greatly influenced in composition by age, exposure to light and moisture, climate and soil, so that chemistry fails to furnish an infallible criterion whereby the specific origin of a cinchona may be established; the study of the anatomical structure of the bark of the different cinchonas, however, has furnished the means whereby they may be distinguished, or which may become available as soon as the variation in structure, caused by the natural development, shall have been correctly observed through the various phases of growth of each species. Botanical anatomy readily explains the reasons why most of the *Labiatæ* rapidly deteriorate in quality by parting with most of their volatile oil after a comparatively short exposure; and it shows us the cause why some, like rosemary, for instance, retain, even after years, considerable of their volatile oil, although in their unbroken condition they may possess but little odour, which is developed, however, on cutting or bruising the leaves. In the one case the oil cells are either in direct contact with the atmosphere or scarcely protected by a thin layer of epidermis, while in the other case the epidermal layer is heavy and leathery; and a further protection against evaporation of the oil is afforded by the natural folds of the leaf or its revolute margin. The same instrument which reveals to our eyes the minute structure of organisms, the microscope, is often the readiest means to ascertain fraudulent admixtures, and to ascertain the nature of the adulterations; by it the blood corpuscles are revealed, if dried blood has been mixed with such a costly article as musk, and the pollen granules of phanerogamous plants are easily detected, if they have been employed to increase the harvest of the sporules of *Lycopodium clavatum.*

On dissolving a solid in a liquid, cold is produced; natural philosophy teaches us that, in passing from one state of aggregation into another of less density, a certain amount of heat becomes latent, and hence the sensation of cold is felt. The same discipline explains to us the causes why, as a general rule, the solubility of bodies in simple solvents is increased by heat; and where there are exceptions, it calls in the aid of an accessory discipline to furnish an explanation substantiated by experimental proof. Volatile oils volatilize slowly even at an elevated temperature which remains below their boiling point; but they are readily obtained by distilling water from the bruised plants. It is well known that the boiling point of water is far below that of these volatile principles; but the laws of the diffusion of vapours explain satisfactorily the correctness and efficiency of a process which was used for many centuries before it received its true explanation.

In the few instances enumerated, we find ourselves aided by natural philosophy, chemistry, botany, and zoology; in fact, by nearly all the branches of exact science, which either have constructed the delicate apparatus wherewith matter as well as the imponderable forces may be accurately measured; or which employ these instruments in the exploration of a certain domain of nature. The examples given will also, in a measure, point out those disciplines which form the basis of scientific pharmacy, and, consequently, may be taken as an answer to the query: *What should the pharmacist study?* Materia medica, or in its more limited application to the direct wants of the druggist and the pharmacist, pharmacognosy, is botany and zoology applied to drugs; and what may be termed pharmacy proper is really natural history and chemistry applied to preparing into suitable forms the crude materials furnished by materia medica. With but very few exceptions, mineralogy now-a-days yields no drugs. A century ago, the officinal mineralogical drugs were by far more numerous; but since then, the close investigations of chemistry have removed them one after another, substituting in their stead definite compounds of a precise composition; until now but three have been left in our pharmacopœia as representatives of unaltered products of the inorganic kingdom of nature. They are black oxide of manganese, marble, and chalk—the two first named being now not directly used in medicine, but merely employed for the generation of chlorine, carbonic acid gas, and one or two salts of calcium, leaving chalk the only mineralogical medicinal drug which has been retained by the United States and most other pharmacopœias. In a few localities discarded calamine and tutty are somewhat employed yet; but in most places they seclude themselves in the remotest corner of the shop, where they may dream undisturbedly of by-gone days and of the instability of worldly honours; of the times when, in the officine of the pharmacist, they kept company with the agate, amethyst, sapphire, onyx, diamond, and other precious gems. The place which mineralogy once occupied in the drug trade and in pharmacy, is more than filled out by chemistry; and the necessity which formerly required the druggist and pharmacist to become to a certain extent a mineralogist, no longer exists. Mineralogy, as an indispensable part of pharmaceutical education, has entirely lost its importance, although it still holds and for ever will occupy its prominent position as one of the requisites of every liberal education.

The direct products of the inorganic kingdom of nature have almost entirely disappeared from our list of materia medica, and from the crude products of nature only those remain which are of organic origin. They either possess a cellular organization or they are destitute of it, being then merely the secretions or excretions of organized beings. Of the two principal divisions of organisms, those derived from the animal kingdom have been, like the minerals, greatly reduced in number among our officinal articles, until now scarcely half a dozen can be found in our pharmacopœia; of this number, one—hen's egg—represents an embryonic animal; two—cochineal and cantharides—are entire animals; one—isinglass—is a certain tissue, and two—musk and castor—are constituted by peculiar secretions separated in sac-like cavities. These comprise all really organized drugs of animal origin, the remaining non-organized animal drugs being almost exclusively confined to secretions of a fatty or saccharine nature; and of late the secretion of the mucous coat of the animal stomach has been added thereto, but solely with the view of obtaining therefrom the digestive principle, pepsin. How insignificant this number is in comparison to the number of animals, their parts, secretions and excretions, which were highly valued medicines at the same time when the emerald was regarded as a specific against all fluxes and as an antidote against the plague, pestilential fevers, and the bites of serpents and mad dogs, and when the wearing of diamonds was supposed to take away fears and melancholy, and to strengthen the heart. Then not only the blood and flesh of numerous animals of all classes were medicinally employed, but even the hair, hide, urine and dung of many were prepared in various ways, and supposed to possess often miraculous powers in curing disease. The animal kingdom, it seems, is following the mineral kingdom in its relations to medicine as a source of curative agents, of commodities for the removal or prevention of sickness. Musk and castor are gradually becoming scarcer as the human race penetrates more and more into regions hitherto uninhabited; medicinally, cochineal is now regarded as little more than a colouring matter; cantharides are rarely employed except for their rubefacient and epispastic properties, and isinglass with its chemical cousins, the gelatins, is far more frequently employed in the culinary than in the pharmacial art. It shares in this respect the fate of the remaining organized animal drug, the hen's egg, which human instinct prefers using from the breakfast and supper table, to taking it merely as an emulsionizer of disagreeable oils and oleoresins.

There remains but one important source of crude drugs at the present time, namely, the vegetable kingdom. This is destined, by the laws of nature, to assimilate inorganic bodies, transforming them into organic compounds, and thus preparing food for the beings of higher organization. Plants have been medicinally employed in prehistoric times, and, notwithstanding many which have at times been held in high repute, have, on close scrutiny, been found to possess little or no reliable medicinal powers; still the gaps occasioned by the discarding of some have always been filled up by the discovery of others, more reliable than those which have become obsolete owing to their inefficiency, or from other causes have fallen into disuse. Such drugs are furnished by the torrid zone of our globe in almost innumerable numbers; but the more temperate climes of the Northern and Southern hemispheres make valuable additions to this number, and even the icy regions of the subarctic girdle offer their modest share of vegetable products for the benefit of suffering humanity. And as though the offerings of the older sections of our earth were insufficient to meet the varied demands of modern investigation and increasing wants, the antipodal regions of the Australian continent have of late years begun to add to the already valuable stock; and it is not improbable that this at present rather isolated patch of the earth's surface will, in the course of time, send upon the market of the world many important drugs, which may well be able to compete with such as are now obtained from the abodes of civilization in older continents, or from the unexplored and almost unknown regions of central Africa and Asia.

In endeavouring to present to you a short sketch of the proper domain of materia medica, and to indicate the variations in the boundary lines of this discipline, it cannot be my purpose at this time to follow these changes from step to step, and enumerate examples of admitted and discarded articles of materia medica; it is a curious chapter in the history of the human race, and one well worthy of a critical review. But in it, as in all other relations of the human family, we discover the progressive influence of science, before whose light the darkness of ignorance vanishes, and the fog of superstition and fancy is dispersed.

Most important in its influence upon the development of medicine and the selection of curative agents has been chemistry; that science which deals with the relations of the various kinds of matter to each other, whose labours are influencing the investigations of every other branch of natural science, are felt in numerous trades and manufactures, and are of the utmost importance in their bearings upon every-day life. It is not many years ago, when the brines left after the separation of common salt from saline spring or sea water were without value; to-day, immense amounts of bromine are recovered from them, and this element has not only become an indispensable article in many of the arts, but medicine has also appropriated it for the cure of disease; and its compounds, which but yesterday were chemical curiosities, are to-day met with in every officine, and prescribed by every physician. The oily and tarry products of our gas factories had been valueless for a long time, until chemistry converted some of them into brilliant colours of every shade and hue, which are employed in dyeing various fabrics, in colouring candies and sweetmeats, in making fancy inks, etc. The mother liquor from soap had been a waste product, until uses were found for its most important constituent, and glycerin is now such an indispensable agent in pharmacy and medicine, in the arts and the household, that we may well wonder how civilized mankind could get along without an article which in its natural combinations is daily employed everywhere.

Chemistry has made many inroads upon materia medica, and in consequence of the investigations of the former, many articles of the latter have been placed upon the retired list, and others will doubtless sooner or later follow into deserved obscurity. Acidulous fruit, the sorrels and other refrigerant acidulous drugs, have gradually been retired from active service, or are now in most cases merely doing duty as supernumeraries in medicine; since the pure acids, upon which their virtues depend, are being prepared in large quantities and in a condition fit for long preservation. Since the time when the vegetable alkaloids have been discovered, and the processes for their manufacture were perfected, their employment in medicine has continually increased, and, as a matter of consequence, the corresponding increase in the use of the crude material has been prevented. But chemistry is not content with such results even. By processes of substitution it furnishes new remedies of valuable medicinal properties, which seem to be calculated to take the place, wholly or in part, of older remedies. Chloral, crotonchloral and monobromated camphor are among the latest instances of such innovation, and already chemistry prepares a new way for replacing time-honoured medicines in offering *apo*-derivatives of alkaloids, at least one of which, apomorphia, promises not only to hold its place against tartarized antimony and the various mineral emetics, but it threatens even to supersede such a valuable emetic as ipecacuanha, and to render the fears groundless of the gradual extermination of this plant.

In preparing the drugs for the use of the sick, many manipulations have to be performed intelligently and correctly; to enable the pharmacist to perform this task, it is necessary that he should be versed in the principles of natural philosophy, which also form the groundwork for experimental and applied chemistry. The proper constructions of even the more simple apparatus depends upon the correct application of physical laws, no less than the proper performance of all operations and processes. The pharmacist has to judge of the correct shape and the proper material of his mortars, capsules, flasks and retorts; he must be able to examine the correctness and faultless construction of his prescription balance, and to use the same, be it for ascertaining the direct or the relative weight of substances. He must know the effects of air, light, and heat upon each one of the numerous drugs and preparations of his officine in order to enable him to decide promptly how to keep, how to weight, and how to comminute them; and if intended for exhaustion and concentration, the proper vessels have to be selected, maceration and percolation successfully performed, and afterwards evaporation and distillation, crystallization and oftentimes exsiccation, executed in an expeditious manner, involving the least possible loss of time and material, and guarding against each and all the causes for partial or complete failure or deterioration. And if, in consequence of some unavoidable accident, the preparation does not turn out to be in conformity with the wants of the pharmacopœia, the question may have to be decided—not whether it can be patched up to resemble the article for which it was originally intended, but whether the loss, which would be occasioned by its rejection, may in a measure be avoided, either by recovering the valuable solvent or by converting the preparation into some definite compound, the direct composition and purity of which may be ascertained, so as to leave no doubt as to its identity.

It is partly in consequence of the thin population of some sections of our country, that the wholesale druggist has frequently to perform the same laboratory operations, which should never be neglected by the pharmacist. The two callings resemble each other in so far as the handling of drugs and chemicals is concerned; and this involves all the essential questions of their identity, purity and preservation, and, as stated, frequently also the manipulation of pulverization, exhaustion and concentration. Here the similarity of the two callings ends. It is equally important for the druggist as for the pharmacist to be able to recognize jalap, rhubarb, and opium, to distinguish them from inferior qualities, to ascertain their medicinal value, to preserve them from deterioration, and to convert them into the various galenical preparations. The dealings of the druggist are with the pharmacist, and and as the latter stands in his intercourse with the public between the practising physician and the patient, so does he occupy a similar position with regard to the druggist. It is no excuse for the pharmacist, that the physician has prescribed an unusual dose of a poison; he is not justified to furnish the medicine until he shall have ascertained that the physician has prescribed it knowingly and advisedly. It is likewise no excuse for the pharmacist to have received from the druggist any drug or medicinal substance incorrectly labelled; he is not justified to use or sell the same by virtue of its label, but only after he shall have satisfied himself of its identity and purity. It is notorious that, for some time past, large quantities of muriate of cinchonia have been sold in various parts of the United States as the sulphate of quinia of a well reputed French manufacturer. It would be disreputable for any druggist to knowingly sell this fictitious article; but it becomes a criminal act on the part of a pharmacist if he neglects to ascertain that the quinia he has bought, perhaps ten or fifteen cents per ounce under the regular market price, is, in reality, what it purports to be.

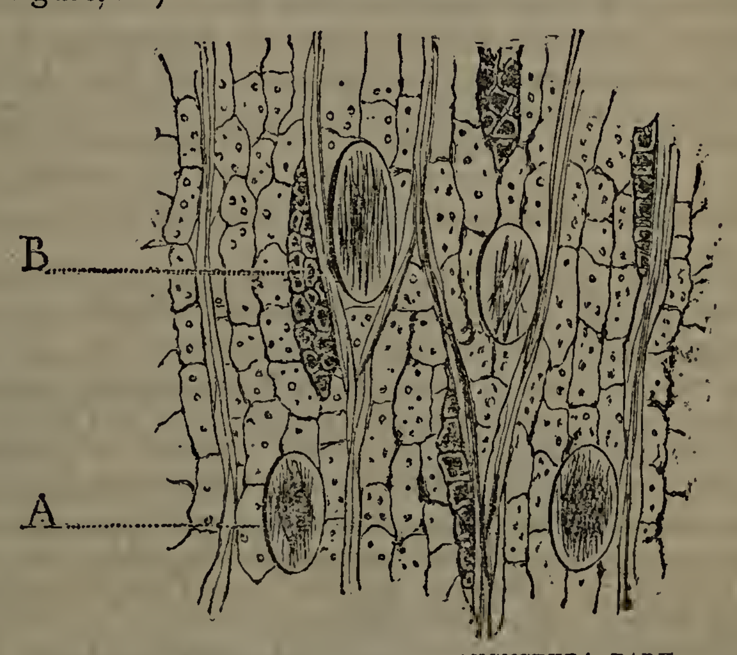
The pharmacist is daily, nay hourly, called upon to perform manipulations and decide upon occurrences which never happen to the druggist. The varied handwritings in prescriptions—often hieroglyphic in form and appearance—the variation in the preparations ordered, the form in which they are exhibited, the doses for adults and infants, the proper methods of combining the prescribed articles, are a few of the incidents which tax the mental faculties of the pharmacist almost incessantly during the business hours. To meet all such difficulties promptly and correctly, it is not merely necessary to know that they may happen. Experience, under correct guidance, is the best, in fact the only reliable teacher in such cases, as in all others requiring mental as well as manual dexterity.

MICROCHEMICAL EXAMINATION OF ANGUSTURA BARK*.

BY P. CAZENEUVE.

The author has been engaged in a microscopical investigation of the physiological characteristics presented by true angustura bark and that of *Strychnos nux-vomica*, and also of the variations in their behaviour when treated with nitric acid. He states that if a transverse section of true angustura bark, cut as thin as possible, be moistened with a little glycerine and examined under the microscope, irregularly scattered groups of much thickened cells will be seen. The false bark, examined under the same conditions, presents two distinct zones of these sclerogenous cells, which are entangled with one another, as may be seen in sections cut in various directions.

The examination may by carried furthur, by taking a very thin tangential section, cut perpendicularly to the medullary rays, placing it upon an object glass, and moistening it with a small drop of distilled water in such a manner that the water overflows the tissue but very slightly when compressed by the upper glass. With a magnifying power of 270 diameters, grains of starch may be seen in the cells of the liber parenchyma; and here and there, in the same tissue, large ovoid cells filled with acicular rhaphides consisting essentially of oxalate of lime. (See figure, A)



TANGENTIAL SECTION OF TRUE ANGUSTURA BARK.
A, Raphides of Oxalate of Lime; B, Cells containing granular matter (Cusparin ?).

There are also groups of rounded cells, the appearance of which recalls the appearance of a perpendicular section of the medullary rays in the woody tissue of dicotyledons in general. These groups of cells (B) contain a granular substance, soluble in alcohol, ether, and acids, and insoluble in alkalis and in water.

If, by means of a glass rod, a drop of nitric acid be applied round the edge of the glass, the acid by capillary action will spread between the two plates of glass to the narrow zone of water which surrounds the tissue. Upon the junction of the two liquids, it will be possible to watch under the microscope the progressive action of the nitric

* Abstract of a paper in the *Répertoire de Pharmacie* for May 10, p. 261.

acid. The oxalate of lime is dissolved, as might be expected. When the granular substance before mentioned, which the author considers to be cusparin, is reached, it melts in each cell, with disengagement of gas, into a reddish liquid, which finally disappears with excess of acid. In the false angustura bark, the action of the nitric acid appears in contact even with the aqueous zone, showing the solvent action of water upon the brucine compound. The colour produced resembles the tint of the hæmoglobin of blood; it spreads rapidly through the tissue, which becomes impregnated with it throughout. By using nitrous vapour upon a perfectly dry section, and avoiding great excess of vapour, which might condense and lead to the diffusion of the colour, the author found that the active principle of the *Strychnos nux-vomica* is contained in the inner liber cells.

If a thin section of the suberous layer of false angustura bark be treated with nitric acid, then dipped in glycerine and afterwards examined under the microscope, it presents rounded cells, empty of contents, and coloured a beautiful green on the sides; this colour is gradually modified and passes definitely to a yellow. The suber of true angustura bark is not modified by the action of nitric acid.

The above-mentioned characteristics of the two barks may be thus summarized: cells containing oxalate of lime are numerous in the true bark, but absent from the false one; the red colouration by nitric acid is localized in the true bark, but general in the false; the suber layer of the true bark is not coloured by nitric acid, whilst that of the false is coloured emerald green.

We are indebted to the kindness of the editor of the *Répertoire de Pharmacie* for the use of the woodcut of the accompanying illustration.

HENNA.

A recent number of the *Belgique Horticole* contains an interesting paper, by M. G. Delchevalerie, upon the henna of the Egyptians, of which the following abstract has appeared in the *Gardeners' Chronicle.*

Two very distinct varieties of the plant are cultivated in Egypt. The first, *Lawsonia spinosa*, differs from *L. inermis* by its very spiny branches and much finer leaves. This is used in making garden hedges; and a fragrant distilled water is prepared from its blossoms. The henna is one of the favourite flowers of the Egyptians, and during its time of blossoming they ornament their rooms with it.

The second form, *L. inermis*, has much larger leaves than the former, and the branches are without spines. It is increased by suckers, and large tracts of ground are closely planted with it under trees in half-shady places. The green stems are cut several times a year, and stripped of their leaves, which are dried and reduced to powder, and thus form an article of commerce under the title of henna powder. The plants, which are cut down almost to the ground, soon throw out fresh shoots, which are cut with a sickle like the first, and the several crops are thus yielded during many successive years.

The culture of henna is easy, and might probably be carried on successfully in Italy and Central France. The variety *inermis* is that which is employed as a dye plant in Egypt. To obtain the flowers the shrub is not pruned, but is allowed to attain the height of two or three metres, when it flowers in the second year. To obtain the colouring principle, however, it is sown or planted very thickly, and the branches are mown as soon as they have reached the height of a metre.

Henna has been in use among the Egyptians from the most ancient times, the leaves having been employed in medicine as well as a cosmetic. The ancient writers mention its astringent and tinctorial properties. Dioscorides mentions it under the name of Cyprus. "The cyprus or ligustrum," he says, "is a tree which bears leaves resembling those of the olive, but longer and softer, and of a greener colour. Its flowers are white and fragrant growing in downy bunches. Its fruit is black, and resembles that of the elder." The name of "cyprus," which the henna formerly bore, doubtless originated from the fact that the Greeks obtained it from the Island of Cyprus, the Cyprians having formerly monopolized the trade in this colouring matter.

Pliny says that the cyprus of the Egyptians is a tree with leaves like those of the zizyphus, seeds like coriander seeds, and white fragrant flowers. The most esteemed and the dearest comes from Canope, on the banks of the Nile; the second from Ascalon in Judæa; and the third (taking them according to the sweetness of their odour) from the Island of Cyprus.

Prosper Alpinus states that invalids procure ease by inhaling the perfume of the flowers of henna, and applying them to the forehead. The Moors, who were well acquainted with this quality, made very extensive use of the flowers for this purpose. The same author says that the natives of Egypt prepared with the leaves a powder called archenda, which was used by the women for dyeing their feet and hands of an orange colour as a means of enhancing their charms. If our women, he adds, would apply this secret to rendering their hair golden they would not need to expose their heads to the heat of the sun and to many other painful methods of ensuring this result. It thus appears that the recent rage for golden hair, like most other fashions, has nothing of novelty to recommend it.

Olivier says that the henna (which the Jews call *hacoper*) furnishes flowers of a penetrating odour, and that an aromatic water was obtained from them by distillation which was employed in baths, and as a perfume in religious ceremonies, such as marriage, circumcision, and the feast of Courban-Bieram. The Jews had also a custom of sprinkling the flowers of henna on the garments of the newly-married.

The ancient Egyptians made use of henna for the purpose of perfuming the oils and unguents with which they anointed the body with a view of obtaining suppleness. They also employed it in embalming, and flowering branches of henna are found in mummy-cases.

Avicenna compares the properties of henna with those of dragon's-blood. He says that its leaves possess the same property of curing ulcers, and that a decoction of them is employed in cases of inflammation and burns, and as a remedy against ulcers of the mouth. Forskal, in his 'Flora of Egypt,' refers to the medical and tinctorial properties of henna. The leaves are dried and reduced to powder, being first mixed with fine sand, which causes them to divide more easily. This powder is used in dyeing, and is an article of considerable commercial importance. It is used in colouring the nails and hands, as also in giving a red tinge to the hair; and it is thus used by old men for dyeing their grey beards. When it is desired to dye the hands with henna, the powder is formed into a paste, and applied during the night. In the morning the hands are washed, and then anointed with oil to give them greater brilliancy. If a browner hue is desired, the juice of unripe acorns is added to the paste.

Bellonias remarks that henna was an important object of commerce among the Turks, who exported it from Alexandria to Constantinople, where the trade in it was considerable. The Grand Seignor, who had a monopoly of this traffic, derived from it annually the sum of 18,000 ducats. At the present day Egyptian henna is largely exported from Alexandria, and, according to the official report, 18,385 cwt. was shipped from this port alone, during the Coptic year 1588 (or 1873), the official value of this quantity being 900,000 piastres.

The colouring principle, which is known as hennotannine, is very abundant in the leaves of henna, and might probably be advantageously used in manufactures. It is still employed by men and women for dyeing the palms of the hands and the nails of the hands and feet of a reddish-orange, the hair and tails of horses and asses are also coloured with it; and it has other uses in Egypt which are of minor importance.

The Pharmaceutical Journal.

SATURDAY, JULY 4, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE IRISH APOTHECARIES' LICENCES BILL.

Upon the second reading of this Bill last Thursday it was referred to a Select Committee, which will afford opportunity for the representation of the various opinions entertained in reference to the proposed measure. As yet we have not heard that the Bill of the Apothecaries' Hall has been introduced into Parliament, but as regards the probability of its success, in case it should come before the House of Commons, it is worthy of notice that it does not seem to command the general support of the Irish Apothecaries, as would appear from the terms of a circular issued on behalf of the Association of Licentiate Apothecaries of Ireland, and bearing the signature of twenty-three apothecaries, located in as many towns in Ireland.

In the drawing up of this circular it seems to have been assumed that the effect of the Pharmacy Bills proposed in regard to Ireland, would be to permit a less educated class than themselves to the same legal rights now enjoyed by apothecaries who, before obtaining their licence, have been compelled not only to have been engaged in practical pharmacy but also to spend four years at professional studies, and pass examinations sufficient to qualify for a licence in medicine. They argue that there would virtually be a disestablishment and disendowment of the existing Irish apothecaries, unfair to them, though it is not contended that the law should continue thus. In fact the circular points out that, although under existing conditions every Irish apothecary *must* undergo this protracted and expensive course of instruction, even to practise pharmacy only, it is the fact that a large number of the licentiate apothecaries do confine their attention entirely to the compounding and dispensing medicines, and are dependent on that business for subsistence.

They therefore seek, in any legislation on the subject, recognition of their vested rights, and compensation from the State for the unnecessary outlay of time, labour, and money to acquire their qualifications in the past, as well as for injury to their interests in the future by the admission of a lower grade of pharmacists to the same privileges, as dispensers of medicine.

It is also suggested that for the future the Apothecaries' Hall in Ireland should grant but one licence, that being a licence to practise pharmacy only. To obtain this license it is suggested that candidates should not be required to attend lectures on, or be examined in, such superfluous subjects as anatomy, physiology, surgery, medicine, or midwifery; but that the standard in subjects essential to a sound pharmaceutical education, such as chemistry, botany, materia medica, pharmacy, etc., should be as high as possible.

Our readers will probably remember that a statement was made some time since, by Dr. Leet, the Registrar of the Irish Apothecaries' Hall, to the effect that there were from twenty-eight to thirty of the most important towns of Ireland, with populations varying from 10,000 to 50,000, where there was no apothecary or other competent person qualified to dispense medicine.* This has long been a common complaint, and it was one of the main reasons assigned for the introduction of some reform of the law relating to pharmacy in Ireland. But the associated licentiate apothecaries dispute the accuracy of this statement. They say that Dr. Leet evidently erred egregiously, since there are not more than sixteen towns in all Ireland whose population (according to the Census of 1861) exceeds 10,000; and they assert, in contradiction of his statement as to the dearth of apothecaries, that in every one of those towns there are a sufficient number of apothecaries for all requirements, so that no inconvenience can arise on that score.

It is further alleged that at present Ireland has no need for Pharmacy Acts, such as those passed in England to promote the efforts of the Pharmaceutical Society of Great Britain towards the raising of the educational standard. It is thought that in Ireland the standard does not require to be raised, but only modified for the future by the omission of purely medical and surgical subjects from the curriculum prescribed.

Especial objection, however, is taken to that clause of the proposed Bill of the Apothecaries' Hall which provides for the registration of persons in business at the time of the passing of the Act, upon their passing a modified examination. It is considered that there is no reason whatever why a druggist in Ireland should not pass through exactly the same ordeal as any other candidate for a pharmaceutical licence; and, on the contrary, it is urged that there is no such dearth of competent dispensers throughout the country as demand the admission of an imperfectly educated class.

Lastly, it i ointed out that druggists have never been legally entitled to dispense medicines in Ireland, and consequently have not entered into business there with such an intention, so that they really do not labour under any disability; and there is, so far, no reason for following the precedent of the English Pharmacy Acts of 1852 and 1868, in regard to chemists and druggists already in business at the passing of those Acts.

A copy of the circular above referred to has been

* See Pharm. Journ., vol. iv. p. 595.

sent to every Irish member of Parliament, together with a letter offering some further remarks on the subject, and requesting them to exercise their vote and influence to secure the objects of the Association of Licentiate Apothecaries of Ireland whenever either of the proposed Pharmacy Acts shall be introduced into Parliament.

CONVERSAZIONE OF THE ROYAL COLLEGE OF PHYSICIANS.

AMONG the scientific *réunions* of the London season the Conversazione of the Royal College of Physicians always holds an honoured place, and we learn from a medical friend that last night's celebration was more than equal to its best traditions.

The President, Sir G. BURROWS, and the Council, received the guests as they arrived; while the "objects of interest" that filled the library were at once varied and attractive. Nearly every department of medico-scientific study, or of antiquarian or artistic interest was represented. Among the former may be mentioned the "Aphloistic Ear-trumpets," contributed by Dr. C. J. B. WILLIAMS; the beautiful and effective "Binocular Microscopes and Anatomical Objects" of Messrs. ROSS and Co.; the hardly less perfect instruments of Messrs. POWELL and LEALAND, Messrs. MURRAY and HEATH, and Mr. BAKER; and the "Cholera-Curves" of Dr. C. MACNAMARA. Among the artistic objects, the contribution of our President, Mr. T. H. HILLS, "the studies of Lions, by the late Sir EDWIN LANDSEER;" the alabaster bust of SCIPIO AFRICANUS, recently found in London; the royal robe, with the diamonds and other precious stones from Coomassie; and the photographs, and specimens of pottery and Wedgwood ware, attracted much attention. Interest of no common kind attached to Sir W. FERGUSSON's contribution of the "Cast of the Left Humerus of Dr. LIVINGSTONE, showing the false joint consequent on the bite of a lion, whereby the body was identified. Some plans of model dwellings for the industrial classes in town and country gave gratifying proof of the advances recently made in one of the first conditions of public health and social regeneration. The international ice manufacturing company exhibited a drawing of the Apparatus for the manufacture of ice by steam power, with samples of ice so made,—an article to which the proverbial heat of London reception-rooms gave a more than theoretical interest.

The number of guests appears to have been unusually large, affording opportunity for many pleasant *rencontres* between professor and pupil, college companions long separated by time and space, and members of other departments of the healing art besides the physician proper.

THE ALLEGED ADULTERATION OF SCAMMONY.

IT will be remembered that at the close of the case of an alleged adulteration of scammony, which was dismissed by Mr. VAUGHAN, the magistrate sitting at the Bow Street Police Court on the 17th June,* the hearing of two other cases was adjourned for a fortnight. When these cases were called in Court on Wednesday last neither prosecutor nor defendants answered, and it would therefore appear that the cases are abandoned. If this be the case, the course was resolved upon at the last moment, since, in reply to an application at the office of the Strand Board of Works on the previous day it was stated that the prosecution was to go on.

* PHARM. JOURN., June 20th, p. 1020.

THE PRESCRIBING OF "PATENT MEDICINES."

SPEAKING of the recent action for libel in connection with the supply of a "fever tincture" to the Government, for use on the Gold Coast, the *Medical Times and Gazette* says,—

"We only refer to this case to deplore the custom of, in a certain sense, compelling medical men to have recourse to secret and unknown remedies for the treatment of disease when such a complete collection of well-known and well-tried medicines is available for the physician's use. The result of this practice, however, appears to be, that on the outbreak of a war such as that which has happily just terminated on the Gold Coast, a well-intentioned but hurtful pressure is brought to bear on the authorities; and, in deference to the strongly urged suggestions of its advocates, a secret remedy (of the composition of which the medical officer who is to employ it knows nothing) is sent out to be tried upon our sick soldiers, though we should fancy few medical men of the present day in civil practice would care to avail themselves of its services. In the present case, moreover, the testimony of the lamented Dr. LIVINGSTONE was adverse to the efficacy of this nostrum, though supported by high medical authority, as a remedy for the treatment of African fevers. In one of his books of travel, the Doctor states that on the recommendation of a friend he had tried it, and found the result unsatisfactory.

"With a comprehensive British Pharmacopœia, periodically revised by the most competent men of the time, we trust that the day of nostrums and secret remedies will soon pass away for good, and that the progressive enlightenment of the people generally will eventually conduce to their utter extinction."

It may also be mentioned that whilst Dr. HASSALL was under examination by the Select Committee on the Adulteration Act he was incidentally asked what he thought of the sale of "patent medicines." He replied that "patent medicines" were patent evils, since they were prescribed as secret remedies by persons ignorant of their composition; and whilst in some cases they might do good, it was quite probable that in many cases they did harm.

ENGLISH MEDICINE SEEN THROUGH CHILIAN SPECTACLES.

LAST week we had the opportunity of putting before our readers the opinion of a South American pharmaceutical authority upon English pharmacy. The *Times* telegrams of Monday last enable us to supplement this with a view of English medicine from the same quarter of the globe. It appears that the British Minister at Santiago has been making complaints that English physicians are prevented from practising in Chili. To this the Dean of the Medical Faculty in Chili has replied that the medical knowledge imparted in England is greatly inferior to that required before the degree of Doctor of Medicine could be acquired in Chili, and that it would, therefore, be unjust to allow British physicians to practise with less competence than was required from Chilian physicians. Whether this be the voice of self-interest, self-satisfaction, or conscious superiority, we are glad that neither of these elements operated to produce so harsh a criticism of English pharmacy from the neighbouring country.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, July 1st, 1874.

MR. T. HYDE HILLS, PRESIDENT, IN THE CHAIR.

MR. A. BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Greenish, Hampson, Owen, Radley, Robbins, Sandford, Savage, Shaw, Stoddart, Sutton, and Williams.

The minutes of the previous meeting were read and confirmed.

THE INAUGURAL ADDRESS IN OCTOBER.

The SECRETARY read a letter from Mr. R. Giles, of Clifton, accepting the invitation of the Council to deliver the address to the students in October next.

THE BRITISH PHARMACEUTICAL CONFERENCE.

The PRESIDENT read a letter from Mr. Carteighe, thanking the Council, on behalf of the sub-committee of the British Pharmaceutical Conference for their offer to make arrangements for a Conversazione, and stating that the fifth of August appeared to be the most suitable evening for the purpose. It was resolved accordingly that the Conversazione be held on August 5th.

The President, Vice-President, Mr. Sandford, and Mr. Williams, were appointed a Committee to make the necessary arrangements for the reception and entertainment of the members of the British Pharmaceutical Conference in August next, and also to arrange for the Conversazione to be held on the same occasion.

DIPLOMAS.

The following, being registered as Pharmaceutical Chemists, were respectively granted a diploma, stamped with the seal of the Society :—

Cortis, Arthur Brownhill.
Feaver, John.
Luff, Arthur Pearson.
Smith, John Jacob.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

David, John ....Kenfig Hill.
Harvey, John William............Croydon.
Luff, Arthur Pearson ....South Kensington.
Smith, John Jacob ....Islington.

Chemists and Druggists.

Gossop, George Kennington ...Great Grimsby.
Rowell, Robert ....South Shields.

ASSOCIATES.

The following, having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society.

Minor.

Gardiner, William Eustace......Peckham.
Lyon, James ....Kingsland.

Modified.

Evans, Gomer ....Bala.

The following, having passed the Minor Examination, were elected "Associates" of the Society :—

Billinge, Mark ....Hyde.
Bulcock, Joseph Henderson......Clitheroe.
Burley, William ....Edinburgh.
Cooper, Henry.......................London.
Davey, John Trimble ....Exeter.
Draper, James William ....Malmesbury.
Dunlop, Thomas Hall.............Newcastle-on-Tyne.
Durnford, John.......................Maidstone.
Gardiner, Bruce Hubert John...London.
Gradidge, William Ivimey........Andover.
Hammond, William Henry......Northampton.
Heslop, George.......................Newcastle-on-Tyne.
Husband, John Cecil..............Berwick.
Lee, Joseph...........................Southport.
Mac Farlane, Peter.................London.
Pechey, Thomas Pollard..........Birkenhead.
Phillips, James Wilson............Broadstairs.
Ridley, Edward Henry............Manchester.
Riley, Charles Reynolds ... .London.
Shaw, William Burton............Scarborough.
Stevenson, Henry Ernest.........Southport.
Strickland, Robert Brewster.....Manchester.
Tame, Thomas.......................Oxford.
Thompson, Charles.................Bedworth.
Walter, George William.........Horncastle.
Wheatly, Arthur William ......Thame.
Winn, John Christopher ....Darlington.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary Examination, were elected "Apprentices or Students" of the Society :—

Axford, John William.............Coventry.
Campbell, Robert Saul........... Manchester.
Cleminson, John Hetherington Beverley.
Cocker, Justus John.. ....Over Darwen.
Hall, Edwin ....Horncastle.
Hallawell, William..................Manchester.
Heaton, Wilmer Everard.........Colne.
Holmes, Alfred John.............Preston.
Larder, Herbert ....Horncastle.
Parker, Thomas ....Preston.
Sadler, William......................Margate.
Smithurst, John......................Nottingham.

Several individuals who had neglected to pay their subscriptions in proper time were ordered to be restored to their former status on payment of the subscription for the current year and a fine equal to half the amount.

THE PRELIMINARY EXAMINATION.

The SECRETARY reported that, in consequence of the large number of candidates coming up for the Preliminary Examination, he had made inquiries as to getting accommodation elsewhere, and found that, if desired, the examination hall of the Incorporated Law Society, in Chancery Lane, could be obtained at an expense of ten guineas each examination. Several members expressed a strong opinion that it was very undesirable to hold the examination away from the Society's own House unless absolutely unavoidable ; and, after some discussion, it was referred to the House Committee to make such arrangements, and incur whatever expense might be necessary, for the purpose of the examination, authority being given to close the Library on that day if necessary.

FINANCE.

The report of this Committee, recommending the payment of various accounts and salaries, was received and adopted.

BENEVOLENT FUND.

This Committee had met and considered several applications for relief; and they recommended the following grants to be made :—

To the widow of a registered chemist and druggist, residing in London, aged 57, £10.

To a registered chemist and druggist at Halifax, aged 60, who was a member of the Society from 1841 to 1872, now an invalid and unable to attend to business, £10.

The name of Mary Ann Dodd, of London, and that of Thomas Parker, of Halifax, were ordered to be put on the list of "approved candidates for annuities."

Two other cases were deferred for further investigation.

Some discussion arose as to the desirability of adding fresh names to the already published list of approved candidates, but the general opinion appeared to be that all eligible candidates should be placed upon the list, and the report and recommendations of the Committee were therefore adopted.

Mr. Radley suggested that, in future, the list of approved candidates should not be published until complete, in order not to give one candidate an advantage over another. He therefore moved, and Mr. Owen seconded—

"That the regulations of the Benevolent Fund be reconsidered by the Benevolent Fund Committee."

Mr. Hampson said he should like to know what required reconsideration before voting for this resolution.

Mr. Shaw suggested that any such action should be deferred until after the approaching election.

The President said there could be no harm in the Committee reconsidering the regulations and reporting to the Council.

The Vice-President suggested that the Committee should report in November, and with this addition the motion was agreed to.

Mr. Owen reported that he had been successful in his efforts to obtain the election into the London Orphan Asylum of one of the children of Mrs. Stockman, towards which purpose £20 was recently voted from the Benevolent Fund. He desired to add, in order to show that the wholesale trade were ready to assist any real case of distress, that Messrs. Baiss Brothers had come forward and given him £20 for the same purpose.

Library, Museum, and Laboratory.

The Committee recommended the purchase of the following books for the use of the Library:—

Smith's 'Pharmaceutical Guide,' 2nd Edition.
Waring's 'Therapeutics.'
Parrish's 'Practical Pharmacy,' 4th Edition.
Dr. J. C. Thorowgood's 'Students' Guide to Materia Medica.'
Pettigrew's 'Physiology of the Circulation in Plants, in Lower Animals, and in Man.'
Babington's 'British Botany,' 7th Edition.
Notcutt's 'Handbook of British Plants.'
Mohr's 'Commentar zur Pharmacopœa Germanica.'
Wanklyn's 'Water Analysis,' 3rd Edition.
Black's 'General Atlas,' last Edition.

The Librarian had reported that, from May 13th to June 17th, he had issued 48 vols. to the provinces under the recent regulation; that the average attendance in the Library had been 18 in the day, and 5·38 in the evening. Professor Bentley had reported that there were 43 pupils attending his special class at the Botanical Gardens; Professor Redwood, that there were 26 Students in his class; and Professor Attfield, that there were 33 pupils now at work in the Laboratory.

A letter had been received from Professor Attfield, stating that the Chemical Society proposed advertising their Journal in several periodicals, and suggesting that the Pharmaceutical Society would be doing a graceful act in inserting such an advertisement gratuitously. The Committee, therefore, recommended that one advertisement per month be inserted for six months, not exceeding a quarter of a column in length, provided space could be found for it.

The Secretary reported that about fifty original letters from the late Dr. Pereira to Dr. Guibourt, of Paris, had been presented to the Society by the late Dr. Guibourt. The Committee recommended that these letters be carefully bound and placed in the Library.

The report and recommendations of the Committee were received and adopted.

Female Students.

The Committee had also before it a letter from Professor Attfield, stating that two lady students who were attending the classes of his colleagues, asked permission to attend the Laboratory. They were already devoting a good deal of time to study in the British Museum, and were desirous of working for some time in the laboratory; to which, after giving due consideration to the subject, he saw no reason to object, if the Council were willing.

Mr. Hampson then moved:—

"That the reply to Professor Attfield's letter be to the effect that this Council has no objection to his receiving lady students in the Laboratory, and that the House Committee be requested to make the necessary arrangements."

His views upon this question were so well known, that he would not trouble the Council with many words upon it. They had already admitted ladies to the classes of the other Professors, the Act of Parliament admitted them also to examinations, and now the two ladies applied to be enabled to obtain the best instruction in practical chemistry, which would fit them for passing their examinations. He believed this course was really of more value than almost any other, inasmuch as it brought them face to face with principles and chemical conditions, and it was now for the Council to consider whether they should refuse them admission. He thought, to be consistent, this could not be done, as the applicants had already been admitted to the lectures. Remembering also that they were empowered by Act of Parliament to examine ladies, they ought to give in that institution equal opportunities for obtaining the requisite knowledge. It was simply a matter of justice and fair play, which he hoped would be conceded.

Mr. Greenish seconded the motion, saying he thought it was really a question for Professor Attfield, under whose management the Laboratory was placed; and as Professor Attfield saw no difficulty, he did not think the Council should interfere. There was only one question which the House Committee would have to consider, namely, making certain requisite arrangements.

The Vice-President said he did not desire to oppose Mr. Hampson's view, but he asked him to withdraw the latter part of the resolution, authorizing the House Committee to make the necessary arrangements, because it was just possible that such arrangements as they could make, would not be satisfactory; and if lady students were to be admitted to the Laboratory it would be well perhaps at the commencement of the ensuing session to make such provision for them as would be creditable to the Society.

Mr. Hampson said he had no objection to withdraw the latter part of the resolution.

Mr. Sandford thought that such an important matter ought not to have been brought forward without notice having been given. It would entirely contradict the resolution to which the Council came some time ago—not to admit ladies to the laboratory—which was a very different thing to admitting them to the lecture-room. He happened to know that Mr. Brown, who was not present that day, agreed with him in that, and in thinking that having ladies in the laboratory would be a source of mischief; there was not proper accommodation for them. When Professor Attfield mentioned the matter, he said he had found a room which would answer the purpose of a retiring room, but in so doing he thought the Professor had gone rather beyond his province. It had been decided that ladies should not be admitted as members of the Society, and when the question came before the General Meeting, the opinion was overwhelmingly against it, and even against encouraging them to enter the trade at all. For his own part he felt that it was not a fit vocation for women, as they were exposed to certain things which he should be extremely sorry that any woman in whom he felt an interest should be exposed to. He hoped, therefore, the motion would be refused.

Mr. Savage said that as Professor Attfield saw no objection to the ladies being admitted, and he for one quite coincided with him, he thought they ought to accede to his application. It was a matter of some importance, and although two years ago certain resolutions were passed, there had been a great deal of progress since then. As far as the accommodation was concerned, that was for the ladies themselves to consider. His opinion was that they would be a restraining influence on the young men, and that their presence would be productive of great benefit.

Mr. OWEN said it was only a question of time, they must come round to it at last. Still he thought that notice of motion should be given.

Mr. HAMPSON said a reply was required to the letter of Professor Attfield, or he should not have brought it forward; indeed, he knew nothing of the matter until the previous day.

Mr. BETTY objected to the way in which this question was brought forward; a side issue being raised on a letter, of which no previous notice had been given, thus taking the Council rather by surprise. He did not think they ought to be called upon suddenly in that manner to give a reply to a letter on such an important question. If it came before them in a more regular way, no doubt it would be received more favourably; and he would, therefore, suggest to Mr. Hampson to withdraw the motion for the present, and let the matter of the admission of ladies come before them in a legitimate and fair manner for discussion and decision. He would not speak on the merits of the question at present, but, personally, he should wish to vote that the ladies be admitted and that the professor be not restricted in the selection of his pupils.

Mr. SUTTON thought, as a matter of order, Mr. Betty was quite right, though he felt very strongly that the application in itself was right and proper.

Mr. WILLIAMS said Professor Attfield brought this question forward at the fag end of a Committee meeting, and really desired the Committee to consent to his admitting the ladies into the laboratory without bringing the matter before the Council at all. The Committee, however, declined such a responsibility, and requested the Professor to submit the matter to the Council. It appeared to him they could only refuse the application at present, whatever course might be pursued hereafter.

Mr. BAYNES also urged Mr. Hampson to withdraw the motion, seeing that no great injustice could be done, as only about one month's instruction could be obtained by these applicants during the present session.

Mr. HAMPSON said it was true he had not given notice of motion in a formal manner, and he was rather gratified to find that the application came in the ordinary way, without raising the whole question and unduly enlarging it. He thought, coming in the way it did, it simply showed it was a *bonâ fide* application to receive instruction, and that the Council would have been disposed to listen to the application, rather than require a formal notice of motion to be given for reopening a question which had been considered so startling. However, he would rather withdraw the motion than lose it, because he believed there was a great principle of fairness and impartiality involved in it. He would, therefore, withdraw it for the present, and give notice of motion to bring it forward on a future occasion.

Some discussion then ensued, as to what reply should be sent to Professor Attfield.

Mr. WILLIAMS moved, and Mr. BETTY seconded the following motion:—

"That Dr. Attfield be informed that the Council cannot, under the present arrangements, agree to the reception of lady students in the Laboratory of this Institution."

To this an amendment was moved by Mr. SAVAGE, and seconded by Mr. HAMPSON:—

"That the further consideration of admitting ladies to the Laboratory be postponed, and, in answer to Dr. Attfield's letter, he be informed of the fact."

The amendment being put to the vote, the following was the result:—

For—Messrs. Baynes, Greenish, Hampson, Owen, Savage, and Sutton.

Against—Messrs. Atherton, Betty, Radley, Robbins, Sandford, Shaw, Stoddart, and Williams.

The President and Vice-President were present, but did not vote.

The amendment was therefore lost, and the motion was then put and carried.

LAW AND PARLIAMENTARY.

The report of this Committee stated that they had received copies of the Apothecaries' Licences Bill, and the Pharmacy Bill for Ireland proposed by the Apothecaries' Company of Ireland. The first Bill would extend some of the powers of the Pharmacy Act to Ireland, and enable the Pharmaceutical Society to appoint a Board of Examiners in that country. The Committee recommended that these bills be carefully watched; and the Secretary now reported that the first named Bill had been referred to a Select Committee of the House of Commons.

The Committee had also had laid before it certain correspondence from the Society's Solicitor, in which he narrated his failure to obtain sufficient evidence to enable him to commence proceedings against a person who was alleged to have contravened the provisions of the Pharmacy Act.

The report was received and adopted.

HOUSE.

The report of this Committee dealt principally with estimates which had been obtained for doing certain painting, etc., to the Society's premises. It was received and adopted, and the necessary work ordered to be proceeded with.

APPOINTMENT OF PROFESSORS, ETC., FOR THE ENSUING YEAR.

Professor Redwood was re-appointed Professor of Chemistry and Pharmacy.

Professor Bentley was re-appointed Professor of Botany and Materia Medica.

Professor Attfield was re-appointed Professor of Practical Chemistry.

Mr. Holmes was re-appointed Curator of the Society's Museum.

LOCAL SECRETARIES.*

The following gentlemen were appointed Local Secretaries for 1874-75, in the towns to which their names are appended:—

Aberdare	Thomas, Watkin Jones.
Aberdeen	Davidson, Charles.
Abergele	Ellis, William.
Aberystwith	Davies, John Hugh.
Abingdon	Smith, William.
Altrincham	Holt, William Henry.
Andover	Madgwick, William B.
Ashby de la Zouch	Johnson, Samuel E.
Ashton-under-Lyne	Bostock, William.
Aylesbury	Turner, John.
Banbury	Linnett, Samuel S.
Banff	Ellis, Bartlet.
Bangor	Griffiths, John E.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow in Furness	Steel, Thomas.
Basingstoke	Sapp, Arkas.
Bath	Pooley, John Carpenter.
Bedford	Cuthbert, John M.
Belper	Ashton, John.
Berwick	Carr, William Graham.
Beverley	Hobson, Charles.
Bewdley	Newman, Robert.
Birkenhead	Nicholson, Henry.
Birmingham	Southall, William.
Blackburn	Pickup, Thomas Hartley.
Blandford	Groves, Wellington E.
Bodmin	Williams, Joel Drew.
Bolton	Dutton, George.
Boston	Marshall, Robert.
Bradford (Yorkshire)	Rimmington, Felix W. E.

* Local Secretaries are appointed in all towns in Great Britain which return a Member or Members to Parliament, and in such other Towns as contain not less than Three Members of the Society or Associates in business.

Brecon	Meredith, John.
Bridgnorth	Deighton, Thomas Milner.
Bridlington	Forge, Christopher.
Bridport	Tucker, Charles,
Brighton	Gwatkin, James Thomas.
Bristol	Stoddart, William W.
Buckingham	George, Sirett.
Burnley	Thomas, Richard.
Burslem	Blackshaw, Thomas.
Bury St. Edmunds	Portway, John.
Buxton	Barnett, Alexander.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Cross, William.
Cardigan	Jones, John Edwards.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard M.
Carnarvon	Jones, John.
Chelmsford	Baker, Charles Patrick.
Cheltenham	Smith, Nathaniel.
Chester	Grindley, William.
Chesterfield	Greaves, Abraham.
Chichester	Long, William Elliott.
Chippenham	Westlake, Bernard.
Christchurch	Green, John.
Cirencester	Mason, Joseph W.
Cockermouth	Bowerbank, Joseph.
Colchester	Manthorp, Samuel.
Congleton	Goode, Charles.
Coventry	Wyley, John.
Crewe	McNeil, James Norton.
Darlington	Robinson, Alfred Francis.
Deal	Green, John.
Denbigh	Edwards, William.
Derby	Frost, George.
Devizes	Portbury, George Henry.
Devonport	Dickerson, Henry.
Dewsbury	
Diss	Gostling, Thomas Preston.
Doncaster	Dunhill, William W.
Dorchester	Evans, Alfred John.
Dorking	Clift, Joseph.
Dover	Bottle, Alexander.
Droitwich	Taylor, Edmund.
Dudley	
Dumfries	Allan, William.
Dundee	Hardie, James.
Durham	Sarsfield, William.
Eastbourne	Provost, James A.
Edinburgh	Mackay, John.
Elgin	Robertson, William.
Evesham	Dingley, Richard Loxley.
Exeter	Delves, George.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, W. F.
Fareham	Franklin, Alfred.
Flint	Jones, Michael.
Folkestone	Cadman, Daniel Charles.
Frome	Harvey, William Brett.
Gainsborough	
Gateshead	Elliott, Robert.
Glasgow	Kinninmont, Alexander.
Gloucester	Curtis, A. A.
Gosport	Hunter, John.
Grantham	Gamble, Richard.
Gravesend	Smith, Geo. Mason.
Greenock	Fraser, Charles.
Grimsby, Great	Palmer, Enoch.
Guernsey	Arnold, Adolphus.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Jones, Charles.
Harrogate	Davis, Richard Hayton.
Hartlepool, West	Jackson, William G.

Harwich	Bevan, Charles F.
Hastings & St. Leonards	Jameson, William Edward.
Haverfordwest	Williams, William.
Helston	Troake, Marler Hamilton.
Hereford	Jennings, Reginald.
Hertford	Lines, George.
Heywood	Beckett, William.
Hirwain	George, John Evan.
Hitchin	Ransom, William.
Horncastle	Elsey, John.
Horsham	Williams, Philip.
Huddersfield	King, William.
Hull	Bell, Charles Baines.
Huntingdon	Provost, John Pullen.
Inverness	Galloway, George Ross.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John, jun.
Kendal	Severs, Joseph.
Kidderminster	Hewitt, George.
Kilmarnock	Borland, John.
King's Lynn	Atmore, George.
Knaresborough	Sindall, John William.
Knutsford	Silvester, Henry Thomas.
Lancaster	Wearing, William.
Launceston	Eyre, Jonathan Symes.
Leamington	Jones, Samuel Urwick.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Cooper, Thomas.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Davis, David Frederick.
Lewes	Martin, Thomas.
Lincoln	Maltby, Joseph.
Liskeard	Eliott, Samuel.
Liverpool	Abraham, John.
Loughborough	Paget, John.
Louth	Hurst, John B.
Ludlow	Cocking, George.
Lyme Regis	Thornton, Edward.
Lymington	Allen, Adam U.
Macclesfield	Bates, William Isaac.
Maidenhead	Walker, Robert.
Maidstone	
Maldon	Wallworth, David.
Malmesbury	Brown, Francis James.
Malton	Hardy, George.
Malvern, Great	
Manchester, etc.	Wilkinson, William.
March	Davies, Peter Hughes.
Margate	Knight, Alfred.
Market Harborough	Bragg, William B.
Marlow	Foottit, Charles Miller.
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Robson, James Crosby.
Montrose	Burrell, George.
Neath	Hibbert, Walter.
Newark	Harvey, John.
Newbury	Davis, Frank Pratt.
Newcastle-under-Lyme	Cartwright, William.
Newcastle-on-Tyne	Proctor, Barnard S.
Newport (I. of Wight)	Orchard, Herbert Joseph.
Newport (Mon.)	Pearman, Henry.
Newtown	Owen, Edward.
Northallerton	Warrior, William.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Atherton, John Henry.
Nuneaton	Iliffe, George.
Oldham	Hargreaves, Henry Lister.
Oswestry	Smale, Richard Bill.
Over Darwen	Hargreaves, William Henry.
Oxford	Prior, George T.
Paisley	Hatrick, William.
Pembroke	John, David William.
Pembroke Dock	Andrews, Charles.

Penrith	Kirkbride, William.
Penzance	Cornish, Henry Robert.
Perth	Dandie, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Balkwill, Alfred P.
Pocklington	Cundall, Robert.
Poole	Penney, William.
Portsmouth, etc.	Rastrick, J. L.
Preston	Hogarth, William.
Ramsgate	Morton, Henry.
Reading	Hayward, William G.
Redditch	Mousley, William.
Reigate	Forbes, William.
Retford	Baker, William.
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Colley, John.
Rochdale	Taylor, Edward.
Rochester	Harris, Henry William.
Rothesay	Duncan, William.
Runcorn	Whittaker, William.
Rugby	Garratt, John C.
Ruthin	Bancroft, John James.
Ryde (Isle of Wight)	Wavell, John.
Rye	Plomley, James F.
St. Albans	Martin, Henry Gilham.
St. Andrews	Govan, Alexander.
St. Austell	Hern, William Henry.
St. Ives (Cornwall)	Young, Tonkin.
Salisbury	Atkins, Samuel Ralph.
Scarborough	Whitfield, John.
Selby	Colton, Thomas.
Shaftesbury	Powell, John.
Sheerness	Rayner, William.
Sheffield	Wilson Edward.
Shepton Mallet	Cottrill, Gilbert Jones.
Shields, North	Williamson, James.
Shields, South	Mays, Robert J. J.
Shipley	Dunn, Henry.
Shoreham	Barker, John.
Shrewsbury	Cross, William Gowen.
Skipton	Foxcroft, Elijah.
Slough	Griffith, Richard.
Southampton	Dawson, Oliver R.
Southport	Walker, William Henry.
Spalding	Rhodes, Frank.
Stafford	Averill, John.
Stalybridge	Brierley, Richard.
Stamford	Patterson, George.
Stirling	Duncanson, William.
Stockport	Lowndes, Hervey.
Stockton-on-Tees	Brayshay, William B.
Stoke-on-Trent	Adams, Jonathan Henry.
Stourbridge	Bland, John Handel.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Blake, William F.
Sudbury	Harding, James John.
Sunderland	Nicholson, John J.
Swansea	Brend, Thomas.
Tamworth	Allkins, Thomas Boulton.
Taunton	Prince, Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Walkinton, Wm. Marmaduke.
Tewkesbury	Allis, Francis.
Thirsk	Thompson, John.
Tiverton	Havil, Paul.
Tonbridge	Wibmer, Lewis Michael.
Torquay	Smith, Edward.
Truro	Serpell, Samuel.
Tunbridge Wells	Howard, Richard.
Ulverstone	Radnall, William Henry.
Uttoxeter	Johnson, John Borwell.
Wakefield	Taylor, John.
Wallingford	Payne, Sidney.
Walsall	Highway, Henry.
Wareham	Randall, Thomas.
Warrington	Woods, Joseph Henry.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wellington	Langford, John Brown.
Wells	Manning, Richard James.
Westbury	Taylor, Stephen.
West Bromwich	Pershouse, Edward.
Weston-super-Mare	Rich, Thomas.
Weymouth	Groves, Thos. Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wigan	Dunsford, Samuel.
Winchester	Powell, Edward.
Windsor	Russell, Charles J. L.
Wolverampton	Brevitt, William Yates.
Woodstock	Sant, George.
Worcester	Witherington, Thomas.
Worthing	Coitis, Charles.
Wrexham	Edisbury, James Fisher.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, Wm. Sheppard.
York	Davison, Ralph.

The British Pharmacopœia.

Mr. Hampson, in accordance with notice of motion, moved as follows :—

"That this Council respectfully urges upon the General Medical Council the desirability of having appointed a Joint Pharmacopœia Committee of Physicians and Pharmacists, for the purpose of preparing any future edition of the British Pharmacopœia, or preparing any further Addendum to the present issue.

"This Council also suggests that it would be an equitable and desirable arrangement, if the Council of the Pharmaceutical Society were to nominate the Pharmaceutists on the proposed Joint Pharmacopœia Committee."

He said that for a considerable time before the recent excitement took place, which culminated in the reading of a certain paper at one of the evening meetings, he had formed a strong opinion upon this subject, and had come to the conclusion that the Society occupied a very anomalous position with regard to the Pharmacopœia. He felt that he was treading upon rather delicate ground, and that he was under some responsibility in introducing this subject, because medical gentlemen were as much concerned in the matter as himself ; but still he felt persuaded it might be treated in such a manner that no one's feelings could be hurt by it. He was exceedingly desirous that the relations between the medical profession and themselves should be most cordial ; but they had a duty to perform in this matter, and they ought not to shrink from it. The Society represented Pharmacy, and it was their duty when a subject of this sort came forward, to speak out plainly their convictions. Some twenty or twenty-five years ago it was the function of the various colleges to prepare Pharmacopœias, and in so doing they received assistance from pharmacists then living. Since then, however, a great development had taken place in pharmacy, partly in consequence of increased activity in the trade and partly from legislation. It was only necessary to refer to the character of their own examinations, and to the proceedings of the Pharmaceutical Conference, to show what a development had taken place in pharmacy, and he considered the time had come when pharmacists ought to take an equal place on the Pharmacopœia Committee. At the same time it would be absurd for pharmacists to interfere with the medical part of the question, such, for instance, as determining doses or what medicines should be admitted; but it being their duty to be acquainted with practical pharmacy, they were in a better position than medical men to frame the processes of a Pharmacopœia. His proposition therefore was, that there should be a joint Committee, consisting partly of medical men and partly of practical pharmacists, who should have an equal voice and an equal legal responsibility in the matter. Their present position was eminently unsatisfactory, and pharmacy was not yet recognized as it ought to be. When the British Pharmacopœia was prepared, the Society had been requested to *assist*, but not as principals, and that was the position he maintained they ought to fill. They were in this respect far behind all Continental nations, where pharmacists met physicians on equal terms and took part in the formation of the national Pharmacopœias. Without going at all into details, he was quite prepared to maintain that neither the Pharmacopœia nor the Addendum was satisfactory, and this was of the more importance, because the Pharmacopœia when published was virtually the law of the land. By their own Act of Parliament they were bound to make preparations according to the formularies of the British Pharmacopœia, which was an unfair position to place them in, when some of the processes where known not to be practicable. As had been shown in the recent scammony case, the Pharmacopœia was accepted as the standard, but in some cases that standard might be put too high, and thus the honest trader might suffer. He would say, in conclusion, that he wished the resolution to be simply an expression of opinion, and as such it would have some weight on the future action of the Medical Council.

Mr. Greenish, in seconding the motion, said this was one of the most important matters that could be brought before the Council, and the question really divided itself into two parts, whether they ought to be more fully represented on the Pharmacopœia Committee, and secondly, whether this was the proper time to move in the matter. In the first place, he thought no one could take the British Pharmacopœia, leaving the Appendix out of the question, and consider it satisfactory. He had written to M. Soubeiran, of Paris, who informed him that the French Codex was framed by a mixed Committee of medical men, botanists, and pharmacists. He had ascertained also that in Belgium there was a mixed Committee of medical men and pharmacists; in Holland the Committee was composed of four pharmacists, two botanists, one chemist, and two medical men; and in Austria, pharmacists were groaning under something like the same difficulty as their English brethren, but they were not contented, and were endeavouring to make an alteration. In North Germany, he heard from Dr. Carl Schacht that the Committee for the last Pharmacopœia was composed of five pharmacists, two professors of chemistry, one of botany and pharmacognosy, one of pharmacy, and three medical men; and he thought some such arrangement as that was more likely to result in a good work being produced. On the second point, whether this was the proper time to move in the matter, he thought, as the Appendix had just been issued, and considerable attention had been drawn to the matter, they might very well go to the Medical Council and present their claim to be more fairly represented.

Mr. Savage doubted whether it was desirable to urge this proposition further at the present time. Their relations with the medical profession had hitherto been those of amity and kindness, and he should be sorry to do anything to cause an alteration. At one time the medical men did this work entirely by themselves; more recently they had taken into their councils one of the professors of the Society, who had consulted some leading pharmacists, and he thought it would be better to let things go on quietly, and trust to the spontaneous action of the Medical Council, without exciting any feeling of jealousy on their part.

Mr. Betty said if anything was necessary to convince him of the wisdom of Mr. Hampson's resolution, the remarks of Mr. Savage would have done so. The very fact that the medical profession had done something, showed that they were alive to the necessity and importance of it; and it was only in accordance with their own dignity as pharmacists, to say openly that they claimed to have an official position on the Pharmacopœia Committee. No doubt it was done with the best motives, but the semi-private way in which the recent Addendum was sent to a few pharmacists was not consistent with the best interests of the Society, nor with the position of pharmacy in England. If the thing were to be done at all, it ought to be done in the proper way by the Society.

Mr. Williams said this was a very delicate question. It was the function of the Medical Council to appoint a Pharmacopœia Committee, which should have the exclusive right of saying what should be included in the Pharmacopœia and what not. At the same time, he thought their Society should have the power of appointing a sub-committee as a right, rather than as a matter of favour, who should be responsible for the accuracy of the processes, and the tests and characters of the various drugs and preparations enumerated. But he was not certain they would not be taking upon themselves a responsibility which might not always be pleasant, because they would, perhaps, meet with blame which now rested upon other shoulders. Manufacturers, when applied to for the best method of producing certain preparations, very naturally declined to give them, and the members of the Committee would be therefore left to their own devices to find out the best processes they could. In doing so they would not be always successful, and any members of the Pharmaceutical Society who might hereafter be placed on such a Committee would perhaps find themselves in a very difficult position. Still, he thought an important principle was involved; and that they should, as a Society, ask the Medical Council to accord them this privilege, especially seeing that they were bound, under the Acts of Parliament, to take the Pharmacopœia as their standard, and they therefore ought to have some voice in its formation. To give one instance, in the new Addendum, acetic ether was given with a sp. gr. of ·910, at which, as far as his experience went, it could not practically be made by following the directions given in the Pharmacopœia.

Mr. Shaw said this was a very delicate matter, and a considerable amount of personal feeling had been lately generated in connection with it. Therefore, though he sympathized very strongly with the wishes and views enunciated in the resolution, he thought it would be better to postpone the matter until they had reason to believe that a new edition or an Addendum was in contemplation, which probably would not be the case for some years to come.

Mr. Betty suggested that the second paragraph of the resolution should be omitted, which would leave the Medical Council more at liberty to make their own arrangements.

Mr. Sandford said it was very difficult to oppose Mr. Hampson when he said that pharmacists should be well represented on any Committee that was to compile a Pharmacopœia. But at the same time it must be remembered that, by the Medical Act, the General Medical Council, and they alone, were empowered to prepare and issue the Pharmacopœia. When they were preparing the first edition in 1864, a much larger Committee was appointed, and pharmacy was more fully represented on it; but still the result was a very imperfect production, as was shown by another edition being issued three years afterwards. When the edition of 1867 was being prepared, a Committee of only five members was appointed, and the Pharmaceutical Council was asked to send a representative to it. Dr. Redwood was selected for this office. He had given a great deal of attention to it, and everybody admitted that that edition was a great improvement on its predecessor. He fully agreed that pharmacists ought to be more fully represented, but he thought there was a feeling of irritation at the present moment in the minds of some of the Medical Council which had been engendered by recent discussions at the evening meetings, and which would be against their conceding what was asked; he therefore earnestly urged Mr. Hampson to withdraw his resolution for the present.

The Vice-President, though agreeing with Mr. Hampson, thought it undesirable that they should move in the matter at that time.

Mr. Hampson said he felt a great difficulty in declining to withdraw his resolution after what had been said, but he thought it would be a mistake to do so. He saw no reason why medical men should feel aggrieved at pharmacists forming and expressing the same views which they would themselves express in a like position. As to the prospect of an Addendum or new Pharmacopœia not being required for some time, he did not think that was any reason for delay, because the future Pharmacopœia was already beginning to be formed in the minds of medical men and pharmacists. There were certain errors palpable in the present one, which it would be advisable for such a joint Committee as he proposed to consider and discuss before it was necessary to issue a new Pharmacopœia. It would be the duty of such a committee to gather information, not only from English but from foreign pharmacists, and the more time they had for experimental processes the better.

Some further discussion ensued and several suggestions were made as to verbal alterations in the resolution; eventually, on the suggestion of Mr. Sandford, it was unanimously agreed to in the following terms :—

"That this Council respectfully urges upon the General Medical Council the desirability of associating more practical pharmacists with any Committee which may be appointed for the purpose of preparing any future edition of the British Pharmacopœia, or any further Addendum to the present issue. This Council would be prepared to nominate such pharmacists in the event of the Medical Council agreeing to their proposal."

It was then moved by Mr. Williams, and seconded by Mr. Owen—

"That a copy of the resolution just agreed to, be forwarded to the General Medical Council with the respectful compliments of the Council of the Pharmaceutical Society."

Payment of Scrutineers.

Mr. Greenish, in accordance with notice of motion, then moved—

"That, in future, Scrutineers be paid at the rate of two guineas each for their services."

After some discussion, however, as the general feeling of the Council seemed to be against such an innovation, the motion was withdrawn.

Report of the Board of Examiners.

The Board of Examiners for England and Wales reported that during the month of June they held six meetings, and examined as follows :—

June, 1874.

England and Wales.

Examinations.		Candidates. Examined.	Passed.	Failed.
Major	June 16th and 16th	5	4	1
Minor	June 17th	21	11	10
"	" 18th	27	9	18
"	" 24th	26	9	17
"	" 25th	25	11	14
"	" 26th	28	6	22
		—127	— 46	— 81
Totals		132	50	82

Certificates received in lieu of the Preliminary Examinations :—

3	University of Cambridge
2	" " Oxford
3	College of Preceptors
1	Royal College of Surgeons (England)
1	" " (Ireland)
10	

Deputation to the North British Branch.

A letter from Mr. Mackay, the Honorary Secretary of the North British Branch, was read, intimating that the first examination in the Society's new rooms in Edinburgh, would be held on the 28th inst., and inviting the Council to appoint a deputation to be present on that occasion.

It was resolved—

"That a deputation, consisting of the Vice-President, and Messrs. Cracknell, Carteighe, and the Secretary, be appointed to attend the examination at Edinburgh on the 28th inst."

EXAMINATIONS IN LONDON.

June, 1874.

Present—17th and 18th—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

24th and 25th—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

26th—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Taylor, and Umney.

Dr. Greenhow was present on the 24th on behalf of the Privy Council.

MAJOR EXAMINATION.

Five candidates presented themselves. *One* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

*Luff, Arthur Pearson................Old Brompton.
Smith, John Jacob ....Yeovil.
Feaver, John..........................Truro.
Cortis, Arthur Brownhill............Worthing.

MINOR EXAMINATION.

One hundred and twenty-seven candidates presented themselves for the Minor examination. *Eighty-one* failed. The following *forty-six* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

*Riley, Charles Reynolds ....London.
*Heslop, George ....Newcastle-on-Tyne.
Frank, John...........................Whitby.
Maynard, George Christopher ...Moreton-in-Marsh.
Ashley, Henry ....Gravesend.
Lee, Joseph ....Southport.
Equal. { Bulcock, Joseph Henderson ......Clitheroe.
Fowler, James ....Barton-under-Needwood.
Davey, John Trimble ....Exeter.
Newitt, Herbert Henry ....Bicester.
Draper, James William ....Malmesbury.
Equal. { Bayston, George Coryndon.........Guildford.
Gradidge, William Ivimey ....Andover.
MacFarlane, Peter ....London.
Lamble, John Alfred ....Kingsbridge.
Frost, John ....Abergavenny.
Buckle, James.........................Malton.
Jones, Charles William ....Ashby-de-la-Zouch.
Gardiner, Bruce Hubert John ...London.
Arnold, Harry Shaw ....Cwm Avon.
Equal. { Durnford, John ....Maidstone.
Husband, John Cecil ....Berwick-upon-Tweed.
Dale, George Edgar.................Colchester.
Thompson, Charles ....Bedworth.
Strickland, Robert Brewster ......Manchester.
Equal. { Cripps, Ernest Henry ....Devizes.
Winn, John Christopher ....Darlington.
Equal. { Bodger, John William ....Peterborough.
Stevenson, James ....Cirencester.
Equal. { Longmore, Henry Edward.........London.
Stevenson, Henry Ernest ....Southport.

* Passed with Honours.

	Tame, Thomas	Oxford.
Equal.	Cooper, Henry	London.
	Dee, Walter	Cheltenham.
	Steele, Stephen	Steyning.
	Hammond, William Henry	Northampton.
Equal.	Lancaster, William George	Sheffield Moor.
	Porter, Albert	Abingdon.
Equal.	Pechey, Thomas P.	Birkenhead.
	Shaw, William Burton	Scarborough.
Equal.	Billinge, Mark	Hyde.
	Ridley, Edward Henry	Manchester.
Equal.	Phillips, James Wilson	Broadstairs.
	Rogers, Sydney	Newport Pagnell.
	Stacey, Henry George	London.
	Walter, George William	Horncastle.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination :—

Certificates of the University of Cambridge.

Hawthorne, Charles Oliver.........Stafford.
Sadler, William ....Margate.
Smith, John Ord ....Scarborough.

Certificates of the University of Oxford.

Cleminson, John Hetherington ...Beverley.
Fazan, Charles Herbert...............Colchester.

Certificates of the College of Preceptors.

Beilby, Alfred Emanuel ....Sutton-in-Ashfield.
Green, William James ....Yeovil.
Wilson, William Alexander.........Birmingham.

Certificate of the Royal College of Surgeons of England.

Hancock, Edwin..........................London.

Certificate of the Royal College of Surgeons of Ireland.

Clements, Henry Joseph ....St. Leonards.

Proceedings of Scientific Societies.

NEWCASTLE-UPON-TYNE CHEMICAL SOCIETY.

At the meeting of the above Society, on the 6th March, a paper, of which the following is an abstract, was read on :—

The Position of Professional Chemists, as affected by the Adulteration Act.

BY PROFESSOR MARRECO.

The author, having premised that his main object was to elicit the views of the society, as representing the chemical opinion of the North, proceeded to suggest the following propositions as a basis for discussion.

1. That in the interest alike of the buyer, the seller, and the profession, it is desirable that only thoroughly competent persons should be appointed to the new office of public analyst.

2. That there is at present no recognized standard for the "competent knowledge," medical, chemical, and microscopical, required by the Act.

3. That until some recognized examination exists, giving some guarantee of the knowledge of these various subjects required by professional analysts, this state of things cannot be remedied.

4. That it is desirable that such an examination under proper supervision should be instituted, and that only persons holding such diploma should be considered as duly qualified for the post of public analyst.

The President said, the questions which Professor Marreco had raised was a very large one. Was he prepared with any suggestions for the solution of the difficulty?

Professor Marreco said, of course the details of the solution were things with which they had nothing to do. He did not care how constituted or where situated, but let them have a Board before whom a man could give clear evidence that he ought to call himself a professional chemist. A man might make as many analyses as he pleased; but he ought not to be eligible for the post of public analyst, unless he could bring forward some evidence of training and a standard of knowledge, in the same way as a man who was medical officer to a workhouse. If you appointed a man at £30 a year as medical officer to a workhouse, he had to produce distinct evidence of his training and qualification; and what he contended for was this, let everybody be required to show proofs of these things before he was eligible—before he was, in the language of the Act, "duly qualified."

The President said, if he gathered Professor Marreco's meaning rightly, what he suggested they should do was to let a formal expression of opinion from that society proceed to the proper quarter.

Professor Marreco—I don't go to that. We have had quite enough of expressions of opinion lately.

The President said, it could not be denied that in some of the late cases brought under prosecution, the issues had been scandalous. From his own observations and reading, he quite agreed with every word which Professor Marreco had said; and thought that what he aspired to was not at all impossible to attain. It would simplify the matter extremely if there were any regular degree, conferred by any English University or acknowledged place of higher Education, such, for instance, as the degree of Bachelor of Science. The higher degree would follow, as a matter of course, or any other degree which might be named for that degree, were it *primâ facie* qualification; and those who could not show any such degree, might be obliged to undergo a certain examination before a Board properly constituted by authority. He thought that so long as chemists only sought to act from the commercial point of view in private practice, the public government should not in any way interfere with them; it would, in his opinion, be much more inconvenient if they did, and he did not approve of it at all. In that case you must say *caveat emptor!* If the merchants would go to chemists not competent to make an analysis, it was their own fault: they should go to somebody who had given warranty of his ability in the matter. But this was not a question of a merchant sending an analysis to a chemist to be performed, but was a question of a whole district depending upon the services of a publicly appointed officer. When it was a question of magistrates deciding cases, and perhaps punishing a man, if not by the infliction of a heavy fine yet with the entire loss of his credit, then he thought it was an extremely awkward thing that the magistrates should be obliged to rely upon the judgment of people who, in themselves, did not give the least warranty that their evidence was trustworthy. In the case of a very wonderful story, Gibbon says—the Arabian historian vouched for the truth of it; but who vouched for him? He thought this was a case which only too often occurred now: the public analyst vouched for a certain analysis, but nobody vouched for his competency to make it. He, for his part, cordially agreed with the suggestion which Professor Marreco had thrown out; only he would like it to take some more tangible form, because he thought a simple expression of it in their minutes would not go very far.

Mr. Glover thought Professor Marreco had hit the right nail on the head when he laid the blame of the present appointment of chemists upon the appointing body. They all knew the popular opinion was, that if a man had had a medical training he was therefore a chemist. Now, they knew that nine-tenths of medical men knew very little of chemistry. With all respect to their medical knowledge, their training did not give them that knowledge of chemistry which fitted them to be analysts. It was a branch of science distinct entirely from that of medical practice; and therefore, if there was an appointing board to be connected with some of our scientific institutions—if in Newcastle, for instance, the appointing board was connected with the College of Science—he had no doubt a properly qualified analyst would in all cases be appointed. At least, there would be evidence that he would be in possession of knowledge which would fit him to perform the very delicate duties of an analyst of articles of food. As long as the appointment was solely in the hands of town councils and local boards, it was utterly hopeless to expect that any properly qualified person would be appointed.

Mr. Pattinson quite agreed with Professor Marreco that some kind of certificate or diploma of competency in these matters should be obtained. The Adulteration Act had been launched upon the country when the country had not been prepared with a sufficient number of people competent to examine food, drugs, and drinks. He thought that something more than could be obtained in any of our present educational institutions was required in this instance. Probably it would be best to have a special training college or school, where the precise subject of the detection of adulteration should be specially taught, and a certificate of competency given to such people as passed certain examinations. If that were done, it would be some considerable safeguard for the public against the mistakes we had heard of recently.

Mr. Berkley thought that town councils and local boards were the proper persons to appoint public analysts. But at the same time, if they had diplomas as medical gentlemen have, the local boards or town councils, who were generally composed of men who had common sense, would select good men. Analysts who pretended to analyse food and drink should have diplomas or certificates of competency. He believed that a great many of those who professed to be analysts knew nothing whatever about the subject.

Mr. Proctor would like just to confirm what Mr. Pattinson said about the necessity of having a distinct educational board. Professor Marreco had alluded to the sort of education which pharmaceutists are put through; and he knew, from having passed that examination himself some years ago, and also from members of the Board of Examiners, that the examination of pharmaceutists was certainly not sufficient to qualify a man to hold a position as public analyst. Of course, there was very great diversity in the amount of chemical knowledge and of medical knowledge which pharmaceutists possessed. It depended altogether upon how they pursued matters after they passed the examination. No body at present existing had the sort of machinery at command which was necessary to bring men to the very great diversity of information which was requisite in a public analyst. A man might be a manufacturing chemist, or a theoretical chemist, and still want that species of technical knowledge which was a part of pure chemistry. Men were wanted combining chemical and other knowledge, and they were not to be got at present. In this particular line of business, he supposed nothing could be done until time was given for the school to grow, and the students to be produced.

The President said that time had been given for the training of a sufficient number of adulteration chemists, if he might so call them; meanwhile they ought to take the very best substitutes they could find, namely, gentlemen who evidenced in some way a good general knowledge of chemistry; and they should insist that only such men should have the right to be elected public analysts. If that were done, he thought nearly everybody would agree that the local authorities should retain the power of appointing the local analysts, but with the restriction that they must only elect them from a number of duly qualified persons. He would throw out a suggestion, that the Society petition Parliament to pass a law according to which the local authorities should only appoint public local analysts from such persons as had either obtained a degree in an English college ———

Professor Marreco: No, no. The appointments should be made from persons who have received a special training.

Mr. Richardson said the difficulty was that a sufficient number of qualified men did not exist.

Mr. Pattinson said the qualification would have to be defined.

Mr. Richardson said any resolution passed now should simply tend to suppress the office of public analyst.

Professor Marreco: Because you cannot get the very best men, that is no reason why you should take the worst.

Mr. Proctor said, that, in the absence of other evidence, the best evidence of the fitness of a man for that post was the higher graduation of the Pharmaceutical Society.

Professor Marreco: I quite agree with you.

Mr. Proctor: It was far better than any medical evidence they professed, and he fancied it embraced ground more valuable than that which they had got in a college of pure technical chemistry. A knowledge of drugs and of things analogous to drugs was so important, that although the pharmaceutical chemist was very deficient in pure chemistry, his knowledge of drugs compensated, to a certain extent, for it, and this covered the ground better than any other which they possessed at present. At the same time, he would not at all recommend the Government to appoint pharmaceutical chemists. It seemed hopeless to do anything at present, till there was established a school which would educate such chemists.

Mr. Richardson said it was not only necessary to have qualified men as chemists, but also more knowledge of chemistry was required on the part of magistrates, local boards, and corporations. Until education on the matter was more diffused, which would not be for many years, he suspected it would be more or less a *fiasco*. We would go on in our old English fashion of learning to do a thing by doing it, instead of learning to do it.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Apothecaries' Licences Bill.

On Thursday, June 25, the Apothecaries' Licences Bill was read a second time and referred to a Select Committee. On Wednesday, July 1, the Select Committee were nominated as follows:—Mr. Errington, Sir Michael Hicks Beach, Sir John Gray, Mr. Corry, Dr. Cameron, Mr. Ion Hamilton, Dr. O'Leary, Mr. Bruen, Mr. Sheil, Mr. Leslie, and Mr. Chaine.

Juries Bill.

The consideration of the Juries Bill, which has been recommitted, has been deferred till Monday next.

Poisoning by Carbolic Acid.

On Tuesday evening, Dr. Lankester, the coroner for Central Middlesex, held an inquest at Upper Holloway, touching the death of Mr. Thomas John Baker, aged 53, a surgeon. Mrs. Elizabeth Baker stated that her husband, the deceased, who suffered from dyspepsia, went to bed on Saturday night about half past 12, but could not go to sleep. About two o'clock witness was awakened by hearring the deceased moving about the room. In reply to her questions he said he had taken something, and was afraid it was poison. There was a bottle on the drawers labelled "Carbolic acid—poison;" the deceased frequently went into his surgery for a draught. Two or three days before, he had told her that he had mixed some potash and brandy to take. She suspected that he went for this in the night, and took up the wrong bottle in mistake. There was no light in the surgery. Dr. G. O. Spencer stated that he was called to the deceased, whom he found quite dead. On making a *post-mortem* examination, he found the cause of death was poisoning by carbolic acid. The jury returned a verdict of "Death from misadventure."—*Times.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Scammony.

Sir,—The recent trial of Mr. Cocks, at Bow Street, is one, in many respects, to be regretted, and serves to show how cautious analysts should be in granting certificates, in regard to alleged adulterated drugs. The specimen of powdered scammony was a fair sample; but with every respect for Dr. Attfield's authority, I am sorry to say he failed to give the correct data, as will be seen. In reply to the question: "Do you say that this article we are summoned for is a genuine scammony or adulterated?" *Dr. Attfield*:—"It is a genuine scammony, it is not adulterated." According to his own analyses, he obtained, what he called, 76 per cent. of resin, and from a perfectly dry powder 80 per cent.

The former shows 24, the latter 20, per cent. of extraneous matters—as chalk, starch or flour, earth, moisture, etc. How then can the scammony in question be said to be pure, and up to the highest standard of the British Pharmacopœia, which gives 80 to 90 per cent. of resin removable by ether? That it was a good sample of scammony cannot be denied; but the standard in the B. P. was not given correctly. Dr. Attfield was bound to give the B. P. standard, and no other. When asked: "As the highest to be expected," Dr. Attfield says: "80 per cent. is mentioned in the B. P." Now, Mr. W. Squire, in his examination, quotes from a paper by Maltass, 88·2 per cent. of resin; Christison found 82 to 83 in dry specimens; and Marquart 81·25. My object in writing is to show that the B. P. standard is not too high for pure scammony. Why was 80, and not 90 given? In future prosecutions, I hope the magistrates will demand the production of the Pharmacopœia, and not be satisfied with the statement of any witness. Had this been done, it is open to conjecture whether the prosecution would have failed or broken down as it did. In regard to Mr. Piesse, I hope, in future, he will consult our standard authority. Had he done so, he would not have fixed the standard of scammony at 75 to 80. So long as we have a standard authority, I hold that witnesses are bound to acknowledge it, and no other, and to quote from it correctly.

Henry Brown, L.R.C.P., L.R.C.S., etc.

Northallerton, 29th June, 1874.

Analysis of Milk.

Sir,—In your issue of the 13th inst., you reported a case of Milk Adulteration, in which I had certified a sample of milk as adulterated with half an ounce of salt per gallon. Several inquiries have been made of me with reference to that result.

Will you, therefore, allow me to state that the salt, reported as an adulteration, was in excess of the quantity present in genuine milk.

The ash of genuine milk contains an average of ten per cent. of its weight of chlorine.

Calculating this as chloride of sodium, it will equal about 86 grains per gallon. The variations from this quantity are within moderate limits. I have not yet met with a milk, known to be genuine, in which it exceeded 110 grains per gallon. In the sample in question the ash of 100 grains bulk, which weighed 1·08 grains, contained ·468 grain chloride of sodium, calculated from the chlorine found—equivalent to 328 grains per gallon or 218 grains in excess of the maximum.

It is said that salt is added to milk during the hot weather in order to keep it sweet, and cause the cream to rise quicker; and although I cannot vouch for this, yet I have on several occasions found a considerable excess of salt in milk adulterated with water.

G. W. Wigner.

79, Gt. Tower Street, E. C.,
29th June, 1874.

Excessive Labour in Pharmacy.

Sir,—There must be very many, who, like myself, have read with gratification the letter which appeared from a "Country Major Associate" in your last.—It is seldom that we see so plain and straightforward an avowal of fact from an employer, and as such, it must have additional interest. It would be hard to believe that his is an exceptional case, for if so, why is it that on all hands—in town as well as in the country—we hear of the scarcity of assistants? I am sure, if the truth were told, that the most fertile source of reduction in our ranks is nothing else but "long-hours." There are many who point to the examinations as being the primary cause, but, speaking as a young man, I cannot believe it. In the examinations themselves, there is little to fear—provided that there were a few hours in each day that every assistant, or apprentice, could claim as his own; and, if such were the case, we should hear less of the enormous per-centage of failures.

It may be very pleasant to think that ours is an honourable calling, and that we are in a position in which we may be of very material aid to our neighbour, by helping to alleviate his sufferings, and so on; but charity commences at home, and certainly there is no inducement for a young man to enter the lists when, on inquiry, he finds that he may think himself blessed if he gets twelve hours' work only per day; whilst, possibly, in the majority of cases, he would find that he was expected to serve his master fourteen hours of the day, and to find what time he could out of the remainder of the twenty-four for rest, recreation, and study.

Leaving remuneration out of the question entirely, for we all know what that is, are there many who are fit for studying after a hard day's work? And yet numbers amongst us have no other time for this purpose, and then only to be constantly interrupted by those persons who will persist in coming after business hours, however paltry their wants may be. We may get up early in the morning, it is true, and I dare say there are many who could tell of good results from such a practice; but is it to be expected of the future generation that their whole existence shall be passed in harness? Are they to rise early and get to their books, go from their books to the shop, and from the shop back to their books again? It seems so, or there would have been some great change in our hours of business ere this. That the change is practicable there is not the shadow of a doubt, and it would only be another illustration of the maxim that "unity is strength."

There are some who, in defence, might say that when they were young they had to work many hours more than we have at present; but I would remind these that the old system was found lamentably deficient, that new regulations have had to be enforced by Parliament in the matter of education, and that unless concessions are granted, and those very speedily, too, as far as regards "time," we may look in vain for apprentices and assistants in sufficient number to keep pace with the demand.

A "Major" Student.

"*A Student.*"—No; the reaction is as follows:—

$$3\,Cu'' + 8\,HNO_3 = 3\,Cu(NO_3)_2 + 2\,NO + 4\,H_2O.$$

Cupric nitrate. Nitric oxide.

W. Symons.—We believe that efforts have been made on different occasions to secure such an arrangement, but they have always been unsuccessful.

J. Williams.—Your complaints of breaches of the Medical Act—which we are indisposed to credit—would be more appropriately addressed to the Registrar under that Act. Your other statements appear to be merely expressions of your own opinion, which are hardly of sufficient importance to pharmacists to warrant their being printed.

A. Mitchell.—(1) *Orchis incarnata.* (2) *Orchis maculata.*

N. J. L.—Questions 1, 2, and 4 relate to questions of law, which we are not competent to answer. (3). The 23rd section of the Pharmacy Act, 1868, to which probably you refer, was repealed by the "Act to Amend the Pharmacy Act, 1868," 32 and 33 Vict., cap. cxvii. (5) The person mentioned has passed the preliminary examination, but is not now "a registered apprentice or student of the Society."

H. Young.—The subjects are usually literature and science, and full information may be obtained from any of the universities granting such degrees.

"*Dandie Dinmont.*"—See the regulations for the appointment of naval dispensers in the Pharm. Journ. (vol. iii., p. 364), or the Society's Calendar, and the correspondence respecting army dispensers in the Pharm. Journ., vol. iv., p. 79.

Communications, Letters, etc., have been received from Mr. Sturton, Mr. W. Symons, Mr. Wilson, Mr. T. H. Williams, Mr. Baildon, Dr. F. Porter Smith, Mr. Druce, "An Associate," "Seven o'clock," "Nasus," W. T. E., X. Y. Z.

RHAMNUS FRANGULA
versus
RHAMNUS CATHARTICUS.

BY CHARLES UMNEY.

As the constant demand for novelty is a great inconvenience to pharmacists, no undue encouragement should, on this account, be given that may in any way tend to multiply unnecessarily our already too lengthy materia medica.

But there are occasions when it is found that certain preparations, although they may have become remarkable for their longevity, should be superseded by others for manifest reasons.

One is often tempted to think that if compilers of Pharmacopœias were to be interrogated why such and such preparations had been left again and again in their accustomed place, they would probably reply that they had heard little or nothing against them, and that they had accordingly permitted the formulæ to remain where they found them.

No better illustration can be found of the foregoing than the syrup of buckthorn of the British Pharmacopœia.

It is not here contemplated to dispute that the berry of *Rhamnus catharticus* is devoid of purgative principle, or is not an active cathartic, but rather to show that now certainly, and in all probability for years past, the manufacture of the juice and syrup of buckthorn has been of a most suspicious and unsatisfactory character, indeed, has been a thorough sham

Syrup of buckthorn first appeared in the London Pharmacopœia of 1650 ("*Syrupus De Spina Cervina*"), but the administration of buckthorn was by no means a novelty at that period, for a decoction of the berries had been used at a much earlier date as a cathartic.

The formula referred to may, with advantage, be reproduced here, if it be only to show that in the 17th century the manufacture of syrups was thoroughly understood.

SYRUPUS DE SPINA CERVINA.

℞

Baccarum Spinæ Cervinæ, Mense Septembri collectarum . . . . *q.v.*
Contundantur in pila lapidea, et exprimatur succus
Succi expressi pars quarta primum per se evaporet in balneo
Dein libris ejus duabus injice Sacchari purissimi uncias sedecim
Coque in Syrupum, quem condias
Mastiches
Cinnamoni
Nucis Moschatæ
Sem. Anisi tenuissime pulveratorum ana drachmis tribus.

This formula was again given in the Pharmacopœia of 1668, but was modified in 1677 by the very sensible omission of the mastich, also of the anise fruit, cinnamon and nutmeg only being used.

This alteration seems to have been approved for the next half century (P. L., 1682, 1721, 1724), but in 1746 the fashion was in favour of ginger, which was added to the other spices, and was used (P. L., 1763) until 1788, when pimento was ordered, and the cinnamon and nutmeg omitted.

This formula has been maintained, and been given a place in each London Pharmacopœia during this century; and, finally, in our British Pharmacopœia, we find it side by side with those modern syrups that are considered to represent the elegant pharmacy of the 19th century.

Buckthorn Berries.—The British Pharmacopœia does not describe (as it almost invariably does in other cases) the characters by which these berries may be known and distinguished from others similar in appearance. It is possible occasionally to select berries from those that are sold for preparation of the expressed juice that have not the four-celled and four-seeded characteristic of *Rhamnus catharticus* The compilers, no doubt, correctly premised that few pharmacists would prepare the juice for themselves. This, unfortunately, is too true, and herein is the whole source of error.

Buckthorn berries are by no means plentiful. The London market is supplied from (amongst other places) Buckinghamshire, Hertfordshire, and also from Wiltshire, but the quantity sent is exceedingly small.

The simplers and others who collect these berries prefer to supply the juice (?) as expressed by themselves, rather than dispose of the ripe berries for such purpose.

Buckthorn Juice is described by the British Pharmacopœia as "the recently expressed juice of the ripe berries of common buckthorn."

It is just possible that the compilers had no opportunity of examining an authentic specimen of the juice, and therefore did not venture a description of the characters by which it could be distinguished from spurious liquids resembling it.

Of course, true buckthorn juice should at the proper season be met with in trade; it is difficult, however, to find a specimen of purchased juice that will compare with that expressed by oneself. I have never been successful during the past ten years, in satisfying myself that from two to five volumes of water had not been added in the several specimens I have examined.

My own observation shows that ripe buckthorn berries, when expressed in the early autumn, will produce about 45 to 50 per cent. of juice, which has the following characters when freshly prepared:—Sp. gr. 1·070 to 1·080; of a green colour, which gradually changes into red, on account of the acidification of the mucilaginous and saccharine matters, of which considerable quantities are present, accompanied by a copious deposition of an inulin (?) like substance.

After the lapse of a year, the specific gravity will have decreased, on account of this change, to about 1·035.

A recent examination of trade specimens gave the following results, and indicated that the same sophistication is still going on, which has been common for years past.

Succus Rhamni, of trade (1874)

	Sp. gr.
1.	1·005
2.	1·004
3.	1·007
4.	1·007
5.	1·075 (true juice)
6.	1·035 (true juice, 1 year old.

These specific gravities indicate that water is the chief ingredient in the Succus Rhamni of trade, and the deductions from above figures would point to a ratio of about six parts of it to one of true juice.

In buckthorn syrup the juice is so disguised by the spices and sugar that it is no easy matter to speak authoritatively upon the genuineness of a specimen.

Any one however, who has had an opportunity preparing a syrup direct from the berries, cannot fail to identify a spurious preparation.

Of course, however, it must follow that, if true buckthorn juice is such a *rara avis*, so also is buckthorn syrup.

The question now arises, how is all this to be remedied. It is true we have an act specially framed for detecting and punishing adulteration of drugs as well as food and drink, but in this particular case (as in many others equally absurd) I much question if any one could be found who would seriously take up the matter.

Would not any one venturing upon it become an object of ridicule to the medical profession and pharmacists generally, for wasting time upon such frivolity?

The remedy is in the rejection of *Rhamnus catharticus*.

The *Rhamnus frangula* bark enumerated in the materia medica of recent German and other Pharmacopœias, although somewhat a novelty in this country, still has been experimented upon by Baildon, Giles, and others, and is said to be a most valuable aperient. This bark can be easily procured at all seasons, is most easy of manipulation, and from it a syrup (if we must have a syrup) can be easily made.

Having experimented, with a view to prepare an elegant and reliable liquid preparation of *Rhamnus frangula* bark, I am of opinion that a fluid extract containing an equivalent of one drachm of the bark in one fluid drachm, would be most acceptable.

Percolation of the finely-powdered bark by dilute alcohol, with a *modus operandi* similar to that of the United States Pharmacopœia for fluid extracts, produces a preparation elegant in appearance, but open to one objection, viz., the precipitation of much resinous matter upon dilution with water.

Decoction and subsequent evaporation to the required bulk, seem to be best adapted for the production of a concentrated fluid extract that shall be miscible with water in all proportions.—Thus :

Fluid extract of the Bark of Rhamnus Frangula.

(ʒj = ʒj fl.)

Take of

Bruised Bark of Rhamnus Frangula	1 pound.
Alcohol (·838)	4 fl. ozs.
Distilled water	q. s.

Boil the bark in three or four successive portions of water until exhausted. Evaporate the decoctions by the aid of a water bath to twelve fluid ounces, or a sufficiency, so that the product to which the spirit has been previously added, shall, when filtered, measure *sixteen fluid ounces.*

Although I am not much impressed with the advantages to be gained by the administration of a syrup, still if such be required in order to replace the now officinal syrup of Rhamnus catharticus, I should suggest the following formula :—

Syrup of Rhamnus Frangula.

(10 grs. to fl. ʒj.)

Take of

Bruised Bark of Rhamnus Frangula	3 oz. 287 grs.
Sugar	1 pound
Water	a sufficiency.

Boil the bark in successive portions of water until exhausted. Evaporate the decoctions by a water bath to ten fluid ounces or a sufficiency, so that the solution shall, when the sugar has been dissolved in it by a gentle heat, finally measure one pint, or weigh one pound ten and a half ounces. (Spec. grav. 1·320.)

This new addition of *Rhamnus frangula* to our materia medica has, I imagine, been for some time known to, or even been brought to the notice of the Pharmacopœia Committee for consideration.

As some considerable time must necessarily elapse before the re-issue of another British Pharmacopœia, it would be advisable to give the foregoing, or some similar preparations, a trial; indeed, any investigations bearing upon pharmacy would very much lessen the labours of those who are entrusted with the compilation of the work, and, to a great extent, preclude those disparaging remarks which we are all more or less inclined to make should any imperfect formulæ be introduced into our national Pharmacopœia.

Laboratory, 40, Aldersgate Street, E.C.

THE APPENDICES OF THE BRITISH PHARMACOPŒIA.

BY WALTER G. SMITH, M.D., DUBLIN,

Fellow and Censor K. and Q. C. P. I.; Examiner in Materia Medica, Q. U. I.; Assistant Physician to the Adelaide Hospital.

(Continued from p. 3.)

VOLUMETRIC SOLUTION OF BICHROMATE OF POTASH. $K_2Cr_2O_7$=295.—1000 grain-measures contain $\frac{1}{20}$ molecule=14·75 grs.

Use.—This solution is used only for estimating the amount of *ferrous* salt in the preparations of iron, and was introduced for this purpose by Dr. Penny, of Glasgow. The bichrome is easily obtained pure, and the solution is quite permanent.

Procedure.—The iron compound, whatever it be, is dissolved in excess of dilute hydrochloric acid,* and the standard bichrome solution immediately† dropped in until the whole of the ferrous is converted into ferric salt, which is known when a minute drop of the liquid to be tested, placed in contact with a drop of a very dilute solution of *red* prussiate of potash on a white plate, ceases to strike with it a blue colour. The bichrome, it need hardly be said, has no action upon ferric salts. From the amount of bichrome solution consumed, the quantity of ferrous compound is readily calculated from the following data. One molecule of bichrome ($K_2Cr_2O_7$) is known to contain three atoms, and no more, of available oxygen, *i.e.* oxygen which it will give up to other bodies. But since $2\,FeO + O = Fe_2O_3$, we learn by analogy, that two molecules of any ferrous compound *plus* one atom of oxygen will be converted into its corresponding ferric compound, *i.e.* n atoms of oxygen will peroxidize $2n$ molecules of ferrous salt. Therefore, one molecule of bichrome will peroxidize six molecules of any ferrous compound whatever, and the fundamental reaction is typified by the following equation:—

$$6\,FeSO_4 + K_2\,Cr_2O_7 + 7\,H_2\,SO_4 = K_2\,SO_4, Cr_2 3SO_4 + 7\,H_2O + 3\,Fe_2\,3\,SO_4$$

Now the volumetric solution of bichrome contains, for convenience, $\frac{1}{20}$ of a molecule of $K_2Cr_2O_7$, *i.e.* 14·75 grs. ($\frac{295}{20}$), in 1000 grain-measures, the capacity of the burette, which quantity, therefore, will exactly convert $\frac{1}{20}$ of six molecules of ferrous into ferric salt.

Example.—Ferri Oxidum Magneticum is a mixture of ferrous oxide, FeO, with ferric oxide, Fe_2O_3. To determine the precise amount of ferrous oxide,

* The presence of free acid, hydrochloric or sulphuric, is necessary, as otherwise a basic compound of chromium would be precipitated and the oxidizing action interfered with.

† So as to avoid absorption of oxygen from the air.

dissolve a suitable quantity, say 20 grs., in hydrochloric acid, and add the standard solution of bichrome until the iron is all peroxidized. It will be found that 230 grain-measures are required.

The molecular weight of $FeO = 72$, which $\times 6 = 432$, and this $\div 20 = 21{\cdot}6$. Then, 1000 : 230 : : 21·6 : $x = 4{\cdot}96$ grs. of FeO in 20 grs. of magnetic oxide, = 24·84 per cent.

NOTE.—Permanganate of potassium ($KMnO_4$) is also often employed in an analogous way for the estimation of iron by Margueritte's process. 2 $KMnO_4$ or $K_2Mn_2O_8$ yields five atoms of available oxygen and will therefore peroxidize ten molecules of any ferrous compound. The permanganate is added so long as its purple colour is destroyed, and the only case in which this reaction is utilized in the Pharmacopœia is in testing the purity of Potassæ Permanganas.

The bichrome solution is used in determining the proportion of protoxide of iron in the following preparations—

Ferri Arsenias	20 grs.	= 170	grain-measures of vol. sol.
„ Carb. Sacch.	20 „	= 208	„ „ „ „
„ Oxid. Magn.	20 „	= 230	„ „ „ „
„ Phosphas	20 „	= 250	„ „ „ „

VOLUMETRIC SOLUTION OF HYPOSULPHITE OF SODA. $Na_2S_2H_2O_4$ $4\ H_2O = 248$. 1000 grain-measures contain $\frac{1}{10}$ molecule = 24·8 grs.

Uses.—This solution is used in the direct estimation of iodine, and in the indirect estimation of chlorine (chlorimetry) in several chlorinated preparations. Free chlorine cannot be estimated by hyposulphite because, instead of tetrathionate of sodium, sulphate of sodium is formed; but chlorimetry is indirectly affected (Bunsen's method) by first adding an acid to the chlorinated compound to liberate chlorine, then excess of iodide of potassium, whereby for each atom of chlorine present an atom of iodine is disengaged and dissolves in the excess of the potassic iodide, and finally titrating the liberated iodine. Hyposulphite has no action upon iodide of potassium.

Procedure.—The colourless solution of the hyposulphite is added to the solution of iodine until the red colour is completely discharged, or, if starch have been used as indicator, until the blue iodide of starch is decolorized. From the amount of hyposulphite used the quantity of iodine or chlorine is readily calculated. The fundamental reaction is—

$$I_2 + 2\ Na_2S_2H_2O_4 = 2\ NaI + Na_2S_4O_6 + 2\ H_2O.$$

Colourless iodide and tetrathionate of sodium are formed. Therefore, since two molecules of hyposulphite = 2 atoms of iodine, $\frac{1}{10}$ molecule hyposulphite = $\frac{1}{10}$ atom of iodine, *i.e.* 12·7 grains.

Example.—The atomic weight of iodine = 127, and accordingly 12·7 grains of iodine should, if pure, require for complete discoloration exactly 1000 grain-measures of the vol. sol. of hyposulphite.

This solution is used for testing the following substances:—

Calx Chlorata	10 grs.	= 850	grain-measures.
Iodum	12·7 „	= 1000	„ „
Liq. Calc. Chlor.	60. „	= 500	„ „
„ Chlori	4·39 „	= 750	„ „
„ Sodæ Chlor.	70. „	= 500	„ „

VOLUMETRIC SOLUTION OF IODINE. I = 127. 1000 grain-measures contain $\frac{1}{10}$ atom I = 12·7 grs.—Iodide of potassium is employed in the preparation of this solution, simply because it is the best solvent of iodine; it exerts no chemical action upon the substances to be estimated by the iodine.

Use.—This solution is used for the estimation of arsenious and sulphurous acids, and sometimes of sulphuretted hydrogen.

Procedure. — The vol. sol. is dropped from the burette into the liquid to be tested, to which a little starch has previously been added, until free iodine begins to appear in the solution, as evidenced by a permanent blue colour. The solution of sulphurous acid must be considerably diluted before being tested, and the arsenical solutions must all be first rendered alkaline by bicarbonate of sodium.

The fundamental reactions upon which the different estimations depend, are—

I. $SO_2 + I_2 + 2\ H_2O = H_2SO_4 + 2\ HI.$

II. $As_2O_3 + 2\ I_2 + 2\ H_2O = As_2O_5 + 4HI.$

III. $H_2S + I_2 = S + 2\ HI.$

The third reaction is not applied in the Pharmacopœia.

Now, the molecular weight of $SO_2 = 64$, and the molecular weight of $As_2O_3 = 198$; therefore, since 2 atoms of iodine = 1 molecule sulphurous anhydride, $\frac{1}{10}$ I = $\frac{1}{20}$ SO_2 *i.e.*, 3·2 grs., and since 4 atoms of iodine = 1 molecule arsenious anhydride, $\frac{1}{10}$ I = $\frac{1}{40}$ As_2O_3 = 4·95 grains.

In estimating the following substances—

Acidum Arseniosum	4 grs.	= 808	gr.-measures.
„ Sulphurosum	34·7 „	= 1000	„
Liq. Arsenicalis	441·5 „	= 808	„
„ Arsen. Hydr.	441·5 „	= 808	„

(*To be continued*).

NOTES ON ALOIN.

At the meeting of the natural history section of the Imperial Academy of Sciences at Vienna on the 21st. May, Dr. Rochleder described the results of some investigations which have been made in the laboratory under his charge, respecting the principles of aloes.*

Dr. E. von Sommaruga has examined some aloin prepared from socotrine aloes. This aloin is not a glucoside, and differs from nataloin and the aloin from Barbadoes aloes. The melting point of socotrine aloin lies between 118° and 120°C.—*i.e.* the aloin softens at that temperature—while the melting point of aloin from Barbadoes aloes, is given at 150°C. The socotrine aloin is also much less soluble in ether than Barbadoes aloin.

Stenhouse found the composition of Barbadoes aloin could be represented by the formula $C_{17}H_{18}O_7$. The figures obtained by the analysis of socotrine aloin answer to the formula $C_{15}H_{16}O_7$. Nataloin according to Tilden,† has a composition represented by the formula $C_{25}H_{28}O_{11}$, and the acetyl derivative is $C_{25}(C_2H_3O)_6H_{22}O_{11}$, or $C_{37}H_{40}O_{17}$. But the formula $C_{16}H_{18}O_7$ affords nearly the same per centage composition as $C_{25}H_{28}O_{11}$, and the formula $C_{24}H_{26}O_{11}$, or $C_{16}(C_2H_3O)_4H_{14}O_7$ has a per centage composition similar to $C_{37}H_{40}O_{17}$. The figures which Stenhouse obtained with the aloin discovered by Smith in Barbadoes aloes, agree with the formula $C_{17}H_{20}O_7$, equally as well as with $C_{17}H_{18}O_7$. It therefore appears highly probable that the three aloins may be represented as follows:—

Barbadoes aloin	$C_{17}H_{20}O_7$
Natal aloin	$C_{16}H_{18}O_7$
Socotrine aloin	$C_{15}H_{16}O_7$

and that they form the members of a homologous series which is deserving of closer investigation.

When melted with potash, as pointed out by Tilden, nataloin yields paraoxybenzoic acid and β orcin ($C_8H_{10}O_2$). The orcin ($C_7H_8O_2$) which together with parabenzoic acid Hlaziwetz obtained by the melting of socotrine aloes with potash evidently originated with socotrine aloin.

* Proceedings of the kaiserliche Akademie der Wissenschaften in Vienna, 1874, p. 116.

† PHARMACEUTICAL JOURNAL, [3] vol. ii. p. 951.

Barbadoes aloin gives with nitric acid, as has been before stated, chrysammic acid, besides oxalic and picric acids; nataloin, only oxalic and picric acids and no chrysammic acid. The aloin from socotrine aloes gave when treated with nitric acid, oxalic and aloetic acids.

Socotrine aloes treated with nitric acid yields chrysammic acid, besides aloetic and oxalic acids. Chrysammic acid has been thus obtained in an hitherto unknown degree of purity; not as a golden coloured powder, but in golden coloured needles. Their composition was found to answer to the formula of tetranitrodioxyanthrachinone.

The action of bichromate of potash and sulphuric acid upon socotrine aloin gives rise to a substance similar to the purpurin of Krapp.

A description of the method of preparing aloetic and chrysammic acids, their properties, substitution, and decomposition products and combinations, is to form the subject of a special communication.

THE VANILLA.*

The vanilla is remarkable for its climbing habit, which is not common among orchids. There are several species, most of which are natives of the hot and damp regions of South and Central America; the genus is also represented in tropical Asia and Africa. The stems climb to the height of twenty or thirty feet, twining round the trunks of trees, and throwing out a profusion of aërial roots, some of which eventually reach the ground, as is the case with the banyan, while others float in the air. The leaves are thick and fleshy, as also are the greenish-white flowers. The important part of the plant, however, is the pod, which, in some of the species, is an article of commerce, and yields the delicious flavouring which is so well known. Some little uncertainty exists as to which of the species produces the most valuable fruit. It appears, however, that *V. planifolia* and *V. aromatica* are the most important, although *V. guianensis*, *V. palmarum*, and *V. pompona* also yield some of the vanilla of commerce. The pods as imported are narrow and flattened, from five to ten inches long, and of a dark brown colour; they are pulpy within, and contain a great number of very small dark seeds.

A great part of the vanilla of commerce is brought from Mexico and Venezuela, and principally from Vera Cruz, whence, according to Humboldt, the value of the annual export in his time was 40,000 dols. The cultivation is mainly carried on at Misantla, twenty-four leagues northwest of Vera Cruz, the inhabitants of which are the only people in Venezuela who cultivate the plant. The growth is, indeed, extremely easy, as the ground requires no tilling: slips of the vanilla plant are set at the foot of a tree on the approach of the rainy season, and soon begin to spread up the trunk. The plantations are cleared once a year from weeds and undergrowth, and in the third year the plants bear fruit.

Five varieties are recognized by the growers. One, the vanille de cochon, is so called from emitting an offensive smell whilst drying. The harvest begins about December, when the fruit becomes yellowish-green. There are two ways of preparing it for the market. In one method the fruit is allowed to dry until the pod loses its green colour. Straw mats covered with woollen blankets are spread on the ground, and when these are warmed through the fruits are spread on them and exposed to the sun. After a time they are wrapped in blankets, and placed in boxes covered with cloths, after which they are again exposed. In about twelve hours the fruits should become of a coffee colour, but if they do not the process is repeated. After about two months' daily exposure they are tied up in bundles of fifty, and packed in tin boxes. Five qualities of vanilla pods are known: the best is the *primiera*, the pods of which are twenty-four centimetres long, and proportionately thick. The second quality is called *chica prima*, the pods of which are shorter, and two count as one; the third, *sacate*, and the fourth, *resacate*, are still smaller, four of the latter being reckoned for one; they are gathered before they are ripe. The fifth and poorest quality is called *basura;* the fruit is very small, spotted, and much cut or broken about.

*From the *Gardeners' Chronicle* for May 23rd, 1874.

The following is another method of preparing vanilla for the market: About 12,000 of the pods are strung together by their lower end, as near as possible to the footstalk; "the whole are plunged for an instant into boiling water to blanch them; they are then hung up in the open air and exposed to the sun for a few hours. By some they are wrapped in woollen cloths to sweat. Next day they are lightly smeared with oil by means of a feather or the fingers, and are surrounded with oiled cotton to prevent the valves from opening. As they become dry, on inverting their upper end they discharge a viscid liquor from it, and they are pressed several times with oiled fingers to promote its flow. The dried pods, like the berries of pepper, change colour under the drying operation, grow brown, wrinkled, soft, and shrink to one-fourth of their original size. In this state they are touched a second time with oil, but very sparingly, because with too much oil they would lose some of their delicious perfume."

It appears somewhat remarkable that the cultivation of vanilla in the West Indies has not been largely undertaken, as it would be attended with but little difficulty, and would be a source of much profit to the inhabitants. But even in Caraccas and Guiana, where the plant grows profusely in a wild state, it is almost entirely neglected. In the Isle of Bourbon, however, it has been cultivated with considerable success, and seventeen and a half tons were exported from Réunion in 1871. At Liége it is grown on a small scale to the value of 600 francs per annum; and a plant cultivated at Paris in 1840 attained the height of three yards, and yielded 117 pods, which ripened in twelve months. In England it has been in cultivation since 1759; fine examples may be seen in the tropical and economic houses at Kew. Mr. Ewing and Mr. E. Bennett grew the vanilla with considerable success at Osberton; the latter gathered no less than 300 ripe pods off a single plant in one season. He considers a temperature of from 50° to 70° to be most suitable for it. He found it necessary to effect fertilization by artificial means, the stigma being prevented from receiving the pollen of its own flower by the interposition of an organ called the retinaculum.

As the English-grown pods are very highly flavoured, it is possible that it might be practicable to grow it for economic purposes. The annual import of vanilla amounts to about five or six cwt.; its price varies very greatly, being sometimes as high as 125*s.* per pound, and at other times as low as 26*s.*

The chief use of the vanilla is in flavouring perfumery and confectionery, and especially chocolate. One pod is sufficient to flavour a pound and a half of chocolate, being ground with sugar for that purpose. The fragrance is said to act upon the system as an aromatic stimulant, exhilarating the mind, and increasing the energy of the animal system. It is occasionally employed on the Continent in cases of hysteria; and is used by the Spanish physicians in America as an antidote to poison and to the bite of venomous animals, as well as in other cases. A liquid used in Peru, where it is known as *Baume de vanille*, exudes from the open pods at perfect maturity. The fruits in time become covered with an efflorescence of fine needle-like crystals, which possess properties similar to those of benzoic acid; when viewed through a microscope with polarized light they are very beautiful objects.

De Menonville, who travelled to Guaxaca in 1777, thus describes his discovery of vanilla in that district. After various hindrances and disappointments he says:—"At length an Indian, with a hoe in his hand, made his appearance. 'Brother,' said I, holding out a dollar, 'show me some vanilla and this is yours.' He coolly bade me follow him, and advancing a few steps through the underwood into a thicket, in which were a number of trees, he immediately climbed up one, threw down to me two pods of vanilla perfectly ripe, and pointed out to me a branch on which several others were hanging yet green, together with two faded flowers. The form of the leaves, the fruit, the peculiar smell of the plant—everything convinced me it was the real vanilla in everything corresponding with such as I had seen at Vera Cruz. All the trees of this little copse were covered with it. I saw a quantity of green fruit, but collected no more than six specimens of these, and four large pods which were ripe. I caused the Indian afterwards to part from the root some of the scions which had sprung up. These I tied well together, wrapping up the whole in the leaves of an Arum, which at their base are 3 feet wide. After thus packing a faggot, which weighed upwards of 30 lb., I placed it in my large sack, which I fastened on my horse. I was so well satisfied with my Indian, that besides what I promised him, I give him two reals in addition. For his part, unwillling to be outdone in generosity, he ran to his hut, and brought me three other pods of vanilla."

The Chica Vanilla of Panama is yielded by another Orchid, a species of Sobralia. The expressed juice of *V. claviculata*, a native of mountainous woods in the West Indies, is applied to recent wounds, and is hence called by the French in S. Domingo *Liane à blessures.* There is a species known as *zizpic* in Yucatan, which is a great ornament of the *cenotes* or subterranean water caverns of the country. These singular caverns are sometimes entirely subterranean, and are then of course without vegetation; frequently, however, they are more or less open at the top, when they are often of surpassing beauty on account of the luxuriant development of vegetable life which they contain. To these *cenotes* the few ferns of Yucatan are almost confined, and it is here that this vanilla attains perfection. The pods are occasionally taken to market at Valladolid, where they may be bought at an almost nominal price.

ADMIXTURE OF JAPAN WAX WITH BEES-WAX

BY C. MENE.

For some years past Japan wax has been offered in the ordinary French markets, where it is quoted at a price less than half that of bees-wax. The author, finding that it was used largely in the sophistication of bees-wax, thought it would be useful to seek a short and easy method of detecting the fraud. He therefore made numerous experiments as to the densities and melting and solidifying points of these substances, and mixtures of them in different proportions.* The results, from which the following notes are taken, were recently communicated to the French Academy.*

	Density.	Melting point.	Solidifying point.
Pure Yellow Japan Wax	1·00200	52-54° C.	45-46° C.
Bees-wax	9·96931	64-65	63-64
Mixtures :—			
50 per cent. Japan Wax / 50 „ Bees-wax .	0·93518	64-65	61-62
60 „ Japan Wax / 40 „ Bees-wax .	0·92785	64-65	61-62
65 „ Japan Wax / 35 „ Bees-wax .	0·90730	64-65	61-62
70 „ Japan Wax / 30 „ Bees-wax .	0·90452	63-64	61-62
75 „ Japan Wax / 25 „ Bees-wax .	0·90164	63-64	62-63
80 „ Japan Wax / 20 „ Bees-wax .	0·88703	63-64	62-63
90 „ Japan Wax / 10 „ Bees-wax .	0·85100	63-64	62-63

The densities of these substances were taken in alcohol, and their relation to the density of water calculated. As will be noticed, the density alone furnishes any help in detecting the fraud, the density of the mixture being always less than that of Japan wax or bees-wax. The author, therefore, thinks that the points of melting and solidification are of no service whatever.

It will be remembered, however, that Dr. Roucher, in an article on the employment of vegetable wax in pharmacy,* stated that he had found that Japan wax has two distinct melting points. As to the highest, he agrees with M. Mène in fixing it at 54° C.; this he states to be the melting point when the heat is applied gradually. But when Japan wax was rapidly raised to a temperature sufficiently above its melting point and allowed to cool, it afterwards melted at 42° C., or a temperature twelve degrees lower. As bees-wax presents no similar phenomenon, Dr. Roucher suggested that this would be an available test between the two substances. It would be interesting to know in what way mixtures of the two substances comport themselves under similar conditions.

* *Comptes Rendus*, vol. lxxxviii., p. 1544.

SYRUP OF HYPOPHOSPHITE OF IRON.

BY P. CARLES.

Syrup of hypophosphite of iron having for some time past been frequently prescribed by the physicians of Bordeaux, the author took occasion to criticize,—at a recent meeting of the Society of Pharmacy in that city,† the previously existing formulæ for its preparation.

He alluded principally to two formulæ, as being the more generally known, those of Wood and Hardy.

Wood's formula is represented by the author as consisting in the mixture of two solutions—one of sulphate of iron, acidulated with phosphoric acid, with another of hypophosphite of lime.‡ Sulphate of lime is formed, which is precipitated, whilst the acid hypophosphite of iron remains in solution, and is afterwards mixed with simple syrup. M. Carles says of this formula, that it is defective, in that (1) it gives an acid solution, in consequence of the addition of the phosphoric acid, which changes the nature of the desired product; (2) that it furnishes a syrup which is too dilute and difficult to preserve; (3) that the proportions of the ingredients do not correspond with the equivalents, 85 for the hypophosphite and 139 for the ferrous sulphate, required for double decomposition to take place exactly.

Hardy's formula consists in preparing hypophosphorous acid by the aid of hypophosphite of baryta and q. s. sulphuric acid, removing sulphate of baryta by filtration, and producing the hypophosphite of iron by boiling metallic iron in the dilute acid. This formula is criticized by the author on the ground that hypophosphite of baryta is a salt rarely met with in pharmacy, and, what is of more importance, is a poisonous salt; so that if the operation be conducted by a person only little accustomed to chemical reactions, a portion, in consequence of its solubility, may remain undecomposed in the liquor, and give rise eventually to a poisonous medicament. Besides, the process is tedious and minute, and requires special apparatus.

Another method which has been suggested, is to prepare the solution of hypophosphite of iron intended for the syrup, by double decomposition between oxalate of iron, which is now to be met with in most French pharmacies, and hypophosphite of lime. M. Carles finds, however, that in practice this method is very defective.

Commercial neutral oxalate of iron requires for its solution a large quantity of liquid, and the same inconvenience, though in less degree, occurs with hypophosphite of lime; so that the precipitation of the oxalate of lime is

* PHARM. JOURN. [3], vol. iii., p. 122.

† *Bulletin des Travaux de la Societe de Pharmacie de Bordeaux*, vol. xiv., p. 102.

‡ This does not quite correctly describe Wood's process, as may be seen by reference to the original paper in this Journal (second series, vol. ix. p. 461), where it is recommended to "rub the hypophosphite to fine powder, and pour on it the solution of sulphate of iron."

very slow, and the solutions are too dilute to be converted into syrup.

From a consideration of these facts, the author sought for a simple and rapid method, but one where the quality of the product would not be sacrificed to celerity. At first he thought to prepare the hypophosphite of iron by means of ferrous sulphate and hypophosphite of soda. The great solubility of these salts allowed of their being brought into contact in a very small volume of liquid. The addition of alcohol to the mixture separates the sulphate of soda, so that after filtration and evaporation of the alcohol, there remains a solution of hypophosphite of iron, which only requires to be mixed with very concentrated sugar syrup, or to be itself converted into syrup by the addition of suitable quantities of boiled water and sugar. Unfortunately alcohol only slowly and incompletely determines the precipitation of the sulphate of soda, and the filtration too is slow, so that in the interval the hypophosphite becomes partially insoluble and peroxidized.

M. Carles has finally adopted the following process as the best:—

Ferrous sulphate (crystals)	15·00
Hypophosphite of soda (crystals)	9·14
Distilled water (boiled)	350·00
Powdered sugar	660·00

The ferrous sulphate is pulverized and dissolved separately in about 20 grams of the water, and the hypophosphite in the remainder. The two solutions are mixed, and agitated violently. After a quarter of an hour the magma is thrown upon a fine cloth, pressed, and if necessary filtered through paper of open texture. A sufficiency of boiled distilled water is then added to make up the quantity of 360 grams of liquid, in which the sugar is dissolved by the aid of a gentle heat. The keeping of the syrup in partially filled bottles should be avoided as much as possible.

Each spoonful (25 grams) of the above syrup will contain 0·25 centigrams of hypophosphite. By mixing the syrup with an equal quantity of syrup of orange flowers, a medicine of much more agreeable flavour will be obtained. In this case each spoonful will contain 0·125 centigrams of hypophosphite of iron.

REPORT FROM THE SELECT COMMITTEE ON ADULTERATION OF FOOD ACT (1872).

The Select Committee appointed to inquire into the operation of the Adulteration of Food Act, 1872, have considered the matters referred to them, and have agreed to the following report:—

Your Committee having held 14 meetings, and examined 57 witnesses, have arrived at the unanimous conclusion that the Act has done much good. It has, at the same time, inflicted considerable injury, and imposed heavy and undeserved penalties upon some respectable tradesmen. This appears to have been owing mainly to the want of a clear understanding as to what *does* and what *does not* constitute adulteration; and in some cases to the conflicting decisions and inexperience of the analysts. Your Committee, however, are of opinion that the Act itself is defective, and needs amendment.

The adoption of the Act has been by no means general, and in many cases where it is applied and officers have been appointed, its operation has been of the most restricted character. Even where a competent analyst has been established, if the local authority does not associate a special inspector with him, or does not insist upon the police or other recognized officials performing the duties of inspectors, the Act remains a dead letter. It appears that only in 26 boroughs and 34 counties have appointments been made, while the number of boroughs under the Act is 171, and of counties, 54. In the City of London the Commissioners of Sewers, and in the rest of the metropolis all the vestries or district boards under the Metropolis Local Management Act, have appointed analysts.

From a return of the convictions in the year 1873, as received by the Home Office, it will be seen that the number of proceedings outside the metropolis and a few large towns has been singularly small. The amount of good resulting from the Act must not, however, be judged by the number of the prosecutions and convictions. The deterrent effects are undoubtedly great, and the opinion of the promoters has been substantiated, that the most beneficial effects of the Act would be to prevent adulteration, rather than to punish it.

Tea.—It appears that, since the Report of 1856, certain grossly prepared teas have been imported from China, some being largely mixed with exhausted leaves and ferruginous sand, and others much too highly faced or coloured; the ingredients used for colouring being chiefly Prussian blue or indigo, powdered gypsum and turmeric; but the total amount of such teas has been small, and is kept in check mainly by the low price of pure teas. The import of green teas has recently fallen considerably, in consequence, it is stated, of the operations of the Act.

Facing tea after the duty is paid was, prior to the Act of 1872, practised to a small extent in this country; but whether in China or at home, the evidence is conclusive that in colouring tea no deleterious matter is used to such an extent as to be absolutely injurious to health; at the same time facing may be employed to conceal tea of a bad quality. Your Committee have reason to believe that very little adulteration of tea is practised in this country.

They would further observe that defacing tea, or removing artificial colour, seems now much more common, but this process does not appear to extract the ingredients which form the base of the colouring matter; it simply removes the colour, leaving all the other materials on the tea.

It is proved that the bright green teas of China are always faced, and that the natural green teas of Japan, India, etc., are frequently of a colour hardly distinguishable from some qualities of black tea. While condemning the practice of highly facing tea, your Committee cannot recommend that fairly faced green tea should be condemned as an adulterated article.

Suggestions have been made that a certain per-centage should be allowed for colouring matters and other impurities in tea. But your Committee consider that the limitation to a very small per-centage of foreign matter would exclude from the country some wholesome low-priced teas, which are largely consumed by the poor, and if a less stringent limit were adopted, it might have the effect of increasing the amount of facing laid upon the better descriptions of green teas.

The Act has borne with considerable hardship upon the retail grocers, among others, from the following causes:—The evidence and samples being, in the first instance, entirely in the hands of the prosecution; the defendant being incapacitated as a witness; the sole employment of analysts, to the exclusion of practical judges of the article; the differences among analysts, and the magisterial decisions thereon; and the recent judgment of the Court of Queen's Bench, that under this Act the faced tea known as green tea is adulterated; but more especially that the alleged adulteration has taken place before the tea reached the retailer, and that he is not responsible for the frauds and tricks of the Chinese manufacturer.

It has been repeatedly suggested to your Committee that an examination of tea, for the purpose of detecting impurities, should be undertaken on landing by the Customs; and that all tea found to be seriously adulterated should not be admitted for home consumption.

The Chairman of the Customs admitted that such an inspection of tea in bond could be undertaken by the Custom House officers, and that the great bulk of the tea would require but a brief examination by good practical officials, while suspected samples could be analysed at the laboratory at Somerset House.

Your Committee recommend that this examination should be made, as they believe it would practically stop the sale in this country of tea adulterated abroad, and relieve the retail dealer from the hardship which now arises from his being held answerable for certain manipulations of which he may be wholly ignorant.

Milk.—The evidence before your Committee points to the fact that, previous to the passing of the Act of 1872, milk was generally adulterated with water. It has since greatly improved in quality wherever the Act has been enforced, but the good results in improving the milk supply have not been attained without some serious cases of injury and injustice to milk-sellers.

Too high and rigid a standard has been fixed by some analysts, and no sufficient allowances have been made for the natural variations in milk. Ten per cent. of milk solids may be more difficult to obtain under certain unfavourable conditions than twelve or fourteen under a more generous diet, a warmer atmosphere, and more confortable lodging. Not only does the quality of milk vary with the food, the breed of cattle, the time of year, and treatment of the animals, but the milk of one cow of the same breed will differ greatly from that of another, managed under a precisely similar system; and further, the first and last pint of milk which a cow gives at the same milking will present all the difference between an extremely poor, and an exceedingly rich milk. Allowances should therefore be made for these natural variations, which some purely scientific chemists seem to have occasionally overlooked.

It has been argued that, notwithstanding all these discrepancies, a certain per-centage of solids might be agreed upon below which no milk should be considered pure. If a low standard were fixed, there would be a great inducement for the vendors of really rich milk to abstract a portion of the cream without reducing the milk below the recognized standard, and, on the other hand, it might offer a premium upon the production of a naturally poor class of milk.

Your Committee are decidedly of opinion that the fraudulent abstraction of cream should be punishable; at the same time they consider the sale of skim milk should be encouraged, as it is certainly a nutritious and valuable article of food; but your Committee are unanimous that the sale of *skim* milk for *new* should decidedly be regarded as a punishable offence.

Butter.—Butter is often imperfectly made in the United Kingdom, and sometimes contains too much water, and now and then an unfair proportion of salt; beyond this, it does not appear that adulteration is much practised in this country. Certain foreign butters are mixed with lard and other fats, and there is reason to believe that salt and water, after the butter comes from the farmer, are added in some manufactories abroad. Attempts are being made in France and elsewhere to manufacture artificial butter, chiefly from the fat of animals; if these articles are composed of wholesome materials, and not sold as butter, your Committee see no reason to forbid their sale. The slight colouring matter occasionally added to butter, cheese, etc., should not, in the opinion of your Committee, be regarded as an adulteration.

Bread.—Bread, on the whole, appears to be fairly pure. Potatoes are used to help fermentation, and rice flour is employed in dusting the loaves. No doubt the chief adulteration is alum, and evidcnce was adduced showing the great difficulty which the best chemists experience in discovering minute quantities of alum in bread.

Mixtures.—Your Committee have had under their consideration the sale of mixed articles of food and condiments; amongst them great prominence has been given to mustard and cocoa. The evidence tends to show that these articles have been sold pure, as well as mixed with other ingredients, to suit the requirements of consumers. And it has also been demonstrated, to the satisfaction of your Committee, that the compounds are frequently made quite as much to suit the public taste as to increase the profit of the manufacturers, inasmuch as by using a lower quality of mustard-seed or cocoa-bean, a pure article may be made at a lower price than some of the mixtures. For this reason the statement of the proportion of each ingredient used could not be any real protection to the consumer, and should not be required. It is also due to the manufacturer to record that mixed mustard and prepared cocoa are, and have long been, manufactured at the Deptford Yard, for the supply of the navy.

Your Committee, therefore, come to the conclusion that the sale of such mixtures or compounds is allowable, and, indeed, needful, to meet the public requirements, provided the fact of their being mixtures is plainly indicated to the purchaser by a legible label or notice, conspicuously attached to the outside of each package in which, or vessel from which such mixture is sold. A verbal declaration at the time of sale is impracticable, and if practicable would be unnecessary when a proper label is used.

Corn Flour.—The attention of your Committee has been called to the article known as corn flour, in reference to which important evidence as to its purity and its useful dietetic qualities has been given by some eminent medical and chemical authorities, which, however, is denied by one witness. Your Committee are fully convinced that the manufacture is quite legitimate, and that like arrowroot, sago, and other starch foods, corn flour is perfectly wholesome, but that it should not in any case be given to infants without a considerable admixture of milk.

Wines, Spirits, and Beer.—The adulteration of wines, spirits, and beer, have not been extensively examined under the Act of 1872. The Licensing Act, which was passed in the same year, contained special clauses against the adulteration of these articles. The evidence before your Committee is of a negative character, and it may be that alcoholic drinks have slipped through between the two Acts. The adulteration clauses in the Licensing Act are sought to be repealed by a bill that has just passed the House of Commons, and there appears to be no reason to doubt that if this Act is amended as your Committee suggest, it will contain ample powers for detecting the adulteration in the drink as well as the food of the people. Witnesses have stated that spirits are largely diluted with water, but are rarely adulterated with sulphuric acid; that almost all wines are more or less "fortified" for the English market; and that water is often added by the publican to beer and porter (perhaps with an addition of salt or sugar), but few of those villainous compounds with which malt liquors were formerly much adulterated have been recently discovered by any analysis. There was a singularly unanimous expression of opinion from many scientific witnesses as to the baneful and maddening effects produced by the consumption of very new and roughly-distilled spirits.

Several witnesses have complained to your Committee of the manner in which the cases under this Act have been tried before justices. They state that in some instances the magistrates, considering the prosecution to be a criminal one, would not allow the defendant to be examined. Your Committee believe that, in all cases, this privilege should be accorded to the accused and his wife. Your Committee also think that when a retail dealer, charged with adulterating an article, shall produce evidence that he bought the article under guarantee from a wholesale dealer, and that he sold the article in the same state and condition as he received it from such wholesale dealer, it shall be lawful for the magistrate, upon the retail dealer giving security for costs, to summon the wholesale dealer as well as the retailer. In some cases, magistrates have declined to allow any other analysis than that of the analyst appointed to act for the district to be taken as evidence. Your Committee think that evidence from well-established analysts should be allowed to be produced for the defence; and they suggest that when cases of dispute arise between the chemical authorities, there should be some court of appeal to settle the disputed points. It has been suggested that such an authority might be easily established at the laboratory of

Somerset House; and the official witness from that department gave your Committee to understand that, with a little enlargement and assistance, the existing laboratory and staff could undertake these important duties. In the absence of further information as to any better appeal, your Committee suggest that where the analysis of the chemist of the local authority is challenged, the sample which is the matter of dispute shall be analysed at the laboratory of Somerset House, and the decision arrived at there be regarded as final.

It was stated to your Committee that some justices would not accept the analysis of the chemist of the local authority without his presence in court; others insisted on his signature to his analysis being duly witnessed, and in all cases it appears that the inspector is bound himself to deliver the sample of the goods to the analyst. This, besides taking the inspector for days from his legitimate duties, entails considerable expense upon the local authority, in the case where the analyst resides outside the district or where one gentleman holds several appointments. Your Committee consider that if the sample is duly secured, and properly sealed, it may be sent by post, or by other safe means; and they are of opinion that the analysis of the chemist of the local authority should be received in evidence without his presence being necessary, unless the defendant should demand the personal attendance of such analyst. There does not seem to be much necessity for attestation of the analyst's signature, nor is it apparently required by existing Acts, but in any case your Committee consider that the practice in this particular should be everywhere similar, and that proper forms for the analysis of different articles should be issued by some central authority, so as to secure greater uniformity and more detail in these documents in all courts of justice.

Many witnesses have declared that the failures and hardships in carrying out the Act have been chiefly due to the incompetence and inexperience of the analysts. Your Committee, whilst refraining from endorsing this wholesale condemnation, admit that some of these gentlemen appear to have evinced more zeal than discretion in carrying out their novel and difficult duties. In some cases, indeed, a decided want of chemical knowledge has been proved, but no more than was to be expected from the sudden call made for the services of adepts in a branch of chemistry which had not previously been very highly valued. Witnesses testified their belief that few really competent analysts were at present to be found in this country, and one eminent chemist stated that he did not think more than "a dozen such men existed;" but, as chemical analysis will now be better taught and better understood, there seems to be no reason to doubt that in a few years there will be an abundant supply of reliable scientific analysts. In the meantime, it seems to your Committee that small districts should be as much as possible consolidated; that, as a rule, the boroughs in a county should be united with the county for the purposes of appointing one analyst for the entire district, and that the only way of securing the services of really efficient analysts is to offer them a fair remuneration, which can hardly be done without the union of several local authorities in one appointment.

To the Local Government Board has been confided the power of revoking or confirming the appointments of the analysts; but without any recognized authority to guide them (beyond the long list of testimonials which seem always forthcoming), the Board have not the means of performing satisfactorily the task imposed upon them. Your Committee think some practical test might reasonably be required from the analysts, to prove their competency to perform the duties of their office.

Evidence has been offered to your Committee that the requisites for a thorough examination of the knowledge and skill of the analyst exist at the School of Chemistry at South Kensington; and they suggest that the Local Government Board should have the option of calling upon the analyst for a certificate of having there passed such an examination.

Complaints have been made by the metropolitan vestries that the fines inflicted under the Act are paid to the General Police Fund. Your Committee think that the Act of 1860 intended that the fines should be paid to the vestries; and they are of opinion that it is only reasonable the fines should go the local authority which has had the trouble and expense of enforcing the Act.

Your Committee consider that inspectors, when traders refuse to sell them articles which are exposed for sale, should be empowered to take samples of goods they suspect to be adulterated, upon tendering payment of the full value of the article. That in all cases the inspector should leave with the trader a duplicate sample of the goods he intends to have analysed, properly securing and sealing the same in the presence of the vendor; and that in no case shall more than one month elapse before the result of the investigation is made known to the trader.

Your Committee suggests that the two Acts to which this inquiry refers, viz., the Adulteration Acts of 1860 and 1872 (23 and 24 Vict. c. 84, and 35 and 36 Vict. c. 74), should be repealed, and another Act, consolidating and amending these statutes, substituted for them. That in the new Act, besides the changes already recommended, it should be provided that the fraudulent abstraction of important properties of any commodity, should be a punishable offence, but that a distinction should be drawn between this and the fraudulent or noxious addition of ingredients, which, more strictly speaking, constitutes adulteration; and that Clause 9 of the Act of 1872 should be so far modified as not to make it incumbent on the analyst to give a certificate, except when he finds the articles submitted to him to be adulterated or debased. They further recommend that the Act should be made compulsory.

In conclusion, your Committee believe it will afford some consolation to the public to know that in the matter of adulteration they are *cheated* rather than *poisoned*. Witnesses of the highest standing concur in stating that, in the numerous articles of food and drink which they have analysed, they have found scarcely anything absolutely injurious to health; and that if deleterious substances are occasionally employed for the purposes of adulteration, they are used in such minute quantities as to be comparatively harmless. Your Committee believe that it is the intention of Parliament that consumers should be protected from frauds, and that they should be enabled to procure the articles they ask for and require. But your Committee do not consider that Parliament desires needlessly to hamper or fetter trade, still less to interfere between the buyer and seller with the view of regulating prices, or attempting to assist the consumer in ascertaining the real money value of any marketable commodity.

REPORT FROM THE SELECT COMMITTEE ON EXPLOSIVE SUBSTANCES.

The Select Committee appointed to inquire into the law relating to the making, keeping, carriage, and importation of gunpowder, nitro-glycerine, ammunition, fireworks, and all substances of an explosive nature, and to consider the best means of making adequate provision for the safety of the public, and of the persons employed in such making, keeping, carriage, and importation, with a due regard to the necessities of the trade, have issued their report, of which the following is an abstract.

The explosive substances to which the Committee have directed their attention, are classified as follows:—

(1.) *Gunpowder;* viz., any preparation formed by the mechanical mixture of a nitrate with any form of carbon, or with any carbonaceous substance not possessed of explosive properties, whether sulphur be or be not added to such preparation, and whether such preparation be or be not mechanically mixed with any other non-explosive substance. This class comprises such explosives as gunpowder (ordinarily so called), pyrolithe, pudrolithe, poudre-saxifragine. Any preparation of this class, if mechanically mixed with any nitro-explosive or chlorate-explosive is included in the nitro class or chlorate class respectively, and not in this class.

(2.) *Nitro-explosive class;* viz., any chemical compound possessed of explosive properties, or capable of combining with metals to form an explosive compound which is produced by the chemical action of nitric acid (whether mixed or not with sulphuric acid), or of a nitrate mixed with sulphuric acid upon any carbonaceous substance, whether such compound is mechanically mixed with other substances or not.

This class consists of two divisions. The first comprises such explosives as nitro-glycerine (ordinarily so called), dynamite, lithofracteur, dualine, gly-oxiline, nitrate of methyl, and any chemical compound, or mechanically mixed preparation, which consists either wholly or partly of nitro-glycerine, or of some other liquid nitro-explosive.

The second division comprises such explosives as gun-cotton (ordinarily so called), gun-paper, xyloidine, gun sawdust, nitrated gun-cotton, cotton gunpowder, Schultze's powder, nitro-mannite, picrates, picric powder. Where any explosive of this class consists partly of a nitro-explosive and partly of a chlorate-explosive, it is to belong to the chlorate-explosive class.

(3.) *Chlorate-explosive class;* viz., all preparations containing a chlorate mechanically mixed with any form of carbon or any carbonaceous substance, either with or without the addition of a nitrate, or a sulphuret, or sulphur.

This class consists of two divisions. The first comprises such explosives as Horsley's blasting powder, Brain's blasting powder, and any chlorate preparation which consists partly of nitro-glycerine or of any liquid nitro-explosive.

The second division comprises such explosives as Horsley's original blasting powder, Erhardt's powder, German gunpowder, Reveley's powder, Hochstadter's blasting charges, Reichen's blasting charges, teutonite, chlorated gun-cotton.

(4.) *Fulminate-explosives;* viz., any chemical compound or mechanical mixture, which, from its great susceptibility to detonation, is suitable for employment in percussion caps or any other appliances for developing detonation, or which, from its extreme sensibility to explosion, and from its great instability (that is to say, readiness to undergo decomposition from very slight exciting causes), is especially dangerous.

This class consists of two divisions. The first division comprises such compounds as the fulminates of silver and of mercury, and preparations of these substances, such as are used in percussion caps; and any preparation consisting of a mixture of a chlorate with phosphorus, or certain descriptions of phosphorus compounds, with or without the addition of carbonaceous matter, and any preparation consisting of a mixture of a chlorate with sulphur, or with a sulphuret, with or without carbonaceous matter.

The second division comprises such substances as the chloride and the iodide of nitrogen, fulminating gold and silver, diazobenzol, and the nitrate of diazobenzol.

(5.) *Ammunition.*—This class includes any explosive of any of the foregoing classes, when enclosed in any case or contrivance, so as to form a cartridge for small arms, or for a weapon other than cannon; or to form any fuze for blasting or for shells; or to form any tube for firing guns; or to form a percussion cap, a detonator, or any contrivance other than the following: a cartridge or charge for cannon or blasting, a shell, a torpedo, or a manufactured firework.

This class consists of two divisions:—The first division comprises—Safety cartridges for small arms, safety blasting fuzes, percussion caps, railway fog signals, safety fuzes for shells.

The second division comprises—Non-safety cartridges for small arms, detonators, non-safety fuzes for blasting, non-safety fuzes for shells, war rockets, tubes for firing guns.

(6.) *Fireworks.*—This class consists of two divisions. The first comprises firework composition, which is any chemical compound or mechanically mixed preparation which is of a combustible or inflammable nature, and is used for the purpose of making manufactured fireworks, and which is not included in the former classes of explosives; and also any coloured fire composition.

The second division comprises any manufactured firework, which includes every explosive of the four first of the foregoing classes, and any firework composition, when such explosive or composition is enclosed in any case or contrivance, or is otherwise manufactured, so as to form a squib, cracker, or other article adapted to the production of pyrotechnic effects or pyrotechnic signals.

The law relating to the foregoing explosives is at present contained in five public Acts, viz.:—The Gunpowder Act, 1860, 23 & 24 Vict. c. 139; Gunpowder Amendment Act, 1861, 24 & 25 Vict. c. 130; Gunpowder Amendment Act, 1862, 25 & 26 Vict. c. 98; the Carriage of Dangerous Goods Act, 1866, 29 & 30 Vict. c. 69; Nitro-Glycerine Act, 1869, 32 and 33 Vict. c. 113. There are also a number of local and special Acts containing provisions upon this subject, of which the more important are the 14 & 16 Vict. c. 67, and the 28 & 29 Vict. c. 278, both relating to the storage of explosives in Liverpool and on the River Mersey.

In the opinion of the Committee, the Acts above-named do not make adequate provision for the manufacture, storage, and transport of many of the explosives to which their attention has been directed; nor for the safety of the public, or of the persons employed in dealing with those explosives, while some of them impose in some respects unnecessary restrictions, and consequently further legislation is required.

The Committee find that the stores of gunpowder may practically be divided into three classes:—(1) Store magazines, belonging to gunpowder manufacturers and merchants; (2) Consumers' magazines, for mine and other purposes; (3) Retail stores.

It appears, with regard to the situation of many of the large store magazines, that the safety of the public is not sufficiently provided for by adequate isolation of the magazines with reference to the quantities which they contain; and that the precautions taken by the store keepers of these magazines in the very large majority of cases, are not of the character which are shown to be necessary to insure safety, and which are adopted in Government magazines. Also, that the present law with regard to consumers' magazines is, in many instances, inconvenient and impracticable, while the evidence before the Committee tended to show that very great carelessness prevails in the management of these stores.

With regard to the retail stores, the Committee find that, except in regard to the amount which may be kept, they are wholly unregulated by the Acts; and as this trade may be carried on without a licence or registration, there is really no supervision with regard to the place or mode of storage, or as to the persons by whom such retail trade may be carried on.

The evidence of many of the witnesses goes to show that no adequate provision is made for the public safety as to the proper package or modes of conveyance for explosives when transported from one place to another, or for forbidding the transport, the loading and unloading of dangerously large quantities, through cities and populous places. The present general law does not in any way regulate the importation or exportation of gunpowder.

With regard to the manufacture of nitro-explosives, the Committee find that, excepting the Nitro-glycerine Act, (32 & 33 Vict. c. 113), which forbids the manufacture of nitro-glycerine preparations, except by licence from the

Secretary of State, there is no adequate legal provision for regulating the manufacture, storage, transport, importation, or shipment of explosives of this class. But the law relating to the keeping of some preparations of nitro-glycerine is unnecessarily restrictive as compared with the legislation relating to other explosives, and a similar remark applies to the carriage, importation, and exportation of such preparations of nitro-glycerine. The law relating to the chlorate and fulminate class appears to be insufficient to the public safety.

With regard to the ammunition and firework classes, the Committee find that, while the law fails to provide adequately for the safety of the public, and the persons employed in those trades, it is in some respects unduly restrictive and inconvenient to the persons engaged in them.

The Committee, therefore, consider that the law relating to the making, keeping, carriage, and importation of gunpowder, nitro-glycerine, ammunition, fireworks, and all substances of an explosive nature, does not make adequate provision for the safety of the public, or of the persons employed in such making, keeping, carriage, and importation, and that further legislation is urgently required with a due regard to the necessities of the trade.

A "Summary of Suggestions" submitted by Major Majendie, with modifications made in consequence of other evidence, was adopted by the Committee as the basis of their recommendations for further legislation, which include the following points—

A new Act to amend and consolidate the Acts regulating the manufacture, keeping, selling, carrying, and importing of explosive substances according to the foregoing classification, the manufacture of gunpowder being made the subject of separate provisions, and power being given to Her Majesty in Council to extend the Act to any explosive not specifically named or defined in the same. Except such operations as the filling of small-arm cartridges, the preparing of blasting cartridges (which should be permitted to be carried on without a license, but under certain precautions to secure safety), the manufacture of explosives and the operations connected therewith to be carried on only under a "common" or "special" licence, without one of which licences also,

No person to keep any explosive above a certain limit, except a carrier carrying in accordance with the Act, and not keeping the same beyond the time actually necessary for his business. No person to sell or deal in explosives unless he hold a license to manufacture, keep, or import such explosives, and no explosives to be imported without a "special" licence.

"Common" licences, for a term not exceeding ten years without renewal, to be obtained as a matter of course, on application to the licensing authority, unless the person or premises be disqualified. In the case of manufacturers, to be granted for the manufacture of fireworks on a small scale.

In the case of storage "common" licences to be of two sorts :—(*a*) "Common house" licences to meet the case of the ordinary retailer, and authorizing the storage up to 300 lbs. of gunpowder, or 1,500 lbs. if in cartridges, and proportionate amounts of fireworks. (*b*) "Common magazines" licence to meet the case of the mine owner, or person requiring to store more considerable quantities for industrial operations, authorizing the storage up to two tons of gunpowder or one ton of gun-cotton or dynamite, or five times the amount of gunpowder in small-arm cartridges, or ten tons of fireworks, according to the conditions of storage and the distance from protected places.

Special licences to be obtained for manufacture or storage of either larger quantities than are allowed by common licences, or for similar quantities under special conditions; these "special" licences to be granted by the local authorities, upon the report of an inspector, and subject to such conditions as to area and description of licensed premises, quantities, distances, and precautions, as the inspector may recommend. Special licences for importation to be granted by the local authorities.

The licencing authorities for special licences are to be:—In the City of London, the Lord Mayor and Aldermen; in the rest of the Metropolitan Board of Works District, the Metropolitan Board of Works; in boroughs, the Town Council; in any harbour, the harbour authority; in counties, Quarter Sessions; in Scotland, the sheriff. For common licences, to be the same, except in an urban sanitary district (not included in a harbour) where the Urban Sanitary Authority is to have the power; and instead of Quarter Sessions, Petty Sessions.

The destruction by explosion of a magazine under a common licence to be at once reported to the inspector, and the existing license to be considered as temporary until the inspector has reported whether the licence should be continued as before, or the licensee should take out a special licence. If two or more buildings of a licensed factory, other than the incorporating mills of a gunpowder factory, are destroyed by explosion, the licensee not to re-erect more than one of such buildings without the written consent of the Secretary of State for Home Affairs, or otherwise than in accordance with such conditions as to mounds, or other precautions, as the said Secretary of State may impose.

The carriage of explosives to be carried on without a licence (except water-carriage in harbours where bye-laws to that effect exist), but under certain statutory "general rules," and all explosives carried to be duly labelled and declared.

Harbour authorities to have power to make bye-laws, subject to approval of Secretary of State, to regulate the navigation and place of mooring of ships, safe stowing and safe keeping of explosives on board; and railway and canal companies for regulating the loading and carriage of explosives over their rail or canal.

"General rules" for the manufacture, storage, packing, and carriage of explosives to be enacted. These rules to be variable only by Order in Council, but no varied rules to be in force unless they have been laid one month on the table of the House of Commons. "Special rules" to be framed by every manufacturer (except small firework makers, who should be provided for by extra rules to be framed by the Secretary of State for Home Affairs), and every holder of a special or sommon magazine licence, or of a special importation licence, if required by the said Secretary of State, for the conduct and guidance of the workpeople in his factory or magazine or place of importation. All "special rules" made as above to be confirmed by the Secretary of State for Home Affairs, who may disallow or add to the same.

Inspectors to be appointed by the Secretary of State for Home Affairs, who are to have power to make such examination, entry, and inquiry, as may be necessary to ascertain whether the provisions of the Act are complied with, and to take samples for analysis of any explosive, or supposed explosive, on tender of payment, and to require railway companies to carry such samples. An inspector to have power in the case of his observing anything unnecessarily dangerous and defective, to give notice to licensee, and require the same to be remedied, subject to an appeal to arbitration (as in the Mines Acts); and, if the matter be, in the opinion of the inspector, urgent, and tend to the bodily danger of any person, to require the same to be remedied forthwith.

Penalties, which may include in some cases forfeiture of licence, to be imposed for a substantial departure from any important condition of the licence, or for making, or storing, or importing an explosive without a licence (where licence is required), or otherwise than in accordance with the terms of such licence, or for wilful neglect, or wilful act, tending to endanger life or limb; with power, if the case is tried on indictment, for the court to forfeit a licence (except in the case of magazines and factories lawfully existing at the time of the passing of the Act).

It is further recommended that the Act should not apply to factories and magazines and explosives belonging to the Crown, or to volunteer storehouses.

The Pharmaceutical Journal.

SATURDAY, JULY 11, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square. Instructions from Members and Associates respecting the transmission of the Journal should be sent to* ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C. Advertisements to Messrs.* CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REPORT OF THE COMMITTEE ON THE ADULTERATION ACT.

WITH somewhat startling promptitude, the Select Committee appointed to inquire into the operation of the Adulteration of Food Act, 1872, has issued its report, and we believe that the majority of those who have watched the proceedings of the Committee with any degree of capability to judge of the merits of the evidence given, will be agreeably surprised at the general fairness and good sense which characterize both the criticism of the Act and the suggestions for its amendment.

With a fresh recollection of the heterogeneous nature of the evidence given by the eighty-seven witnesses examined at the fourteen meetings held by the Committee, it is highly satisfactory to find such a result produced so speedily; and there is much reason for the general public, as well as the trading community, to be grateful to the members of this Committee for the careful and energetic manner in which they have performed their functions.

Considering how amply trade interests were represented on the Committee, it is a high testimony to the practical value of the Adulteration Act to find that the report commences with a declaration that the Committee having considered the matters referred to it, the unanimous conclusion has been arrived at that the Act has done much good. That it has also the means of inflicting considerable injury upon respectable tradesmen, and in some instances of imposing upon them undeserved penalties, is a fact which has become so obvious that its recognition could not be avoided by any impartial inquirers.

In regard to the vexed question of mixed articles of food and condiments, such as cocoa and mustard, it is considered that the evidence tends to show that these articles have been sold to suit the requirements of consumers; that the compounds are frequently made, quite as much to suit the public taste as to increase the profit of the manufacturers. It is therefore proposed to make the sale of such mixtures allowable, upon condition that a legible statement of the fact that they are mixtures is attached to each package when sold, but without the necessity for verbal declaration as well. The statement of the proportion of each ingredient in such mixtures is objected to, on the ground that it could not afford any real protection to the consumer.

The shocking nonsense that has been talked about the innutritious and hurtful qualities of the purified amylaceous preparations analogous to arrowroot, and commonly known by the name of corn flour, has been very properly denounced by the Committee, and due weight has been given to the more sensible evidence that corn flour, when properly used, is a convenient and useful dietetic article, although it is not in itself a perfect food.

One very important suggestion of the Committee is, that when a retail dealer, charged with adulterating any article, shall produce evidence that he bought the article under guarantee from a wholesale dealer, and that he sold the article in the same state and condition that he received it from the wholesale dealer, it shall be in the power of the magistrate to summon the wholesale dealer, as well as the retailer.

We cannot conceive any provision more thoroughly calculated to afford at the same time due protection to the public, and to the retailer who is honestly desirous of supplying pure commodities.

The appointment of some properly constituted authority, to whom appeal can be made in disputed cases, seems to be decidedly approved of by the Committee, and it is suggested that the chemical officials connected with the Inland Revenue laboratory should be entrusted with the decision of such cases. This is suggested in the absence of further information as to any better means of dealing with disputed points, and it has at least the merit of giving definite recognition to a great want as regards the working of the Adulteration Act. We regret, however, that this important point has not been more thoroughly gone into. For reasons we have stated on several previous occasions, we do not altogether concur in the opinion that the duty of deciding disputed cases should be assigned to a special department of the Inland Revenue Board, though we do not in any way undervalue the services rendered by that department in its own sphere.

The admitted want experienced by the Local Government Board of competent guidance in regard to the exercise of its power to confirm or revoke the appointments of analysts appears also to point to the necessity for appointing a special Board for this purpose, as well as for the settlement of disputed cases; and this is one of the things most pressingly necessary for the proper working of the Adulteration Act.

In regard to drugs, there are not any suggestions in the report of the Committee, but it may be assumed that the spirit of the recommendations respecting articles of more general consumption, is intended to apply to the trade in drugs as well, and we have therefore deemed it desirable to place the report of the Committee before our readers in full.

THE IRISH PHARMACY QUESTION.

THE Select Committee entrusted by the House of Commons with the consideration of the Apothecaries' Licences Bill, introduced by Mr. ERRINGTON, has met twice during the present week. On Monday the Committee only met for an hour, and little was done beyond choosing the Chief Secretary for Ireland, Sir MICHAEL E. HICKS-BEACH, as Chairman. On Thursday the evidence of Dr. LEET, Secretary to the Court of Apothecaries' Hall, Dublin; Mr. THOMAS COLLINS, Director of Apothecaries' Hall, Dublin; and Mr. HAYES, the Secretary of the United Chemists and Druggists' Society of Ireland, was taken.

Dr. LEET was first examined, but in consequence of the low tone in which he spoke, notwithstanding repeated requests from the Chairman to speak louder, it was almost impossible for any one but the official reporter to hear much that he said. So far as we could gather, he appeared to object to the Bill on the ground that the English Pharmacy Act was not suited for extension to Ireland. He agreed with the preamble of the proposed Bill, stating the inconvenience entailed on the public in many parts of Ireland in consequence of the deficiency of shops and establishments for the sale of medicines and compounding of prescriptions, but he was of opinion that there was a sufficient supply in large towns. This deficiency, he thought, would be best supplied by the scheme which has been drawn up by the Court of Apothecaries' Hall. He did not wish to say anything against the examinations of the Pharmaceutical Society, but he urged that there were many persons on the English Register who had not passed any examination, and he objected to their being admitted to dispense prescriptions in Ireland. To a question whether dispensers who were good enough for England were not equally good for Ireland, he replied that many unexamined persons were admitted to the English Register by the necessity of circumstances which do not exist in Ireland, where none but licentiate apothecaries are now allowed to dispense physicians' prescriptions. Some surprise was excited by the list of subjects mentioned by Dr. LEET as those in which, at present, it is necessary to pass an examination before gaining the right to dispense prescriptions as an apothecary, and the remark that only in anatomy and physiology was it necessary to attend a second course of lectures, was followed by an audible "Is that all!" from one of the Committee. Of course, Dr. LEET objected to counter prescribing on the part of the pharmaceutical chemists of the Apothecaries' Hall scheme; but in answer to a question whether the creation of such a class would not render it unnecessary for apothecaries to dispense their own medicines, he gave no more definite answer than that the right of apothecaries to dispense was reserved in the scheme of the company. Dr. LEET further said that he thought it was desirable for the Pharmaceutical Society which it had been proposed to establish to be an independent body, and that it was intended to hand over any surplus from the examination fees towards the support of a school of pharmacy; though to judge by the extremely small amount of income from examinations stated by the next witness to have been received by the Apothecaries' Company in past years, such a surplus would not do much good in that respect.

Mr. COLLINS endorsed generally his colleague's evidence, so far as he had heard it. He thought it was necessary that the dispenser of medicines should possess a higher qualification than the mere sellers of drugs and poisons; and admitted that the English Major examination might suffice to ensure this, though he thought the Minor would not. However, unless Mr. COLLINS has an intimate acquaintance with the standards adopted in these examinations, and it did not appear that he has, the force of his remark is not very obvious, for he immediately afterwards declared his ability to make the Minor examination, as it is officially described, as searching a test as the Major. The present dearth of establishments for the compounding of medicines, he attributed mainly—not to the difficult examinations, but to the Irish Poor Law Dispensary system, under which former patients of the apothecary now obtained their medicines gratis. Mr. COLLINS's reason for apothecaries continuing to keep open shop in the event of a sufficient supply of pharmaceutical chemists being forthcoming was one that none but an apothecary would venture to put forward, however near the truth it may be. He said that as soon as the apothecary's consumption of drugs and medicinal preparations was limited to his own prescriptions he would cease to keep many of them, and confine himself to the use of a much smaller number. One main point of this witness's evidence was, the importance attributed to the three years' experience of practical pharmacy required in the Apothecaries' Hall scheme, and it was evident he was ignorant that a similar provision is shortly to come into force in this country. Similar ignorance of the true state of affairs was shadowed forth in a remark that the effect of an extension of the Pharmacy Act to Ireland would be to draw all the Irish students (with their fees) to the school of Pharmacy belonging to the Pharmaceutical Society of Great Britain.

Mr. HAYES objected to Mr. ERRINGTON's Bill, on the ground that the extension of the 15th section of the Pharmacy Act, 1868, to Ireland, making it illegal for unregistered persons to call themselves chemists and druggists, would affect the majority of that class in Ireland. This, it was remarked by the Chairman, was evidently not intended, and of course the reservation of existing rights is a matter of detail that could easily be arranged. He was in favour of the Apothecaries' Hall scheme, as one that he thought promised to provide a School of Pharmacy, and he said that with a few exceptions, especially the reservation of the rights of present assistants to chemists and druggists, the scheme had the approval of the United Society of Druggists.

The Committee is to meet again on Monday next. We believe it is desired that on that occasion some members of the Pharmaceutical Society should attend and give evidence.

AT the Northamptonshire Petty Sessions held last week, the General Committee recommended the appointment of Mr. YOUNG, Pharmaceutical chemist, of Leicester, as analyst for the county. An amendment was moved by Mr. ASHBY ASHBY to the effect that, considering the great expense which would be involved in the carrying out of the Act, no public analyst for this county be at present appointed. On a division, the motion of Lord HENLEY for the appointment of Mr. YOUNG was carried by a majority of 12 to 5.

Mr. YOUNG is also public analyst for the Borough of Leicester, and Counties of Leicester and Rutland.

MR. T. M. DEIGHTON, of Bridgnorth, Pharmaceutical Chemist, and Local Secretary to the Pharmaceutical Society, has been appointed by the Lord CHANCELLOR to be one of the magistrates of the borough of Bridgnorth.

Parliamentary and Law Proceedings.

Charge against a Chemist and Druggist of Adulterating Quinine.

On Thursday, at the police court at Tunstall, Staffordshire, before Mr. H. C. Greenwood, stipendiary magistrate, Mr. W. S. Pearson, chemist and druggist, of Kidsgrove, was summoned for having sold, as unadulterated, some quinine which was largely adulterated with sulphate of cinchonine; the latter being comparatively valueless for medical purposes, and (under the Pharmacy Act, 1868) injurious to health. Mr. Fulford, barrister, instructed by the clerk of the peace for Staffordshire, appeared in support of the charge, and Mr. F. W. Tomkinson, solicitor, for the defence.

Mr. Fulford: I believe the case was before the court a fortnight ago, but I do not know how far it went.

Mr. Greenwood: It was not gone into on that occasion.

Mr. Fulford: Then we will begin at the beginning. This is a charge against Mr. Pearson for having sold to William Gifford, as unadulterated, a certain quantity of sulphate of quinine, which quinine was adulterated with a certain quantity of sulphate of cinchonine. It appears that on the 18th of June, William Gifford, assistant to Mr. Knight, inspector for this division of the county, purchased at the shop of Mr. Pearson, at Kidsgrove, a quantity of quinine. At the time of the purchase, Gifford gave the proper notice to Mr. Pearson that the quinine was to be delivered to Mr. Scott on the 20th of April in order that it might be analysed, Mr. Scott being the county analyst. The analysis was made by Mr. Scott, and I now hand in his certificate.

Mr. Tomkinson: I submit that the certificate is not evidence.

Mr. Fulford: I don't understand what the objection is. The certificate is made evidence by Act of Parliament. The statute of 1872, under which this prosecution is instituted, incorporates the statute of 1860, in which the certificate of the analyst is made evidence, unless there is evidence to the contrary. If evidence is brought forward for the defence to contradict the terms of the certificate, Mr. Scott will then support his certificate by evidence.

Mr. Tomkinson: The certificate is not evidence. The 9th section of the Adulteration Act, 1872, says, "any purchaser of any article of food or drink or drugs in any district, county, city, or borough, where there is any analyst appointed under this Act, shall be entitled, on payment to the inspector or inspectors appointed under this Act, of a sum of not less than 2s. 6d., nor more than 10s. 6d., which shall be accounted for to the local authority appointing such inspector or inspectors, to have any such article analysed by any analyst who may be appointed for such district, county, city, or borough, and to receive from such analyst a certificate of the result of his analysis, specifying whether, in his opinion, such article is adulterated," and so on. In this case the certificate has not been given to the purchaser, but to Mr. Knight. Gifford, not Mr. Knight, is the purchaser; and the certificate is not evidence unless it is given to the purchaser.

Mr. Greenwood: Mr. Knight is the purchaser.

Mr Tomkinson: The learned counsel says Gifford is the purchaser. I dont want to raise these questions unnecessarily, but I want to have an opportunity of cross-examining Mr. Scott.

Mr. Fulford: Mr. Scott is here and you can call him if you like. The usual course is to put in the certificate, and to take it as conclusive unless it is contradicted. If the certificate should be contradicted, then the analyst can be called. I never heard such an objection raised before. The 9th section of the Act of 1872, makes the certificate evidence.

Mr. Greenwood: According to the 6th section of the Act, it is not necessary for the inspector to be the actual purchaser. It simply says he shall "procure and submit samples" for analysis. Thus it is clear that he may procure, either by himself or by deputy, such articles as he suspects to be adulterated, and "shall, upon receiving a certificate stating that the articles of food or drink or drugs are adulterated, cause a complaint" to be made.

Mr. Tomkinson: That is done, and we are here to answer the complaint; but the only way in which the certificate can be produced as evidence is under the 9th section, by being given to the purchaser. The summons, says Gifford was the purchaser. I think, in fairness, the learned counsel should put Mr. Scott into the witness-box.

Mr. Fulford: We will put him in when there is occasion for it. As to the delivery of the certificate to the purchaser, Gifford is the agent to Mr. Knight, and purchased for him. I submit that Mr. Knight is the purchaser.

Mr. Tomkinson: If Mr. Knight is the purchaser, the summons must be dismissed, because it says Gifford made the purchase.

Mr. Greenwood: I have no doubt that we can treat Mr. Knight as the purchaser. The 6th section gives the inspector power to obtain the article either by himself or deputy.

Mr. Fulford: I don't wish to do anything unfair to the defendant. On the contrary, the object is not to take him at a disadvantage, but to have the truth brought out. The only reason I don't put Mr. Scott into the witness-box at present is that I have yet to learn that there is any answer to the certificate. If the defence is no answer to the certificate, I submit the certificate will be sufficient. If any evidence is brought forward in contradiction of the certificate, then by all means have Mr. Scott examined.

Mr. Tomkinson: When an application was made for an adjournment a fortnight ago, it was said that Mr. Scott should be brought forward to give evidence. I have come prepared to cross-examine him. I have Professor Attfield here, and he says the quinine is not adulterated. It will be for you to say, which of the two analyses is the correct one—that which has been made by Mr. Scott or that which has been made by Dr. Attfield. It was my impression when the case was adjourned, that we were to have Mr. Scott put into the witness-box. I cannot understand why there should be an objection to putting Mr. Scott into the box. I say, in fairness to the tradesmen of the county, Mr. Scott ought to be put into the box to substantiate his certificate whenever there is a valid objection to it.

Mr. Greenwood: The certificate is sufficient evidence until it is disputed.

Mr. Fulford: Yes, and if there is anything brought forward to invalidate the certificate, Mr. Scott will at once submit to examination and cross-examination. If Dr. Attfield has made an analysis, it must be shown that he has had before him a sample out of the same bottle as that came from which Mr. Scott analysed. It will not be easy to prove that.

Mr. Greenwood: I shall receive the certificate as evidence, and if there is evidence to rebut it, then Mr. Scott can be called if necessary.

Mr. Tomkinson: I bow to your decision, but in common fairness I think Mr. Scott should be put into the box before instead of after the defence is heard.

Mr. Greenwood: Why did not the defendant, before the purchaser went out of the shop, make him seal up the remainder of the sample and have it analysed, so that there could be positive proof that the two samples analysed were from the same bulk?

Mr. Tomkinson: When a tradesman, who is conscious of having done nothing but what is right, is suddenly called upon, as Mr. Pearson was in this case, he has not the presence of mind to do that which, after sitting in court and listening to a case, he finds would have been desirable.

Mr. Fulford: As soon as there is scientific evidence to invalidate the certificate, I will put Mr. Scott into the box. That will be following the usual course, and I cannot see that any injury will be done to the defendant.

Mr. Tomkinson : I dont wish to continue this discussion, but I must say that the course pursued in these cases is unfair to a defendant. It is very much like the French system of cross-examining a defendant to get evidence against him.

Mr. Greenwood : I dont think I am doing wrong in accepting the certificate.

The certificate was in the following terms, as read to the court by Mr. Thistlethwaite, the magistrate's clerk :—"Quinine : I find the same to be largely adulterated with sulphate of cinchonine, an alkaloid comparatively valueless for those or most of those purposes for which quinine is specially employed. In my opinion the said sample, being largely adulterated, is a drug coming within the meaning of the 24th section of the Pharmacy Act, 1868, which requires all such mixture to be deemed injurious to health."

Mr. Tomkinson : I don't see why the county analyst should undertake to decide in his certificate what comes within the meaning of the Act of Parliament.

Mr. Fulford : The 24th section of the Pharmacy Act, 1868, applies to "all articles usually taken or sold as medicines, and every adulteration of any such article shall be deemed an admixture injurious to health, and any person registered under the Act who sells any such article adulterated shall, unless the contrary be proved, be deemed to have knowledge of such adulteration." So that it is not necessary to prove the ingredient is of itself injurious.

William Gifford, examined by Mr. Fulford.

Are you an assistant to Mr. Knight, an inspector under the Adulteration of Food Act ?—I am.

On the 18th of April did you purchase, at the shop of Mr. Pearson at Kidsgrove, some quinine ?—I did.

How much ?—A shilling's worth.

Who supplied you ? —The master.

When you purchased it, did you say what it was for ?—Yes, I told him I wanted it for the purpose of an analysis. I told him it would be delivered at Mr. Scott's residence, Tattenhill Road, Wolverhampton, at seven o'clock on the 20th of April.

What did you do with it ?—I delivered it to the inspector.

What sort of a parcel was it in ?—A small paper parcel.

Was it sealed ?—Yes.

Who sealed it ?—It was Mr. Pearson's seal.

Was it in the same condition when you delivered it to Mr. Knight as when you received it from Mr. Pearson ?—Yes.

Cross-examined by Mr. Tomkinson.

Whom did you see when you went into Mr. Pearson's shop ?—Miss Pearson.

Did you ask for sulphate of quinine ?—Yes.

Did she go to her father and bring him to the shop ?—Yes.

And did he come to serve you ?—Yes.

When you told him you wanted it for analysis did he show you the bottle from which the quinine was taken ?—He did.

Is this the bottle ?—It is something like it.

Did he tell you whose it was ?—He said it was Howard's best quinine, and that he had bought it as pure.

Do you know how many grains you bought ?—No, sir ; he did tell me, but I cannot say.

Were there twenty grains ?—I cannot swear.

At all events, it was a shilling's worth ?—Yes.

Did he say if that was not enough he would sell you more ?—Yes, he said so, and that he had no doubt it was pure.

Do you know if this was the bottle ?—It is something like it.

Did he show you the label ?—He showed me a bottle like that.

Mr. J. E. Knight, examined by Mr. Fulford.

You are the inspector under the Adulteration of Food Act for this division of the county ?—Yes.

On the 20th of April, did you receive from the last witness a packet of quinine ?—Yes.

What did you do with it ?—I delivered it to Mr. Scott, at his house, at seven o'clock in the evening.

Was it opened ?—Yes, it was opened by me.

Was it divided ?—Yes, and Mr. Scott kept the larger portion.

Have you the remainder ?—I have.

Was it sealed ?—Yes, with Mr. Scott's seal.

What was the number placed on the packet retained by Mr. Scott ?—238.

Is there any other number than 238 on that packet ?—No ; it was Mr. Pearson's writing, I suppose.

238 is on that ?—That is my number.

Some time after you delivered the packet to Mr. Scott, did you receive a certificate of the result of the analysis ?—I did.

Is this it [certificate produced] ?—That is the certificate.

The number on the certificate is 238 ?—Yes.

And that is the number on the packet ?—Yes.

No cross-examination.

Mr. Tomkinson : On behalf of the defendant, I shall have to ask your careful consideration of the evidence I intend to bring before you. I admit that I labour under the difficulty of proving that the same quality of quinine was sent for analysis to Dr. Attfield as was analysed by Mr. Scott. But you have the admission of Gifford that when he purchased the quinine from the defendant it was taken from a bottle similar to this, and he was told that it was Howard's quinine, which was sold as being pure. What I propose to do is this : to show that Mr. Pearson took the remaining portion of the quinine that was in the bottle after Gifford purchased some, and that it was sent in a registered letter to Dr. Attfield for analysis. I shall put in the witness-box Miss Pearson, who assists her father in the shop, and she will say she has never seen in the shop any cinchonine, with which this quinine is said to have been adulterated. Messrs. Howard have peculiar marks for the different preparations of bark. Sulphate of quinine bears a red seal, and is wrapped in a different paper from that used for the other alkaloids. Sulphate of quinidine is not quite so strong. It bears a dark green seal, and is wrapped in a buff-coloured paper. The salt of cinchonine is wrapped in blue paper and has a yellow seal ; and Miss Pearson will tell you that on no occasion has she seen a bottle with a blue seal and wrapped in a yellow paper in the shop.

Mr. Greenwood : I don't know what use that is. How can Miss Pearson tell what may have been put in it?

Mr. Tomkinson : It will be one ingredient in the case to show that, at all events to her knowledge, the preparation of cinchonine never was in her father's possession. I put that forward to strengthen the evidence. Gifford admits the quinine which he bought was taken from a bottle like this in which Messrs. Howard send out quinine ; and when the case was adjourned, a portion of the quinine was taken out of the same bottle, sealed up, and sent to Professor Attfied for analysis by him. Dr. Attfield says it is pure commercial quinine. If I prove that, I think you will dismiss the summons ; at all events, unless the learned counsel puts Mr. Scott in the witness-box. There is one other point which I wish to urge before you, and I think it is a very good defence to this summons. Quinine is made from Peruvian bark. The bark varies in quality ; and, of course, the finer the quality, the larger the proportion of quinine produced. The specimens which Dr. Attfield has brought down are good specimens. Now, from the bark four different articles are produced—first quinine, then quinidine, then cinchonine, and then cinchonidine—and it is impossible to make one of these without having in it traces of the others. Therefore, my contention is that all these chemical preparations being obtained from bark, even supposing in the quinine there was some cinchonine, it would not be adulteration within the meaning of the Act of Parliament. The definition of adulteration would be something added to a commodity for the purpose of either increasing its bulk or cheapening its price. Although cinchonine is a little less in price than quinine, yet both are produced from the same material. It is not as if cinchonine was made from a different bark; it is made from the same material; and, therefore, it is nothing that is added to the quinine; but, being a component part of the raw quinine, it is not an adulteration of quinine. After hearing the evidence of Dr. Attfield, I think you will say it is not an adulteration. Dr. Attfield has had extensive experience. He is a Fellow of the Chemical Society, Professor of practical chemistry to the Pharmaceutical Society, and is in fact one of the first authorities in England on this subject. It will be for you to consider whether the analysis has been properly made, and whether there is not proof that the sample of the quinine which was sent to Dr. Attfield was the same as the sample sent to Mr. Scott. Then, supposing there to be cinchonine in the quinine, you will have to consider whether it has been added to it for the purpose of increasing the bulk or lessening the price. This is a matter which ought to come before the court, but, having investigated it, you will, I feel sure, dismiss the summons.

Miss Louisa Pearson, examined by Mr. Tomkinson.

I believe you attend to your father's shop, and assist him in his business?—Yes, sir.

Do you remember William Gifford going to the shop on the 18th of April to purchase some quinine?—Yes.

You called your father to supply it to him?—Yes, sir.

I believe you well know the appearance of the quinine bottle?—Yes.

Had it a red cork?—Yes.

How long have you been assisting your father in his shop?—For some years.

Have you upon any occasion seen in your father's shop, or in his possession, any bottle with this peculiar yellow wax seal upon it?—Not till last night.

[This was the kind of bottle in which Messrs. Howard send out a salt of cinchonine.]

Your father got it last night?—Yes.

Have you seen any preparation of quinine except in the bottles with the red seal?—No, never, except in those bottles with the red seal.

Mr. Greenwood: Do you know the difference between quinine and cinchonine?

Witness: Not without seeing the bottles.

Mr. Greenwood: If any cinchonine should be in a bottle, you would not know it from quinine?

Witness: I think not. I never sell it without going to my father about it. I should not know how to sell it.

Mr. Fulford: You know nothing about putting them in bottles?

Witness: No.

Mr. John Parker, examined by Mr. Tomkinson.

Are you a draper residing at Kidsgrove?—Yes, sir.

Close to Mr. Pearson's?—Yes, near to Mr. Pearson's.

On Saturday, the 20th of June, did Mr. Pearson call you into his shop?—He did, sir.

And did you see him make up a packet out of a bottle?—I did, sir.

And wrap it in a pink paper?—Yes.

Did you mark the bottle from which it was taken?—Yes.

Is the bottle produced the same? Do you recognize it?—Yes, sir.

By his directions did you seal up the contents of the bottle?—Yes.

Did you put the seal upon it?—I did.

Did you endorse it?—I think Mr. Pearson endorsed it.

Is this the parcel that was made up?—Yes, and I see the endorsement is mine.

Did you put that in an envelope addressed to "Dr. Attfield, 17, Bloomsbury Square, London, from W. S. Pearson, Kidsgrove"?—Yes.

Was this put in another envelope, addressed to Dr. Attfield, and posted by you at Kidsgrove?—Yes.

Did you register the letter, and is this the envelope?—Yes.

Did you get a receipt for the letter?—I did.

Will you produce it?—[Receipt produced.]

Mr. Fulford: I shall not dispute that.

Professor Attfield, examined by Mr. Tomkinson.

Do you reside at 17, Bloomsbury Square, London?—I am Director of the chemical laboratories there.

You are professor of practical chemistry to the Pharmaceutical Society?—I am.

Did you, on the 21st or the 22nd of June, receive that envelope [produced] by post?—Yes, on Monday, the 22nd of June.

In that envelope did you find a small paper containing quinine?—I found a second envelope, sealed, and in that I found this small packet [paper produced], which was also sealed and which I opened.

I believe you are practically acquainted with the chemistry of quinine?—Yes; I have been employed by the English and other Governments to examine quinine which has been purchased from firms such as Messrs. Howard's.

You have had a great deal of experience in testing it?—I have.

Will you explain to the court the production of quinine and the other bodies extracted from bark? — Perhaps if you explain it in your own language it will be most satisfactory.—Quinine is a medicine obtained from cinchona bark, sometimes called Peruvian bark or quinine bark. This Peruvian bark not only contains quinine, but other closely allied substances — namely, cinchonine, quinidine, and cinchonidine. The similarity of the names indicates the close alliance of the substances with each other. They are dissolved out of the bark. One bark will yield quinine chiefly; another will yield the other medicines chiefly.

Is it possible to make quinine without a trace of the other substances being found in it?—It would be possible to be done by a professed chemist, no doubt; but practically and commercially it is impossible to obtain quinine from bark without it containing a small amount of these other alkaloids, say less than one per cent.

Mr. Greenwood: Do I understand you to say quinine might contain an amount of cinchonine, but not more than one per cent?

Dr. Attfield: One per cent. *might* be present, but I have not found that proportion.

Mr. Tomkinson: Are these alkaloids all derived from the same description of bark, but of different qualities?—They are all derived from cinchona bark.

In your opinion would the presence of cinchonine with quinine be an adulteration? Is not cinchonine a valuable medicine?—With regard to the medicinal character of cinchonine, the Government a few years ago appointed a commission to inquire into the value of quinine relative to these other allied medicinal substances, quinidine, cinchonine and cinchonidine. The commission, appointed by Her Majesty's Secretary of State for India, gave a preliminary report in 1866.

Mr. Fulford: I don't like to object, but is this evidence?

Mr. Tomkinson: It is a matter of professional opinion.

Dr. Attfield: This commission was composed of the leading medical men in the Madras Presidency, and they reported as follows: "The main conclusion which the members of the commission have derived from the data before them is, that the alkaloids hitherto but little valued in medicine are scarcely, if at all, inferior as therapeutical agents to quinine." In 1867 the Bombay commission reported in similar terms; and in 1868 there was issued a final report, in which they state: "Most of the medical officers employed in using the alkaloids seem fully impressed with the belief that they are equally or very nearly as efficacious as ordinary quinine; and, as already shown, the mass of information furnished in the tabular reports proves that such belief is well founded."

Do you assume from that that cinchonine is not "comparatively valueless"?—A dose of cinchonine would be four grains, where a dose of quinine would be three grains. If given in that proportion, it is admitted to be as good as quinine.

I believe you have had considerable experience in the examination of the books of Messrs. Howard?—I have had occasion to go to Messrs. Howard's to select samples taken from bulks of alkaloids ordered by different governments. I therefore know the mode in which Messrs. Howard carry on business.

I believe sulphate of quinine is lighter than sulphate of cinchonine?—One ounce of sulphate of quinine would fill a bottle like the one you have now in your hand. One ounce of sulphate of cinchonine would just half fill the bottle. Any porter or packer, though not at all acquainted with the chemistry of the substances, would by the bulk know there was something wrong if a one-ounce bottle of quinine contained a really "large" proportion of cinchonine. A small quantity would make little difference.

If "largely adulterated" with cinchonine the bottle would not be full?—It would not.

Mr. Fulford: But you could fill it.

Dr. Attfield: In that case the bottle would contain more than an ounce.

Mr. Fulford: I don't dispute that Howard's quinine generally is perfect; but there is nothing to show that this quinine was supplied from Messrs. Howard. It came from a wholesale dealer to the defendant. It did not come direct from Messrs. Howard.

Mr. Tomkinson: We shall show that it is pure.

Mr. Fulford: We don't say Howard's is not good.

Dr. Attfield: My knowledge of the barks which Messrs. Howard manipulate, enables me to say that only one ounce of sulphate of cinchonine is by them produced for every 125 ounces of quinine; so that if they mixed the whole of the sulphate of cinchonine they make with their sulphate of quinine, it would not amount to one per cent.; but, further, I know from examination of their books that every ounce of sulphate of cinchonine they make, is sold by them separately as sulphate of cinchonine, and with regard to any accidental admixture of cinchonine with quinine, I am sufficiently acquainted with Messrs. Howard's factory, to know that it is impossible that they can be mixed accidentally; for they manipulate these different alkaloids in different rooms, dry them in different rooms, and keep them in different kinds of vessels. Quinine is kept in tin vessels; cinchonine in earthenware jars. They use bottles of different capacities, and labels of different colours, and they seal the bottles with different coloured wax. So that in these, and other ways, they take every possible precaution against any accidental admixture.

Examination by Mr. Tomkinson continued.

In your opinion is it impossible to have them mixed there?—Practically it is impossible.

Did you analyse the quinine you received in the registered letter?—Yes.

Will you just tell the court what you found—whether it was pure or not?—I found it to be pure. It not only did not contain "a large quantity of sulphate of cinchonine," but it did not contain one per cent. of the three alkaloids (cinchonine, quinidine, and cinchonidine) put together. As to cinchonine, it contained a mere trace.

In your opinion is it pure sulphate of quinine?—It is.

Cross-examined by Mr. Fulford.

Is there much difficulty in distinguishing cinchonine from quinine, if present?—Yes, there is some difficulty.

The test of the British Pharmacopœia, is that a good one?—It is a good test, but rather lenient.

If cinchonine were detected by that test, you would have no doubt cinchonine was present?—None.

What is a fair and liberal allowance to make for the accidental mixture of cinchonine with quinine in the manufacture?—I never found one per cent., but we may say one per cent.

If you found ten per cent., you would not say that was a fair amount to allow either from accident or the process of manufacture?—Not if it were Howard's quinine.

Or anybody else's?—An article has been produced, even under Government sanction, which consists of mixed alkaloids or cinchona principles taken from the bark, and it differs in composition according to the bark from which it is obtained; but if an article purported to be sulphate of quinine and contained ten per cent. of cinchonine, I should say it was a bad sample of sulphate of quinine.

If you found five per cent. of cinchonine in quinine, should you say it was Howard's?—No. If I found five per cent. of cinchonine, I should say that the sample was faulty or that the cinchonine had been added to the quinine.

Mr. Greenwood: Do you mean that if it contained five per cent. of cinchonine it must have been added, or that it could not have been Howard's?—Yes.

Cross-examination continued.

Commercially is sulphate of cinchonine comparatively valueless?—It is about one fifth of the money value of quinine.

What was the date of the report you referred to just now?—The Madras report is dated 1866; the Bombay report 1867, and the final report of the Madras commission, 1868.

Cinchonine is not allowed as an official medicine, is it?—There are many medicines not in the Pharmacopœia which are largely used by medical men. Cinchonine, especially in the form of "muriate" of cinchonine, is largely used by Government officials and by medical men generally. Probably these alkaloids——

I understood you to say in the quinine which you analysed you found no trace of cinchonine?—None worth mentioning. I should think these alkaloids will be in the next edition of the Pharmacopœia, because they are becoming recognized as important medicines. The three alkaloids allied to quinine have not been used very long as medicines, and we should not expect to find them in the Pharmacopœia of 1867. The official reports were only issued about that time.

Does cinchonine give the phenomenon of fluorescence?—No. Solutions of some of these alkaloids have a fluorescent appearance resembling that of the common mineral, fluor spar.

Do they all produce the same effect?—No.

Does the appearance of cinchonine differ from the flourescence of quinine?—The solutions, yes.

[*Bottle produced and shown to witness*].

Witness: I would not judge from appearance alone, but I should think that from the fluorescence quinine is there dissolved in diluted acid. It is sulphuric acid which converts the quinine itself or cinchonine itself into sulphate of quinine or sulphate of cinchonine.

Do I understand you to say that the tests mentioned will show the amount of cinchonine?—Everything depends upon the way in which the tests are applied.

I assume it to be by a man of experience?—Well, it does want some experience to apply it correctly.

If by this test a man of experience—I mean a man who has been a practical analyst for twenty years—arrived at the conclusion that there was at least five per cent. of cinchonine present, what would you say?—He may have been a practical analyst twenty years, and examined articles of food or drink, and yet not have had much experience in drugs.

Do you think he could make a mistake?—I do, unless he had been accustomed to examine quinine.

Re-examined by Mr. Tomkinson.

I suppose in testing this a great deal depends upon the warmth or coldness?—Temperature has a great deal to do with chemical analysis.

Mr. Greenwood: What would be the effect of temperature in this case?

Dr. Attfield: Temperature does not so much affect analyses of quinine as some other substances.

Would it make any practical difference?—If quinine were tested when the solution of it was heated, or even warm, then a substance would be obtained which might be mistaken for cinchonine. One must have considerable experience to test it thoroughly and properly.

This was the case for the defence.

Mr. Fulford: One ground of the defence is that cinchonine is useful as a medicine, and thus that it is not an adulteration; but I wish to call your attention to the second section of the Act of Parliament, showing that it is not necessary that the ingredient should be injurious. That section applies to drugs, as well as to food and drink, and the latter part of it enacts that every adulteration of an article used as medicine shall be deemed an admixture injurious to health, and any person selling such adulterated article must be deemed to have knowledge of it unless the contrary is proved. Therefore, whether cinchonine is useful or not, is quite immaterial to the case. If it is present in an article sold as quinine, it is an adulteration within the meaning of the Act, and the defendant is guilty of an offence, and must be convicted.

Mr. Greenwood: You mean admitting that there is only one per cent.?

Mr. Fulford: I don't say that; I mean if there is an appreciable quantity. If the quantity was only one per cent., I would admit it was pure. Dr. Attfield admits that if there was five per cent. present, there must have been an adition made to the quinine; and if five per cent. of cinchonine has been added, then there has been an offence committed. Mr. Pearson is charged with selling as quinine what we say is a mixture of quinine and cinchonine. With respect to the analysis of Dr. Attfield, it is difficult to prove that what he analysed was the same as that analysed by Mr. Scott for the prosecution. The evidence of Miss Pearson is not sufficient to prove this.

Mr. Greenwood: I attach no importance to the evidence of Miss Pearson. It does not bear materially on the case.

Mr. Fulford: With respect to this particular sample of quinine, I don't know where it came from. The label on the bottle is no doubt Howard's, and so is the seal, but the quinine is not proved to have come from Howard's direct. It has come from a second house.

Mr. Tomkinson: You should not take advantage of a friendly admission.

Mr. Greenwood: It may be that the wholesale dealer adulterates, and the retailer suffers.

Mr. Fulford: Just so. The manufacturer may have sent out the quinine in a pure state, and the wholesale dealer may have supplied an adulterated article. The adulteration need not necessarily have been at Howard's. No doubt Howard's quinine is of an excellent character, and Dr. Attfield has told the court that he has analysed many specimens, and has not found so much as one per cent. of cinchonine present in Howard's. The question is, whether the sample which has been sold has been tampered with after leaving Howard's. I have no desire to keep anything back, and I will place Mr. Scott in the box to give the result of his analysis; the only object of the prosecution being to see whether these articles are pure or not. Mr. Scott will tell you the process and the result of his analysis; and it will be for you, after hearing him, to say whether you have any doubt that the sample which he analysed was adulterated or not. I don't think he will pledge himself to the precise quantity of cinchonine that was found in the quinine, because he tells me these substances were not correctly mixed, and the result of his experiments varied. But he will pledge himself that he found present considerably more than one per cent. of cinchonine. There is still in the possession of the court the remainder of the sample which was purchased at the the defendant's shop; and if there is any doubt that Mr. Scott's analysis is correct, it is within the power of the court to order that that which remains shall be analysed by anyone whom the court may think fit to choose. The sample sent to Dr. Attfield was forwarded a considerable time after the purchase was made by Gifford. I don't wish to cast any imputation upon anyone, but it don't follow that the sample purchased by Gifford and the sample sent to Dr. Attfield came out of the same bottle. There may have been a fresh supply. Gifford bought some quinine on the 18th of April. It was not till the 20th of June that the sample was sent to Dr. Attfield.

Mr. Tomkinson: Until the summons was returnable we did not suppose for a moment but that it was pure.

Mr. Greenwood: It is a similar case to Pendleton's; and it naturally arises in consequence of the defendant not having taken the proper course.

Mr. Fulford: The object of retaining a portion of the commodity analysed by the county analyst is to have it submitted, if necessary, to some one else—some other competent man—and there is a specimen which can be so analysed.

(*Mr. Wentworth Scott, examined by Mr. Fulford.*)

Are you the public analyst for the county of Stafford?—Yes.

Have you been a practical analyst for nearly twenty years?—Very nearly. Since I left college.

Have you devoted yourself to analysing food and drink?—Chiefly.

Have you had much experience in the analysis of drugs?—I have analysed a great deal, both for the Indian Government and private individuals. I have issued reports and contributed papers to the Pharmaceutical Conference.

Have you made many experiments with cinchona bark?—I have, and of the alkaloids obtained therefrom.

On the 20th of April did you receive from Mr. Knight a parcel containing quinine?—I did.

It was divided and you retained a part?—Yes, in the usual way.

Did you analyse the half?—I did.

Is the certificate which has been read the result of your analysis?—Yes.

In that you mention that the sample was "largely" adulterated with cinchonine?—I do.

How much per cent. was cinchonine?—Certainly ten per cent. I do not pledge myself to the fraction of a grain, because I should have preferred to have had a larger sample bought, and have more materials to work upon. Still the result remains the same. I pledge myself certainly to nine or ten per cent. of cinchonine.

Mr. Greenwood: "Largely," the word used in the certificate, is very indefinite. If you will state the amount in your certificates it will be better.

Mr. Scott: I will do so in future. The object of omitting exact figures was that I wish to leave myself a small sliding scale. If I gave decimals a two hours' cross-examination might be made.

Mr. Greenwood: You might leave a margin.

Mr. Scott: I will do so in future.

Examination by Mr. Fulford continued.

You are acquainted with Howard's quinine?—Very well.

Have you analysed their quinine?—I have. They have frequently been good enough to supply me with specimen samples for lectures or private research, and I have bought articles, and have also taken samples from wholesale houses. I am very well acquainted with Howard's make.

How much cinchonine is there in it?—It varies. I have never found so much as one-third of one per cent., but I don't say it might not happen.

What is your opinion as to this quinine coming from Howard's?—The whole of it could not have come from Howard's, and I am not aware that they send any out in admixture.

[Reference to the British Pharmacopœia.] This is the official test. Did you use it?—I used that in a supplemental way because it is the official test. It is by no means so correct a test as others, but I have used it because it is the official test. The sample marked "238" did not answer to that test, which is a rough one.

Have you any doubt that in the sample you examined cinchonine was present to a greater extent than it ought to be?—No.

Cross-examined by Mr. Tomkinson.

How many grains had you to begin with?—I don't remember.

Did you weigh the quantity you took out of the sample?—Certainly.

How many grains have you?—I have not weighed the residue. I took some from the parcel and weighed from my own portion.

How much did you take of what was given to you?—About half.

What weight was it?—I don't know what it weighed.

Was it five or ten grains? Can you tell to a few?—I should think about five grains.

How much have you left in your own possession?—A very small portion.

How many grains would that be?—I don't know. I have not looked at it lately.

Can you tell us to three or four?—There might be one or three; something like that. I really cannot tell exactly. I know there is just some.

If you might have three, then in reality you used seven or eight grains in the testing?—Possibly; I cannot say.

You say you found some traces of cinchonine in it?—Yes.

Did you analyse the cinchonine?—What do you mean by the term?

How did you test that it was cinchonine?—By the usual tests, microscopically and otherwise.

[Book produced, and woodcuts of sulphocyanides of alkaloids exhibited.]—Witness: I don't pin my faith to microscopical woodcuts, but they give a rough idea.

These are wood plates?—I should think so.

You say you tested the quinine: what was the first test?—The first was to dissolve a little in water. Chemists first endeavour to find out what is in the mixture; then how much of it.

What then?—I took a small portion and dissolved it in acidulated water. After allowing that to crystallize spontaneously, I examined it under a microscope. There were some forms amongst the crystals produced which struck me as being what I used to see in pure samples of Howard's various alkaloids.

Had it the appearance of being dirty?—No, it had not.

What had it the appearance of?—It had the appearance of some other alkaloid, but not that of quinine.

What was the next test?—Then I took a small weighed portion.

How much?—I think three grains.

Do you keep any record?—Yes; but I merely give you the general results.

Have you the record with you?—No.

Well, you took three grains: what did you do with that quantity?—I dissolved it in a small portion of acidulated water.

How acidulated?—With sulphuric acid; and I noticed that it did not disappear or dissolve so quickly as I expected; that is, so quickly as would Howard's or some other good maker's quinine pure and simple. It was less soluble than other samples which I have analysed.

Had it a blueish tint?—Yes.

And looked like quinine?—So it would if it had only had a small trace of quinine in it.

[Bottle produced.] Is that the specimen?—No, that is simply to illustrate fluorescence.

Have you analysed the quinine from which that is taken?—I have at some time ascertained it to be pure. I know it was pure.

Did you warm the quinine a little to see if it undergoes a change?—No.

After you had dissolved the three grains in water, what did you do next?—I added a little ammonia till no further precipitation was produced.

What further?—I then added in the usual manner a portion of carefully dried, purified ether.

Where did you get the ether from?—From a bottle in my laboratory.

No spirit of wine in it?—No.

Do you know it is pure?—Yes, from my own knowledge I am able to say everything I use for the purpose of analysis is pure.

Mr. Greenwood: Do you test them first?

Mr. Scott: Undoubtedly.

Cross-examination continued.

How much ether did you use?—I forget how much, but I should think rather over a dram.

What was the effect of the ether?—I should have said I did not add the ether immediately. If the quinine had been pure the whole ought to have been soluble in ether without difficulty.

You mean it would have dissolved at once?—With a little shaking and a little time it would have dissolved very readily.

After you had given it a little shaking and a little time, did it all dissolve?—It did not.

What portion of it was left?—A small portion was left, which I then put into a small filter, so as to get rid of the ether on the one hand and the water on the other. From this portion, which was weighed and which formed one of the experiments, I found some idea of what proportion was cinchonine. I proceeded to apply some of the usual colour tests, as they are called, for the alkaloids, more especially cinchonine, and more particularly the one which is referred to in Dr. Attfield's work. I found there was no doubt that that portion which was insoluble was cinchonine.

You think that?—I don't think, I am perfectly sure about it.

How much would there be left after you had got the ether and the water away?—I did not accurately weigh that portion.

If you did not happen to weigh it, how can you make it ten per cent.?—That was referring to one portion of two or three grains. Taking the other two portions of a few grains each, which I did weigh, they showed nine and ten per cent. of cinchonine. I gathered that the sample had not been perfectly mixed.

Mr. Greenwood: Do you mean the adulterated article?

Mr. Scott: Yes, sir.

Cross-examination continued.

Was that the only test you applied?—By no means.

What were the other tests?—I took a portion of this body, which appeared to give reactions of cinchonine.

How much? Did you weigh it?—I had no occasion to weigh it.

What did you do with it?—I washed it with a solution of what I knew to be sulphate of cinchonine. The object was to wash away any sulphate of quinine that might be present.

Well?—Then, upon dissolving a small portion of that in water, I applied the usual test of fluorescence, and obtained no signs of that colouring which would have shown quinine there. I tested to see if quinine was in it, and no portion of it was quinine. Then I placed a small portion within a polariscope, and I found a ray affected as quinine is not affected, and as cinchonine is affected. I have made myself acquainted with these effects in the polariscope, and therefore I satisfied myself as to the presence of cinchonine.

Were all these tests applied on the fraction of a grain of substance you extracted?—Yes, the microscopic, the chemical, and that with the polariscope.

With respect to the quantitative tests, how much quinine did you have?—I think I used about five grains for the two experiments.

How much did you use in your first experiment?—I don't see your object.

My object will appear: I want you to answer the question. How much did you use in the first of your two quantitative experiments?—You want to get out the point that I have not had enough to work upon. In answer to that, I will say if you give me one grain it is sufficient to tell whether there is any cinchonine present in the quinine. But I would not pin my faith to any exact proportion in this sample, because one experiment gave me a larger proportion of cinchonine than another did. I simply say, it is largely adulterated with cinchonine, and certainly to the extent of ten per cent. I used, I should think, about seven grains in all.

I want to know how many grains you used?—They were divided into two experiments.

Do you know how much quinine was washed away? Did you weigh it?—I did not.

Did you weigh the residue after the quinine was taken away?—Yes.

What is the weight?—I don't know. I have it, and my results are based upon it, but I don't know it at this moment.

Mr. Greenwood: In one experiment you found a larger proportion of cinchonine than in the other?

Mr. Scott: Yes, sir.

Mr. Greenwood: Does that show that it had been added, and was not the result of incorrect manufacture?

Mr. Scott: Yes, and for this reason: if the alkaloids were all crystallized together I should expect, in the same temperature, and with no difference in the crystals, that the analysis would not have varied to that extent. It seemed to have been a mixture of comparatively pure sulphate of quinine, with crystals of sulphate of cinchonine, but that the mixing was badly done.

Mr. Fulford: Would it be possible for nine or ten per cent. of cinchonine to be present in the quinine at the time of the manufacture, without the wilful intention of the manufacturer?

Mr. Scott: It could not have been left there by the accidents of manufacture. Some time ago, Mr. Howard, at Bristol, admitted a mistake, but I will answer for it he would not admit such a mistake as this.

Mr. Fulford: Therefore it must have been either intentionally not extracted at the time the quinine was made, or put in afterwards.

Mr. Scott: Yes; there is no doubt about the presence of cinchonine in large quantity.

This being the whole of the evidence,

Mr. Greenwood said: It is quite clear that, if what Mr. Scott says be true, the sample sent to him was different from that which was sent to Dr. Attfield for analysis. Before I decide this case, I must have a certificate from another chemist, to whom the portion under seal in the possessson of the court must be sent.

It was then decided that it should be sent to Dr. Paul, of London, for analysis, and the case was consequently adjourned.

Removal of Cream not an Adulteration.

Last week, *Thomas O'Connor*, a cowkeeper, of Fulham, was summoned for selling as unadulterated a quantity of milk which proved to be adulterated. Mr. Burge, the analyst, said he examined the sample, and the result was that he found nearly all the cream had been extracted from it. He argued that it was an offence to sell anything which did not come from the cow. Mr. Ingham inquired the meaning of the word "adulterated." The extraction of a valuable quality was not, in his opinion, an adulteration.—Mr. Stainforth, who defended, referred the magistrate to the section in the Act of 1872, which used the words "every person who shall wilfully admix."—Mr. Ingham thought there must be a mixture of some matter with the article of food to prove a case of adulteration.—Mr. Burge said the magistrate's decision would tend to improve the Act which was forthcoming.—The summons was dismissed.

Copper in Preserved Vegetables.

At the Brentford Petty Sessions, on Saturday, July 4, George Thomas Melsom, provision merchant, of Ealing Broadway, was summoned under the Adulteration Act, for selling a tin of preserved green peas, the same being adulterated with copper to improve their colour. Mr. Milton appeared for the prosecution, and produced a certificate from Dr. Redwood, the county analyst, which stated that the peas were adulterated with copper and injurious to health if used as food. A gentlemen who gave his name as Thomas Owen Kilsey, of 34, King William street, stated that he represented the firm importing the peas from France, and that on hearing of the case he telegraphed to the exporters, who stated that the peas were not adulterated in any way, and that a certificate from the prefecture of police was on its way to England to prove this. Mr. Milton asked for the full penalty of £20. The Bench held that a stop must be put to such poisonous traffic, and fined defendant 40*s*. and 8*s*. costs.

Suicide by taking Oil of Vitriol.

It is reported that on last Saturday week a Mr. Fletcher—better known as Dr. Fletcher, of Rainford—committed suicide by taking oil of vitriol. It appears that about Easter last the doctor lost his wife, and since his bereavement he had been very much unsettled, and had taken to indulging freely in liquor. It is supposed that he poured the poison into a wine glass, drank it off, and then laid himself on the bed, where he was found.

BOOKS RECEIVED.

A Practical Handbook of Dyeing and Calico Printing. By William Crookes, F.R.S., etc. London: Longmans, Green, and Co. 1874. From the Publishers.

Harvey and his Times. The Harveian Oration for 1874. By Charles West, M.D., F.R.C.P. London: Longmans. From the Publishers.

Thomson's Conspectus adapted to the British Pharmacopœia. Edited by Edmund Lloyd Birkett, M.D., etc. New Edition, with Supplement, containing Notices of the New Medicines and Preparations contained in the "Additions." London: Longmans. 1874. From the Publishers.

The Essentials of Materia Medica and Therapeutics. By Alfred Baring Garrod, M. D., F.R.S., etc. Fourth Edition. Revised and Edited by E. B. Baxter, M.D., etc. London: Longmans. 1874. From the Publishers.

Dr. Pereira's Elements of Materia Medica and Therapeutics. Abridged and adapted for the Use of Medical and Pharmaceutical Practitioners and Students. Edited by Robert Bentley, M.R.C.S., F.L.S., etc., and Theophilus Redwood, Ph.D., F.C.S., etc. With an Appendix containing the New Medicines included in the Additions to the British Pharmacopœia of 1867, published by the Medical Council in 1874, and Commentaries thereon by the Editors. London: Longmans. 1874. From the Publishers.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Female Students.

Sir,—Kindly give me the opportunity of repudiating the charge of exceeding my duty in endeavouring to comply with the requests of lady-pupils, and of declining the high privilege of taking either side in the controversy about female students.

On page 12 of your last number, a member of the Council states that when I mentioned the application of two ladies to be admitted to my class as well as to the classes they are already attending in the School of Pharmacy, I added that I had found for them a ladies' room, and he thought that in so doing I had gone beyond my province. It was not I who suggested that the housekeeper's cloak-room might serve as a cloak-room for the ladies.

If I were director of private instead of public laboratories, and two ladies who were already attending colleagues' classes and were using the rooms of an adjacent Institution, applied to me for a month's instruction in practical chemistry for two hours daily, I should certainly admit them. If, at the end of the month, I found that the plan of having a mixed class did not work well, I should not renew the ladies' tickets nor again admit female students. If the plan worked satisfactorily, I should continue it.

As to the question of whether I should be doing good or harm to pharmacy by the plan, I have yet to learn that such a question is, or even is ever likely to be, of such proportions as to induce me to trouble myself one way or other about it.

John Attfield.

Carbolic Acid Suppositories.

Sir,—I have written to thank Mr. Pratt for the suppositories that he kindly sent to me, and to which he called attention in a recent issue; but he has not answered my first query as to how much powdered starch he found to be "a sufficiency." I find that the specimens weigh, as Mr. Pratt states, sixteen grains each, an equivalent of exactly one twelfth of the carbolic acid and soap prescribed in the Brit. Pharm. Addendum. It is, therefore, hardly clear to my mind how Mr. Pratt could have followed "the simple directions" of the Pharmacopœia in adding "sufficient starch to form a paste of suitable consistence," when the weights of the suppositories, according to his own showing, are equivalent only to the carbolic acid and soap, *minus* the starch. I find that they are more apt to increase than to diminish in weight by keeping. Mr. Pratt's specimens are softer than the mass that I produce by mixing the prescribed quantities of properly powdered soap and carbolic acid, but of similar consistence to the mass that I produce by using partially dried and coarsely powdered soap; still they are much too hard to be worked "easily" or to finish nicely.

The ready solubility of such suppositories after administration is very doubtful.

T. Howell Williams.

44, *Seven Sisters Road, N.*
June 30th, 1874.

Scammony.

Sir,—In your last number "Henry Brown, L.R.C.P., L.R.C.S., etc.," says that, at the recent scammony trial, I did not correctly quote from the British Pharmacopœia respecting the proportion of resin in scammony. He reminds you that the official numbers are 80 to 90 per cent., and is sorry that in answer to the question "as the highest to be expected," I said "80 per cent. is mentioned in the British Pharmacopœia."

Mr. Brown has simply misunderstood the report of the case. I was proceeding to give the proportions of resin recognized in the British, French, and American Pharmacopœias, and had *already*, as Mr. Brown will see by the report, said that "80 per cent. is mentioned in the British Pharmacopœia," when the learned advocate interrupted me with the words, "as the highest to be expected." I continued my answer respecting the proportions which would stand official scrutiny in Great Britain, France, and the United States, and was not again asked to mention the highest percentages to be expected. Had I been, I should most gladly have answered the question, for it would have given me an opportunity of illustrating the high standards of drug purity which British chemists and druggists accept—in this matter of resin of scammony the United States' Pharmacopœia requiring "at least 75 per cent.," the French Pharmacopœia "75 to 80 per cent.," Pereira, "75 to 80 per cent," *the British Pharmacopœia* "80 *to* 90 *per cent.*"

Mr. Brown says that "Dr. Attfield obtained *what he called* 76 per cent. of resin, and from a perfectly dry powder 80 per cent." I obtained what *was* 76 and 80 per cent. of resin. This doubly licensed gentleman has not the slightest warrant for thus casting a doubt on my practical chemistry.

Mr. Brown asks how the scammony could be said to be up to the highest standard of the British Pharmacopœia. Nobody has said it was. He asks why was 80 and not 90 given? Beautiful simplicity! He admits that the scammony was "a fair sample," nay, adds that it was "a good sample." Wherefore, then, the fuss he makes. He states that his object in writing is to show that the standard of the British Pharmacopœia is not too high for pure scammony. By the way, he does not show this; but he might have written a letter or a paper on that subject, without trying to impugn my accuracy—either of quotation or manipulation.

Mr. Brown conjectures that the prosecution might not have broken down as it did if the Pharmacopœia had been forthcoming. Mr. Brown's liberty to indulge in conjecture is incontestable; but if he will again read the opening of the case and the final decision, he will see that neither the official standard nor the proportion of resin in the scammony had anything whatever to do with the issue. The defendant was summoned for selling scammony powder adulterated with flour and chalk, and the magistrate's decision was that although a little flour and chalk were present, the scammony was not adulterated.

Mr. Brown, besides giving way to conjecture, regrets the trial, is sorry for me, hopes that the magistrate will, in future, suspect chemical witnesses and only be satisfied with the Pharmacopœia; and winds up with some advice to Mr. Piesse. I cannot sympathize with Mr. Brown's regrets, sorrows, or hopes, or even with his conjectures; and as to his advice, must leave it to Mr. Piesse to accept, reject, or wholly disregard.

If Mr. Brown thinks himself strong enough to take up the broad question of the position of science, and especially chemistry and pharmacy, in our courts of law, let him send a paper to the approaching meeting of the British Pharmaceutical Conference. I will gladly propose him as a member of that body; and if his essay includes the idea that professional experts, medical as well as chemical, should be witnesses on neither side, but judges' assessors, I and other will give him our strongest support.

John Attfield.

S. Lyons.—Your letter and enclosure have been forwarded to the publisher.

E. George.—Tomes's 'System of Dental Surgery,' published by J. and A. Churchill.

A. P. S.—(1) Several papers upon the subject have appeared in former volumes of this journal, and a *résumé* of them, with references, was published in vol. i. of the present series, pp. 421 and 481. (2) If it is not labelled "poison" it certainly ought to be labelled, that it should not be given to a child excepting under medical advice.

C. Biddiscomb.—Your letter has been handed to the Secretary. See the notice on p. 31.

T. H. Fletcher.—It may be prepared by passing an excess of sulphurous acid through milk of lime.

"*Excelsior.*"—You are mistaken; the communication appears on p. 928 of the last volume. All communications for the Editor should be sent to the Journal Department, 17, Bloomsbury Square.

C. D.—Probably syrup of iron and quinine is meant, five grains in a drachm.

Communications, Letters etc., have been received from Mr. Young, Mr. Deighton, Mr. Hanbury, Mr. Rimmington, Messrs. Langton, Edden, and Hicks, Mr. Hickson, Mr. Strickland, Mr. Darby, Mr. Creig, J.T.R.

SCAMMONY AND ITS ADULTERATION.

BY A. F. HASELDEN, F.L.S.

Authors have stated that chalk, starch, gum, common resin, guaiacum, jalap resin, decoction of jalap, and of the leaves and twigs or villous stems of the scammony plant, senna, manna, gamboge, and ivory black, are used for the purpose of adulterating scammony.

The following form for making spurious scammony has been published as being followed by some dealers:

Gum Scammony	6 pounds.
Gum Arabic	6 pounds.
Calomel	2 ounces.
Aleppo Scammony	1 pound.
Ivory Black and Water . . .	q. s.

This was printed and published forty years ago, yet not so far back but that some may remember having seen it. Whatever may have been the case then, I do not believe for one moment that any such system is now followed,—unless it be in an article I have before me and obtained recently, yclept *skillet*, valued at 13*s*. per lb., and so named I infer from the pot in which it was melted and mixed together. Of the use to which this is put I am quite ignorant.

I have never yet found common resin, guaiacum, or jalap resin in scammony; at the present time obviously, jalap resin would not be used, as it is dearer than scammony resin. Common resin and guaiacum are readily found if present. That there are several qualities of scammony or scammonium of the B. P. in the market, and I presume in use, there can be no question. I have before me five wholesale price lists, wherein I see Aleppo scammony quoted from 18*s*. to 38*s*. per lb., and virgin scammony from 34*s*. to 40*s*. and 44*s*. per lb. This variation may be readily understood, as one buyer may purchase under more favourable circumstances, or such an article may vary in quality without fault of any one, and thus fetch a less price. In one instance out of the five lists, scammonium B. P. is quoted at 60*s*. per lb.; this must be something exceptional. Resin of scammony does not vary much in price, being quoted from 13*s*. to 16*s*. per lb. I have some which cost me 30*s*., but the manufacturers of this article will, I believe, discontinue making it, as it possesses intrinsically no advantage over the cheaper; the difference in the cost, I am led to think, arises from the employment of pure spirit in one case, and methylated in the other, and though the spirit would be recovered, there must be some lost. These resins may be readily examined by burning, and I found the quantity of residue precisely similar in both, amounting to less than 5 per cent. of ash.

I would now venture to suggest where, perhaps, the framers of the Pharmacopœia compounds in which scammony is employed seem to have acted inconsistently. In the London Pharmacopœias, before the publication of the B. P., virgin scammony was invariably ordered. In 1864, a permission or discretion was placed in the hands of the compounder, in making extract. colocynth. co., to use either scammony *or* resin of scammony; in 1867, B. P., *resin* of scammony alone is ordered, leaving no option, whilst in pilul. colocynth comp., of both books, scammony, meaning virgin scammony, is required. It may be worth while to inquire why this apparent confliction; that which seems good for the extract might be thought good for the pill, the confection, and the compound powder. I will now refer to the opinions expressed years ago, when the resin of scammony was introduced by Messrs. McAndrew. In vol. xviii., page 452, 1st series PHARM. JOURN., Dr. Fred. J. Farre is stated to have reported at the evening meeting of the Society, Feb. 3rd, 1859, as follows:—"The principal cases therefore are Nos. 1 and 3; in these I think the resin and virgin scammony acted about equally well. In the first case both purged effectually and quickly, the virgin scammony rather the most; each griped upon one occasion, and not upon the other. In the third case the resin purged the most, but it also griped the most. As far, therefore, as I can judge from these few trials (five cases), I am of opinion that the medicinal value of the two preparations is about equal." Dr. Johnson reported also well of the resin. Upon the same occasion Dr. A. B. Garrod spoke favourably of it, as thus:—

"From these numerous observations, 120 in number, together with many others which have not been tabulated, I am quite convinced that the scammony by the new process from the untapped root is quite equal as a remedy to the very best virgin scammony met with in commerce, and equal in fact to the resin which is extracted from commercial scammony by means of ether, and it possesses this most important advantage over the scammony of commerce, namely, of being entirely free from the frauds which are constantly practised upon it in the country where the plant grows, and in which it has hitherto been collected, and therefore being perfectly uniform in its physical characters, composition, and therapeutic action. There can therefore be no objection, but manifest advantage, in employing it in place of the scammony commonly met with."

In the same volume, p. 548, I find myself writing favourably of the new resin, and after fifteen years I see no reason to alter that opinion. After these quotations I feel that I may safely suggest that, in the next edition of the B. P., resin of scammony may be introduced in the place of scammonium, and in describing the mode of obtaining scammonium, if retained, instead of saying "a gum-resin obtained by *incision* from the living root," it would give more correct information if stated by cutting the living root *through* at the top, about two inches from the neck, below where the stalks spring from.

I come now to the consideration of the employment of the resin from another point of view. A genuine article may be readily obtained at a moderate price, and it may be easily examined; but, so long as the authorities require virgin scammony to be used, I would recommend that the best that can possibly be obtained be bought, and this practice alone would soon stop the admixtures abroad, which I cannot but think arise from want of care on the part of the collectors, the mode in which it is collected, and the temptation there is to make weight.

Let me impress upon those who may have any doubt upon the subject that the substitution of the cheap scammony for the scammonium of the B. P. in the preparations contained in that book, or where scammony is ordered by prescribers, is virtually an adulteration. The B. P. states that from 80 to 90 per cent. of resin may be extracted by ether, but it would be unreasonable to expect that every pound in a chest taken out separately would yield that percentage, and therefore some margin should be allowed in the examination of such a substance before it is condemned as being adulterated.

PRESUMED HYBRID BETWEEN CINCHONA CALISAYA AND C. SUCCIRUBRA.

We have been favoured with the following extract of a letter from Dr. de Vrij to Mr. J. E. Howard, dated July 6th, 1874 :—

"I have read with much interest your paper on the presumed hybrid between *C. Calisaya* and *C. Pahudiana*, particularly the fact observed by you that this hybrid, *grown out of the tropics*, contains quinamine. Till now, this alkaloid has only been found, both by Dr. Hesse and by me, in the red bark grown in British Sikkim, which is situated out of the tropics. * * * *

"Although I have great confidence in the chemical skill of Mr. Moens, my experience about the constituents of the Java Calisaya and Pahudiana barks compels me to draw a conclusion quite opposite to that made by him. In the numerous specimens of Java *Pahudiana* bark analysed by me, I invariably found them to contain chiefly cinchonidine with little quinine and cinchonine, and *never quinidine;* whilst in the Java Calisaya bark I very often found quinidine, this alkaloid sometimes even preponderating. (PHARM. JOURN., June and July, 1864.) It seems, therefore, to me that the grafting has made a change in the constituents of the bark."

Mr. J. E. Howard remarks upon the foregoing, "It is fortunate that the strongest confirmation is thus given to the views of Mr. Moens, since by a transposition, for which I alone am responsible, 'the latter' should read 'the Calisayas,' and 'the former' 'the Pahudianas.' This error of mine thus brings out the truth more clearly.—J. E. H.

THE APPENDICES OF THE BRITISH PHARMACOPŒIA.

BY WALTER G. SMITH, M.D. DUBLIN,

Fellow and Censor K. and Q. C. P. I.; Examiner in Materia Medica, Q. U. I.; Assistant Physician to the Adelaide Hospital.

(*Concluded from page* 23.)

VOLUMETRIC SOLUTION OF NITRATE OF SILVER.—$AgNO_3 = 170$.—1000 grain-measures contain $\frac{1}{10}$ molecule $= 17$ grs.

Uses.—This solution is used in the quantitative estimation of three substances, viz., hydrocyanic acid, arseniate of sodium, and bromide of potassium, but may be applied likewise to the estimation of chlorides and iodides. It is also employed officially in the detection of fousel oil or aldehyd in spirit of wine. (See *Spiritus Rectificatus.*)

The fundamental reactions upon which the processes depend are—

I. (*a.*) $HCy + NaHO = NaCy + H_2O$.
   (*b.*) $2\,NaCy + AgNO_3 = (AgCy,NaCy) + NaNO_3$.
   (*c.*) $(AgCy,NaCy) + AgNO_3 = 2\,AgCy + NaNO_3$.
II. $KBr + AgNO_3 = AgBr + KNO_3$.
III. $Na_2HAsO_4 + NaHO + 3\,AgNO_3 = Ag_3AsO_4 + 3\,NaNO_3 + H_2O$.

Procedure.—For hydrocyanic acid (Liebig's method).—Add excess of liquor sodæ to the acid (*a*), and drop in the silver solution until a *permanent* precipitate of cyanide of silver begins to form. The reason that no permanent precipitate forms at first, although cyanide of silver is insoluble, is this. So long as any free cyanide of sodium remains in the solution a *soluble double cyanide* of silver and sodium is formed, by equation (*b*), but so soon as all the cyanogen is thus combined, the next drop of nitrate of silver in excess decomposes this double salt, and a permanent precipitate of cyanide of silver is formed by equation (*c*). Now the molecular weight of $HCy = 27$, but since 1 molecule $AgNO_3 = 2$ molecules NaCy, see equation (*b*), *i.e.*, 2 molecules HCy (or $27 \times 2 = 54$), $\frac{1}{10}$ molecule $AgNO_3 = \frac{1}{20}$ $HCy = 2{\cdot}7$ grs.

For any given case, then, we have $1000 : n :: 2{\cdot}7 : x$.

For bromide of potassium. Dissolve in water and add the standard silver solution until, after agitation of the liquid and subsidence of the precipitate, a drop of the test-solution ceases to cause further precipitation. The molecular weight of $KBr = 119$, therefore since 1 molecule nitrate of silver $= 1$ molecule bromide of potassium, $\frac{1}{10}$ $AgNO_3 = \frac{1}{10}$ $KBr = 11{\cdot}9$ grs.

For arseniate of sodium. Expel the water of crystallization by heating to 300° F., so as to obtain a definite anhydrous salt (Na_2HAsO_4), convert into neutral arseniate by adding a little of the vol. sol. of soda, and then run in the silver solution until after agitation of the liquid and subsidence of the precipitate, a drop of the test-solution ceases to cause further precipitation. The molecular weight of $Na_2HAsO_4 = 186$, therefore since three molecules of nitrate of silver $= 1$ molecule arseniate of sodium, $\frac{1}{10}$ $AgNO_3 = \frac{1}{30} Na_2HAsO_4 = 6{\cdot}2$ grs.

In testing the following substances

Acidum Hydrocyanicum	270 grs.	=	1000	grain-measures.
Potassii Bromidum	10 „	=	840	„ „
Sodæ Arsenias (dry)	10 „	=	1613	„ „

VOLUMETRIC SOLUTION OF OXALIC ACID. $H_2C_2O_4\,2H_2O = 126$.—1000 grain-measures contain half molecule $= 63$ grs.

Use. This solution is used in the Pharmacopœia only for the estimation of bases (alkalimetry), principally salts of potassium, sodium, and ammonium. Because oxalic acid is dibasic, and the bases to be determined by it are mostly monobasic or univalent, it is more convenient to take *half* the molecule of oxalic acid in the standard volume of 1000 grain-measures.

NOTE.—Oxalic acid is also employed in volumetric analysis for standardizing solutions of permanganate of potassium :—

$$2KMnO_4 + 5H_2C_2O_4 + 3H_2SO_4 = K_2SO_4 + 2MnSO_4 + 8H_2O + 10CO_2.$$

Weigh the substances before and after the operation; the loss of weight $= CO_2$ expelled, and $5CO_2 =$ molecule $KMnO_4$.

Procedure.—Add a little litmus to a weighed quantity of the basic substance, diluted or dissolved, and run in the standard acid from the burette cautiously until the last drop turns the liquid red.

The fundamental reaction of this process is typified by the following equation :—

$$2NaHO + H_2C_2O_4 = Na_2C_2O_4 + 2H_2O.$$

That is, 1000 grain-measures of the acid (containing $\frac{1}{2}$ molecule) will neutralize one molecule of any monobasic substance or half molecule of a dibasic substance. For example, it is stated in the Pharmacopœia that one ounce of Liquor Potassæ ($= 462{\cdot}9$ grs.) requires for neutralization 482 grain-measures of the standard acid, and that this corresponds to 5·84 per cent. The molecular weight of KHO is 56, then,

$$1000 : 482 :: 56 : x = 26{\cdot}9 = 5{\cdot}84 \text{ per cent.}$$

Carbonic acid turns litmus purple, and therefore in testing alkaline carbonates the standard acid solution is allowed to drop in until the well-stirred liquid assumes a purple tint (due to the liberated carbonic acid); the liquid is then *gently* warmed to promote the escape of the carbonic acid gas, and more acid run in until the last drop of acid turns the solution red.

In testing compounds of lead and lime the indicator consists in the cessation of the formation of a precipitate, because the oxalates of lead and calcium are insoluble.

The caustic alkalies and their carbonates are never met with in commerce in a state of absolute purity, and usually contain from 90 to 98 per cent. of the pure compound.

The tartrates of potassium, citrate of potassium, and Rochelle salt are estimated volumetrically by first converting them into their respective carbonates by ignition, and then adding standard acid. One molecule of neutral tartrate of potassium, and two molecules of acid tartrate of potassium yield one molecule of carbonate of potassium when burnt; and two molecules of Rochelle salt (tartrate of potassium and sodium) yield one molecule of carbonate of potassium and one molecule of carbonate of sodium. Under the same circumstances, two molecules of citrate of potassium yield three molecules of carbonate of potassium.

The following substances are tested with the vol. sol. of oxalic acid.

Ammoniæ Carb.	59	grs. =	1000	grain-measures.	
Borax	191	„ =	1000	„	„
Liq. Ammon. .	85	„ =	500	„	„
„ „ Fort.	52·3	„ =	1000	„	„
„ Calcis . .	4380	„ =	200	„	„
„ „ Sacch.	460·2	„ =	254	„	„
„ Plumbi Subacet.	413·3	„ =	810	„	„
„ Potassæ .	462·9	„ =	482	„	„
„ „ Efferv.	4380	„ =	150	„	„
„ Sodæ . .	458	„ =	470	„	„
„ „ Efferv.	4380	„ =	178	„	„
Plumbi Acetas .	38	„ =	200	„	„
Potassa Caustica	56	„ =	900	„	„ If pure = 1000
Potassæ Bicarb.	50	„ =	500	„	„
„ Carb. . .	83	„ =	980	„	„
„ Citras .	102	„ =	1000	„	„
„ Tartras .	113	„ =	1000	„	„
„ „ Acida	188	„ =	1000	„	„
Soda Caustica .	40	„ =	900	„	„ If pure = 1000
„ Tartarata	141	„ =	1000	„	„
Sodæ Bicarb. .	84	„ =	1000	„	„
„ Carb. . .	143	„ =	960	„	„

VOLUMETRIC SOLUTION OF SODA. $NaHO=40$.—1000 grain-measures contain one molecule, *i.e.*, 40 grs.

Use.—This solution is used for the estimation of acids (acidimetry).

Procedure.—To a weighed quantity of the acid dissolved in water, or diluted if necessary, add some infusion of litmus, and cautiously run in the standard soda solution until the last drop turns the solution blue.

The fundamental reaction of this process is represented by the following equation:—

$$NaHO + HCl = NaCl + H_2O.$$

Therefore, 1000 grain-measures of the soda solution (containing one molecule soda) will neutralize one molecule of any monobasic acid (hydrochloric, nitric, or acetic); half molecule of any dibasic acid, *e.g.*, tartaric or sulphuric; and one-third molecule of any tribasic acid, *e.g.*, citric.

In delicate experiments turmeric may be used as the indicator instead of litmus, especially because some neutral salts, as acetates, citrates, and tartrates, exercise a slight alkaline action upon litmus.

Example.—Under Acid. Hydrochlor. Dil. it is stated that six fluid drachms require for neutralization 1000 grain-measures of the standard solution of soda, and that this corresponds to 10·58 per cent. The molecular weight of hydrochloric acid $=36·5$, therefore the 1000 grain-measures of soda solution $=36·5$ grains of HCl. But the six fluid drachms of the dilute acid weigh 345 grains, and so we have—

$$345 : 100 :: 36·5 : x = 10·58 \text{ per cent.}$$

This solution is used in testing the following substances:—

Acetum	445·4	grs. =	402	grain-measures.	
Acidum Acet. . . .	182	„ =	1000	„	„
„ „ Dil. . .	440	„ =	313	„	„
„ „ Glac. .	60	„ =	990	„	„
„ Citricum . .	70	„ =	1000	„	„
„ Hydrochlor. .	114·8	„ =	1000	„	„
„ „ Dil.	345	„ =	1000	„	„
„ Nitricum . .	90	„ =	1000	„	„
„ „ Dil.	361·3	„ =	1000	„	„
„ Nitro-hydr. Dil.	352·4	„ =	920	„	„
„ Sulphuricum. .	50·6	„ =	1000	„	„
„ „ Arom.	304·2	„ =	830	„	„
„ „ Dil. .	359	„ =	1000	„	„
„ Tartaricum .	75	„ =	1000	„	„

NOTE ON A REACTION OF GALLIC ACID.*

BY HENRY R. PROCTER, F.C.S.

If a solution of sodic or potassic arsenate, of faintly alkaline reaction, be added to one containing gallic acid, and the mixture exposed to the air, it will rapidly absorb oxygen, and develope an intense green colour. If the liquid be undisturbed, the change will commence at the surface, and a beautiful green layer will be formed, floating on the colourless liquid; while if air be altogether excluded, no apparent change takes place. 0·05 mgr. of gallic acid will produce a decided colouration in 1 c.c. of water. The arsenical solution must not be acid, but excess of alkali causes irregular oxidation and the formation of brown products.

Dilute acids change the green to a clear purplish red, and cautious neutralization with alkalies restores the green, but any considerable excess of the latter destroys the colour. In its reactions with acids and alkalies it shows a certain similarity to the colouring matter of red cabbage, but in most other reactions the two are completely dissimilar. There is also a considerable difference in their absorption-spectra, the cabbage green transmitting a broad band of red, while the gallic green does not.

Concentrated nitric and sulphuric, and boiling hydrochloric acids change the colour to a pale yellow, which is not restored by ammonia, but, in the case of nitric acid, is changed to a deep orange-brown.

Oxidizing agents mostly change the colour to an orange-brown. Even iodine in potassic iodide does this immediately.

The colour is also destroyed by reducing agents. *Sulphuretted hydrogen* passed into the acid solution rapidly decolorizes it, with no immediate precipitation of arsenic sulphide, and but slight deposition of sulphur. *Ammonic* and *sodic sulphides* instantly change the colour to brown or orange. *Sulphurous acid* and *ammonic sulphite* destroy the colour in either acid or alkaline solution.

Sodic hyposulphite does not completely destroy the green, but makes it paler, and on the addition of hydrochloric acid a pale bluish green remains, which is unaltered by excess of acid, but gradually fades away.

Nascent hydrogen from zinc or sodium amalgam rapidly decolorizes the acid solution, but only acts very slowly on the alkaline one. No arsenetted hydrogen is evolved. The green matter is not taken up from its aqueous solution by ether, bisulphide of carbon, benzene, or aniline, but is partly precipitated by alcohol.

* *Journal of the Chemical Society for June*, 1874.

When gallic acid is present in excess, a green solution is sometimes formed, which is not reddened by acids, but only turned purplish, and which, on standing, deposits a bluish precipitate.

The reaction seems peculiar to gallic acid. Gallotannic acid slowly gives a faint greenish tint, probably due to traces of gallic acid, while pyrogallin not only does not give the reaction, but seems to interfere with it when gallic acid is present.

THE MUTUAL RELATIONS OF DRUGGISTS AND PHYSICIANS.

The following is taken from an Address upon the Mutual Relations between Prescribers and Dispensers, delivered by Dr. Charles E. Buckingham, before the Graduating Class of the Massachusetts College of Pharmacy, April 22, 1874 :—

It is now some thirty years since I began the practice of medicine. About that time, I remember seeing an advertisement in a Boston newspaper :—"For sale. An apothecary's stand and fixtures." And, among the inducement to purchase, was the statement that "it requires no previous acquaintance with the business." This was in the city of Boston, where we should find people boasting that things were done more by rule than elsewhere in the country. Thirty years ago it would have been considered a difficult matter to find a carpenter, a cooper, a shoemaker, or any other mechanic in charge of a piece of work in his own trade, who had not passed through the regular stages of an apprenticeship for seven years, and of a journeyman. No man would have been looked upon as a safe legal adviser who had not been trained in the whole mystery of the law ; and he who had not at the least read his Bible, would have been considered a blind leader of the blind, had he undertaken to instruct us or our fathers in the mysteries of theology, or to explain the doctrines of sin and salvation, erroneous as the notions of either speaker or hearer might have been.

At the same time, he or she who professed to be born with curative powers, was sure of having a limited number of followers. In former days, a certain amount of mystery was supposed to be necessary in the treatment of disease. Education was not always considered a necessity; that is to say, what we call education to-day. Certain men were supposed, by the world at large, to have been born with the power to heal diseases, and others to have acquired that power by their prayers. Indeed, this belief has by no means departed; and there are enough of the weak-minded still left to encourage the hypocrite and blasphemer who prays for a living, and who advertises to the world that he is about to pray. Such weakness is more common in country communities, although in this city the medical practitioner not infrequently falls in with those who believe that the seventh son of a seventh son has miraculous powers. There are still those who believe in incantations, and night after night, and week after week, the believers in spiritual manifestations consult the medium, whose whole work consists in prescribing the last new remedy for consumption, or in repeating the age of the grandmother, or the number of dead brothers, which the applicant has forgotten that he told her only ten minutes before.

Within a few years, another form of quackery has come into being, believed in by many, though not in any degree by those who practise it. You understand, of course, that I speak of that class of practitioners who pretend to believe that the more you reduce the strength of a medicine, the more you increase and develope its powers ; and that a millionth of a grain has more power than a grain. The men who pretend to act upon this system—I do not know of one who does more than pretend—are aided in their sham by the progress made by chemists in analysing drugs and discovering ultimate principles, which these fellows use under names which do not belong to them. The ignorant public does not and cannot know that the two per cent. of quinia extracted from "Jesuit's bark," or the ten per cent. of morphia extracted from the opium, is not an evidence of the progress of a so-called school of medical practice, which is not followed, even by those who profess it.

But there is progress; progress in your profession, progress in mine. And that progress will be more marked in the next fifty years than it has been in the last fifty. When it was first proposed that druggists should employ only those as assistants who were educated, or to be in part educated, outside of the particular shop in which they were employed, the proposition was laughed at by a large number of those who now believe it to be the true course. But how stands the record? Not a druggist, or pharmaceutist if you like the word better, of really good standing, but is anxious that his boy should have a better education than he had, and that they should require their successors to be still better educated. And if you, young gentlemen, are in earnest in acquiring knowledge, and determined to follow properly the course which has been marked out for you here, and which really you have only begun upon, the day is not far distant when every drug store and its laboratory will be a successful field of scientific business, as some few now are; and the fancy goods store combined with the liquor saloon, as some few have been in years past, will take a lower position or be blotted out.

The same incredulity about its success was manifested when the Medical Department of Harvard University proposed to do away with the peculiar style of instruction which had always been followed there and in all other schools about the country. The substitution of a more thorough course of medical education was pronounced impossible; students would not attend upon it; and this more surely, because a verbal examination of ninety minutes at the end of the course was to be displaced by a written examination at the end of each year, and which might be protracted to twenty-seven hours in all. Those of us who were determined to succeed, and have succeeded to a certain extent, are in full accord with the gentlemen who stand at the head of your college.

It seems impossible that men were admitted to the degree of doctor of medicine, all over this country, with a single examination in nine branches, allowing ten minutes to each examination. That, however, was the fact. And we were warned that if we made the change proposed, the Medical School of Harvard University was destined to die, and its days were already numbered. But there were those who believed that an attempt should be made at progress, and that if death was to be the result, why, it could not be in a better cause.

What has been the result? The examinations have been spread over the three years. Twenty-seven hours have taken the place of the ninety minutes. The number of our students, in the four months' course of 1870-71, was three hundred and one. In the nine months of the following year, this number was greatly reduced. Fifty-four only had adopted our new plan. In the year 1872-73 this number increased to ninety-three, and in the first term of this year we could count one hundred and eighteen students who were willing to undergo the severe examinations required for a degree. But how about expenses and income? for the former must have largely increased and the latter must have diminished. Why, gentlemen, the income of this year, which has but little more than *half* gone, has already been nearly a third more than it was in the whole of last year.

What has become of the other students? Why, they have preferred to go where examinations are easier; where the time is shorter; where the drill is less severe. We are satisfied that the change in the manner of study will be a success. The course which we have marked out is in parallel with the course which has been marked out for you, in taking you from the counter of the drug store, and giving you extra work and study in the college laboratory. We have more branches of study, and our course is longer and harder. Let each and all of us do what lies in our power to make both colleges successful. The quack pretender, perhaps, can make money more rapidly and more abundantly than the educated pharmaceutist or physician. If pecuniary compensation is all that a man seeks, it is true that he can acquire it more easily in quackery and humbug than in fair and open work. That is a matter of taste. A thief or a forger can conquer both in that game. That is a matter of taste also. I am aware that, in your profession, there are obstacles to be overcome which many others have not to contend with. It is true that the laws of the land have put taxes upon your sales perfectly unwarranted, and that many of these are so worded that even the most honest man cannot act under them without risk of punishment and disgrace. People complain of the cost of the medicines which you furnish, and yet do nothing in any way to aid you in getting rid of burdensome per-centages laid upon the same article, over and over again. A stir in the moiety business within a few weeks past is, I trust, the beginning of a reformation by which those government sneak-thieves will be got rid of, who spend their time in trying to trap honest pharmaceutists into breaking a law which, to appearance, was blindly worded purposely.

The duty of educating a doctor of medicine is not completed when he has pocketed his diploma. Indeed, he has then only learned how to learn. He may answer correctly all questions, but his practical education is to begin at that point, and will only be finished with his life or on his retirement from the profession. The duty of this college is to produce such a class of educated graduates as will be able to manufacture and inspect drugs for themselves. But your duty, gentlemen, was not completed when you passed the examination which entitled you to your diplomas. You may say that your course of study is practical throughout. No more so than ours. The older you grow in your work, the better it should be in every way, and science should go hand in hand with profit.

"The experienced doctor," so called, is, in many places, one who has grown grey in the practice of his profession without ever learning a fact which he did not read as an undergraduated student. And he who is often considered by the ignorant public to be the reliable druggist is no better. The object of both our schools is to teach the beginner how to teach himself afterwards.

There are relations between our professions which it is worth while to call attention to. It has been the case, sometimes, that the pharmaceutist and the physician have run in opposition to each other. This should not be. Every man has his preference for individual members of any trade and of any profession with which he has dealings. But you have no right to turn my patients into the hands of any other medical man who chooses to send his prescriptions to you. I have no right to require my patients to buy drugs at any other store than that which they are accustomed to deal at, because he who keeps it is one who patronizes me. The physician who keeps a private remedy at a particular shop, which can be put up only on his order, and which no other druggist can understand, is a quack who has violated his word of honour. If you furnish drugs which I know to be inferior, because they cost you less than drugs of the first quality, that alters the case. Meanness is criminal wherever it exists, and should be punished.

Let us have a case or two from either side of the sheet. A medical man wrote a prescription for some morphia in pills. The size of the pills was excessive, and nothing upon the prescription indicated that there was any unusual call for what to most people would have been a fatally poisonous dose. There were no written directions, as there should be upon every prescription. The druggist very kindly said to the bearer of the prescription that he would prepare the medicine and send it to the house. He tried for several hours to find the writer, and at last caught him at the dinner table, was kept waiting for a time, and was finally informed by the doctor that he never made mistakes, and that the prescription meant what it said. Of course, the druggist returned to his shop, and while engaged in preparing the pills, a messenger from the same patient came with another prescription. It seems that, without waiting to see his office patients, the doctor, on finding that he had made a blunder, too proud to acknowledge it and thank his informer for saving his patient, had hurried to the patient's bedside, changed his prescription as the result of new thought, received the thanks of the family for his attention, and repaid the apothecary with meanness, for an act of kindness which prevented a coroner's jury.

I was knowing to the fact that a physician once advised some medicine to be thrown away because it did not come from A's shop, at which he traded, and no one in Boston knew so well as A how to prepare it. It had been purchased at B's shop. I also knew that B made all of that particular preparation which A sold. The bottle was refilled from the same fountain, and pronounced to be all right. The first was a case of meanness. Meanness and ignorance combined formed the second, and both of them were deserving of punishment. I have known the same physician to change the form of a prescription, given on emergency by another who had been called in his place, simply that none but himself should have the credit of giving relief.

I care nothing who the physician may be, nor who the druggist. The physician has no right to interfere, except upon stronger ground than mere acquaintance or personal preference, or even family connection. Least of all has he the right to decry the druggist's medicine, unless he has good reason to believe it to be of inferior quality. You know, and the public should know, how much medicines vary in quality, and that the price and quality go together. It will be no credit to any of you, if you sell medicine at retail for less money than your neighbour buys it for at wholesale. Take some of the common articles which families keep on hand, and see the difference in cost: sugar of lead from fifteen to fifty cents a pound; sweet spirits of nitre from twenty-five to seventy cents; powdered rhubarb from twenty cents to two dollars; Hoffmann's anodyne from thirty cents to one dollar and seventy-five cents; arrowroot from ten to fifty cents; and other articles used solely in prescriptions at equally varying prices.

(*To be continued.*)

THE ABSORPTION OF AMMONIA FROM THE AIR BY PLANTS.

BY T. SCHLOESING.

It is generally admitted that ammonia diffused in the atmosphere may be absorbed directly by the leaves of plants, and serve them as nitrogenous aliment. But as the author was not aware that this assimilation of aerial ammonia had been demonstrated experimentally, he made it the subject of a series of observations, the results of which he has reported to the French Academy of Sciences.*

The experiment consisted in the cultivation of two plants of the same species under parallel conditions, with the sole difference that one developed its foliage in an atmosphere supplied with ammoniacal vapours, the other in an atmosphere deprived of those vapours. In order to measure and regulate the ammonia supplied to the aerial organs, it was necessary to enclose the plant in a limited atmosphere renewable and perfectly separated from the soil. This latter precaution was indispensable in order to avoid all chance of absorption of the ammonia by the roots. The tobacco plant was chosen, because its straight

* *Comptes Rendus*, vol. lxxviii., p. 1700.

close stem facilitated the carrying out of the conditions of the experiment.

The vessels in which the plants were enclosed had a capacity of 250 litres, and the atmospheres were continually renewed at the rate of about 1200 litres of air in twenty-four hours; this air contained about one per cent. of carbonic acid. As it was found difficult to introduce the ammonia continuously in a gaseous state, the bottom of one of the vessels was covered with a weak solution of sesquicarbonate of ammonia, which was renewed daily. By determining the strength and volume of each quantity of solution that was introduced or removed, all the elements were obtained for calculating the total amount of ammonia diffused in the atmosphere of the vessel. The strength of the solution found to be most suitable was 0·900 gram of sesquicarbonate to the litre of water.

The experiment commenced on the 31st July, and was continued until the 14th September. The amount of ammonia volatilized in the atmosphere of apparatus No. 1 during that time was 1·327 grams, equal to 1·093 grams of nitrogen. The volume of air passed into the vessel being 45×1200 litres, or 54 cubic metres, each cubic metre would contain an average of 25 milligrams of ammonia, or in round numbers $\frac{2}{100000}$ of ammonia to one part of air.

The leaves, buds, stem and roots of each plant were collected separately, dried, and weighed. The nitrogen was estimated by combustion of the organic matter. The parts of No. 1 (supplied with ammoniacal nourishment) weighed 146·9 grams; those of No. 2, 139 grams. Three grams of No. 1 yielded 66·44 milligrams of nitrogen, or 2·22 per cent.; three grams of No. 2 yielded 53·13 milligrams of nitrogen, or 1·77 per cent. No. 1 attained the normal proportion of nitrogen which a plant of that species acquires in the natural conditions of vegetation; No. 2 was sensibly below that standard. The nitrogenous alimentation of the latter had been wanting, whilst the former had sufficiently supplied. According to the analysis,—

The 146·9 grams of	No. 1	contained	3·260	nitrogen.
The 139·0	,, No. 2	,,	2·460	,,
	Difference		0·800	,,

Attributing this excess of nitrogen to the gaseous ammonia supplied to No. 1, it would appear that of the 1·093 grams of nitrogen furnished during the whole time of the experiment the plant had assimilated 0·800 gram, or about three-fourths.

The absorbed ammonia, as might be supposed, went to form organic compounds, and in fact it was not found upon analysis either in the alkaline state or as nitric acid. It was interesting therefore to note whether the absorption of ammonia by the leaves had any effect upon the production of nicotine. It was found, however, that the leaves of No. 1 contained 1·87 per cent. of nicotine, and those of No. 2, 1·78 per cent., so that it would appear that it had no such influence. The nitrogenous compounds derived from the assimilated nitrogen were diffused throughout the entire plant. The leaves, stem, and roots of No. 1 were all more rich in nitrogen than the corresponding parts of No. 2, so that the enrichment of the leaves had profited the stem and the root.

These results agree generally with those obtained in the experiments by Adolf Mayer, which were recently referred to in this Journal (vol. iv., p. 778).

A UNITED STATES AND BRITISH INTERNATIONAL PHARMACOPŒIA.*

BY PROFESSOR CHARLES HERMON THOMAS, M.D.

There is something more than a sentimental relation suggested by the fact of our speaking the same tongue as the British nation. To the physician and pharmacist this is a matter of every-day recognition. The professional text-books and journals of both countries, devoted to medical science, are used in common in their colleges and public and private libraries, and in all departments but one—and that confessedly of prime practical importance—the terms used by authors convey a precise and identical meaning; while in that of materia medica, including pharmacy, the proper English and Latinized names employed are permitted to convey different meanings when used in the two countries, notwithstanding the liability to fatal mistakes added to the confusion thus engendered. If the same disparity of definitions of technical terms had existed in chemistry, anatomy, surgery, gynæcology, etc., that is found in materia medica, arising, as it does, out of the different proportions of constituent materials used in the medicinal preparations, common by name—but by name only—to both the United States and British Pharmacopœias, there never would have arisen that constant useful interchange of thought and experience which now exists; and if it were possible to introduce such a disparity in the ideas conveyed by like words into other departments of scientific literature as exists in this, it would undoubtedly prove a barrier to communication scarcely less formidable than a total difference in tongue or race.

The British and Foreign Medico-Chirurgical Review for January, 1874, contains an article on the U. S. Pharmacopœia, which, while giving us credit for introducing certain improvements, such as the class of glycerites, closes with the following suggestive paragraph:—

"There is almost a constant departure from the directions given in the British Pharmacopœia, in the matter of proportion of ingredients used; so that whilst many tinctures and infusions are considerably stronger than ours, there are many weaker. Thus, for example, the infusions of calumba, cascarilla, and senna are made only of half strength, whilst those of digitalis and gentian are considerably stronger, the former being of double strength.

"Likewise in the matter of tinctures, we find the tinctures of aconite, belladonna, nux vomica, and cantharides made double strength, while those of cannabis, of hyoscyamus, of digitalis, and of colchicum are one-fourth weaker. Lastly, tincture of opium and the camphorated tincture are made weaker than the British preparations.*

* From the *American Journal of Pharmacy* for July.

* The relation in the strength of these preparations is not correctly given by the *British and Foreign Medico-Chirurgical Review*; the difference in the officinal weights and measures has evidently not been taken into account. On close examination it will be found that the preparations of the two Pharmacopœias agree much better than the above quotation would lead us to believe; in fact, the majority, we believe, are *practically* identical in strength, like tincture of digitalis, hyoscyamus, etc.

It must be remembered that 30 fluid ounces of British Pharmacopœia are equal to 29 fluid ounces of U. S. Pharmacopœia, the difference being only about $1\frac{1}{2}$ fluidrachms, and that the British ounce weighs 42·5 grains less than the U. S. troy ounce. One fluid ounce (imperial and U. S. measure) of the above-mentioned preparations contains of the active drug the following number of troy grains:—

	Brit. Pharm.	U. S. Pharm. In fld. oz. imperial.	U. S. Pharm. In fld. oz. wine measure.
Infusum Calumbæ . .	21·87	14·5	15
,, Cascarillæ .	43·75	29	30
,, Digitalis . .	3	7·25	7·5
,, Sennæ . . .	43·75	29	30
Tinctura Aconiti Rad.	54·7	174	180
,, Belladonnæ .	21·87	58	60
,, Cannabis . .	21·87	21·75	22·5
,, Cantharidis .	5·47	14	15
,, Colchici . . .	54·7	58	60
,, Digitalis . .	54·7	58	60
,, Hyoscyami .	54·7	58	60
,, Nucis Vomicæ	43·75	116	120
,, Opii	32·8	36·25	37·5
,, Opii Camphorata	2	1·813	1·875

—Editor *American Journal of Pharmacy*.

"It may be that the Americans are justified, at all events in some cases, in not following our authorities in this matter of strength of preparations; but at the same time it is a matter of regret that greater uniformity in this matter, between two nations speaking the same tongue and so intimately bound together by social and commercial ties, does not prevail.

"To British medical men cast abroad in America, and to American physicians landed in England, it must be vexatious, and at times a cause of injury to patients, to find that well-known formulæ, common by name to both, differ widely in their doses and activity on one and on the other side of the Atlantic.

"Speaking generally, these variations unhappily affect the more potent remedies rather than the others.

"The notion of an International Pharmacopœia has been broached, and has many recommendations, although we apprehend the more or less divergent medical opinions afloat in different countries, and still more, circumstances dictated by peculiarities in modes of life, in climates and in floras, will lead each nation to claim more or fewer special drugs, and so destroy absolute uniformity.

"On the other hand, there would be a sufficient array of substances and formulæ admitting of so much concurrence as in some measure to attain the object desired. But, however this may be, there is good reason for bringing the British and United States Pharmacopœias more in accord, and so far making the first move towards an international codex, and we should be pleased to hear of communications being opened between the Committee for the British and the Convention for the United States' Pharmacopœia in anticipation of so desirable and object."

No teacher who has endeavoured to instruct a class in medicine or pharmacy composed of students representing both nations will fail to realize the difficulty—not to say impossibility—attendant upon the labour of attempting to define and fix upon their minds the ever varying strength and dosage of such important officinals as the reviewer has here cited.

And no physician who has read the standard British authors on therapeutics, practice, diseases of women and children, and the like, with a view to making their precepts available in the treatment of disease, will dissent from the assertion that the value of such works is seriously impaired and sometimes entirely destroyed by the same fact.

The subject is one of far too great importance, and the defect too grave in its actual and possible consequences, to be allowed to remain longer unrecognised; and there can be no doubt that the suggestion at the close of the above quotation will find hearty approbation and cooperation wherever the question is presented.

Probably the chief obstacle to a universal Pharmacopœia, for all civilized nations at least, will be found in the diverse systems of weights and measures employed in different countries; but there are indications that the general interest in and acceptance of the new chemistry, with the adherence of its writers to the metrical system, will serve as an easy introduction for the essential agreement necessary for a satisfactory means of intercourse.

And probably, also, the use of the metrical system will have to become more familiar to scientific men at large than it is at present, before universal communication will be seriously attempted in this direction. But this question aside for the present, we are on a footing for establishing at once a unity of standard for the composition of the principal preparations of the Pharmacopœias of the English-speaking people, and this notwithstanding the radical differences between the systems of weights and measures in Great Britain and in the United States respectively.

The expedient needed to be adopted is no other than for the United States and British pharmacopœial authorities to unite in putting into force the rule established by the Scandinavian nations at their International Convention held in 1865, when the Pharmacopœias of Norway, Sweden, and Denmark were unified, and which rule is to express the relative quantities used in pharmacy in proportional parts by weight, as, *e.g.*, two parts by any system of weight of the first ingredient, four of the second and one of the third, etc., thus securing like relative proportions in all standard compounds.

At the U. S. Pharmacopœial Convention, which met at Washington in 1870, the following resolution of like import was ordered to be taken as a basis for the last decennial revision of our Pharmacopœia; but, for some reason never satisfactorily made known, the Committee on Revision appears to have disregarded its plain provisions:—

"*Resolved*, that measures of capacity be abandoned in the Pharmacopœia and that quantities in all formulas be expressed both in *weights* and in *parts by weight*."

The consolidation already effected of the London, Dublin, and Edinburgh in the British Pharmacopœia, the several Pharmacopœias of Central Europe constituting the German Empire, and some others, all tend to assure the practicability, as well as to suggest the advisability, of the step here proposed.

The advantages to be obtained by an international adjustment of at least the two Pharmacopœias in question, so that a given name shall indicate a preparation identical in composition and strength in both countries, are obviously many and important; the objections to such a change few and insignificant.

A NEW ALKALOID FROM MORPHINE.*

BY G. NADLER.

The author, by the action of ammoniacal solution of oxide of copper on morphine, has obtained an alkaloid, the chlorine compound of which is dazzling white, sparingly soluble in cold, but easily soluble in hot water, and insoluble in alcohol and ether. The aqueous solution gives with ammonia a dense, white, amorphous precipitate, which does not alter in the air while moist, but dries up, like aluminium hydrate. Ferric chloride produces in the aqueous solution an amethyst-red colour, which rapidly darkens. Strong sulphuric acid dissolves the alkaloid on warming, forming a dark-green solution, which does not alter when heated sufficiently to volatilize the acid. Blue ammoniacal copper solution assumes a splendid green colour. Potash, like ammonia, produces in the aqueous solution a curdy precipitate, which, however, dissolves in excess in the cold. In this respect the alkaloid resembles morphine. The potash solution, when heated to boiling, deposits the alkaloid in silvery scales. The alkaloid rapidly reduces silver nitrate, and gives with platinic chloride a pale-yellow platinum salt. Dilute sulphuric acid throws down from the solution in hydrochloric acid a white amorphous sulphate. The new alkaloid is distinguished from morphine by being precipitated in the amorphous state by ammonia, by its behaviour with ferric chloride, ammoniacal copper solution, potash, and strong sulphuric acid, and by the sparing solubility of its sulphate; and from apomorphine by the fact that in the moist state it does not become coloured on exposure to the air, but remains perfectly unaltered.

CEYLON PRODUCTS.

In a description of Ceylon contained in the report of British Colonies at the Vienna Exhibition, prepared at the request of the British Commission, we find brief allusion to certain products of that Island which are of interest to the chemist and druggist. With regard to cinchona, we note that its cultivation in Ceylon was commenced about ten or eleven years ago. A number of young plants, carefully selected, were imported and set in the Botanical Gardens at Hakgala, at an elevation of about 6000 feet. The results, as an experiment, have been most satisfactory. The trees have already yielded a small supply of bark, which is said to have been valued in England at an exceedingly high rate. A large number

* *Chem. Centr.* 1873, 675; from the *Jour. Chem. Soc.*

of crossed species have been spontaneously developed, which, it is believed, will produce exceptionally fine bark. The coffee planters, too, have largely availed themselves of the gratuitous issue of young plants from the Government plantation, and have placed them in those positions on their estates which are unsuited for the growth of coffee. Sufficient success has been attained to justify sanguine hopes that an extended cultivation will be profitable, and that a large export business will spring up. The cultivation of vanilla does not appear to be very extensive, and no record can be found of the amount grown in or exported from the colony. An excellent sample was sent to the Vienna Exhibition. Cinnamon is now exclusively and profitably grown mainly in the neighbourhood of Colombo, and is described as having somewhat the appearance, and being about the size, of the European laurel. Of late years, owing to the immense improvement in the preparation and cultivation of the spice, and to a largely increased demand at remunerative rates, there has been a much increased export from Ceylon, and there has been considerable progress in the industry. The plant exhales no perfume, but the bruised leaf or bark has a powerful odour of the spice. By means of careful pruning the plant can be made to grow the twigs or their branches free from knots, which yield what is called the pipe-cinnamon, possessing a higher marketable value than sheet bark, which is peeled from the stem. The exportation of plumbago from Ceylon has also much increased during the past few years, and this is owing to the extensive European demand for crucibles. Crucibles made of plumbago are said to have much greater power of resisting the high temperature employed in smelting than any other yet constructed. The raw material is found principally in underlying quartz in the south and south-west of Ceylon, and is worked by the natives under licences from Government. It is largely used in the preparation of what is called black-lead for polishing purposes; while a more recent application of it, and probably the most useful, is as a lubricant.

EXPERIMENTS ON THE IMPORTANCE OF THE INORGANIC CONSTITUENTS OF FOOD.*

BY J. FORSTER.

The author observes that the experiments of Chossat and A. Milne-Edwards seem to show that animals cannot grow without a supply of salts. He criticizes the experiments of Magendie, Wundt, Klein and Verson, Kemmerich, and others, on the effects of a deficiency of salts on adult animals. Some of these with washed fibrin show that albuminous substances can be digested even though no salts are given. In some of the experiments, the result was not due to want of salts, but to want of albumen. The salts in the body may be divided into two classes—1st, those which are firmly combined with combustible substances in the body, and are indispensable ingredients of the juices and blood; 2nd, those which are simply dissolved in the juices. These latter greatly exceed the first class in amount, and consist of those salts which are introduced into the body, or are liberated by the decomposition or oxidation of combustible substances in the organism. Those of the first class cannot leave the organism so long as they remain in combination in organized structures, and even when they are simply dissolved in the juices the arrangements in the kidneys hinder their exit from the body. This is proved by the experiments of Bidder and Schmidt, which show that chlorine quickly disappears from the urine when chlorides are withheld, although it is still abundant in the body; by those of Voit and Bischoff, which show that nitrogen and phosphoric acid rise and fall in the excretions when flesh is put on or lost from the body; and those of Kemmerich, which show that when potash and earthy salts are given, but soda withheld, the soda in the blood continues normal, the potash only being excreted. The author's experiments, made by feeding pigeons and large dogs with albumen, starch, fat, and water without salts, showed that the animal organism, though kept in equilibrium as regards the supply of other nutriment, requires for its support a supply of certain salts, and if this supply is defective or entirely absent, the body loses salts and is thereby destroyed. When the mineral constituents are removed as much as possible from the food of an adult animal, the processes of tissue change, destruction, and decomposition in the body proceed until the death of the animal, in the same way as when the food contains inorganic constituents. Gradually, however, derangements occur in the functions of various organs, which finally hinder the conversion of nutriment into absorbable modifications, and thus prevent the reparation of the combustible materials of the body. On the other hand, by arresting some of the processes necessary for life, they occasion the destruction of the organism before the impossibility of absorbing nourishment could produce decline and death.

The excretion of inorganic substances, though much diminished, continues during the whole time that salts are withheld. It is least at the very time that the supply of combustible material is most abundant, as then the tissues of the body are protected from decomposition, and the salts they contain are retained. Although the salts of the body are to a great extent retained and used over and over again, yet a certain proportion of them is excreted, and when salts are withheld and other food given, the consequences are, 1st, that the whole body, and especially the parts in which destruction goes on actively, such as blood and muscle, become gradually poorer in salts and richer in albumen; 2nd, that although the total quantity in the body is lessened, the mixture of salts in organized structures and in the juices remains unaltered. The diminution of salts in the muscles causes muscular exhaustion, and in the nerves causes first excitability and then paralysis of the nerve centres. The quantity of salts necessary in the food is less than has hitherto been supposed, but further experiments are required to determine its exact amount.

* *Zeitsch. f. Biologie*; from the *Journ. Chem. Soc.*

THE INFLUENCE OF HEAT ON PREPARATIONS OF SARSAPARILLA.*

BY J. F. JUDGE, CINCINNATI, OHIO.

For the purpose of answering the query, whether sarsaparilla is altered in its sensible properties and injured in its medicinal qualities by the heat of a water or steam-bath, proposed by the American Pharmaceutical Association, I prepared a fluid extract by exhausting a good article of sarsaparilla with a mixture of alcohol 92 per cent., five (5) parts, and of water three (3) parts.

One (1) fluid ounce of this was evaporated to a thick pilular extract over a water-bath, yielding sixty-three (63) grains of extract of a brownish colour, and retaining the peculiar taste of the fluid extract.

Upon digesting this extract with two (2) fluid ounces of a menstruum similar to that used originally in making the fluid extract, nearly all was dissolved, there being left but little insoluble matter; hence I conclude that in sensible properties sarsaparilla is not injured by the "heat of a water or steam-bath."

In regard to the second branch of the query I cannot say much. From the fact that little if any change occurs in sensible properties, we would be inclined to conclude that the medicinal are likewise uninjured. The direct establishment of that point scarcely comes within the practical work of a pharmacist. Then, again, there is much diversity of opinion in regard to the actual medicinal value of the crude drug itself. It is my opinion, based upon the experiments above cited, that sarsaparilla is not altered in its sensible properties nor injured in its medicinal qualities by the heat of a water or steam-bath.

* From the proceedings of the American Pharmaceutical Society.

The Pharmaceutical Journal.

SATURDAY, JULY 18, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to
Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CONFERENCE MEETING.

The departure from established usage which this year marks the proceedings of the British Pharmaceutical Conference will probably occasion more than ordinary difficulty in the work of those who have to organize the various arrangements for the meeting. Notwithstanding the fact that London is so large and its resources so great in comparison with those of the provincial towns in which the Conference has been accustomed to meet, there can be no doubt that there is also a vast difference as regards the facility with which those resources may be made available in the two cases. The meeting of such a body as the Conference in a provincial town is an affair of sufficient importance to make almost everything for the time being subservient to it. The entire resources of a town are for the moment placed at the disposal of the hosts and their visitors, and the ordinary business of the place is transacted meanwhile as it best may be in a corner. This could not well be the case in the metropolis, and hence it is not without some degree of anxiety that the question as to the successful issue of the approaching meeting is to be regarded.

In speaking of the possible success of this meeting, we do not intend to suggest any apprehension that there will not be a numerous atendance, or any doubt as to the value and interest of the proceedings being at least equal to what they have been on other occasions, but rather to indicate that in consequence of the peculiar circumstances of London it will be especially necessary to have some knowledge beforehand of the number that will be present at the meeting.

Only last year a similar experiment was made in London by the British Medical Association, and the most unfortunate thing connected with it was the overwhelming success of the meeting in regard to numbers, the visitors having been so far in excess of the most sanguine anticipations that, coming suddenly and unexpectedly, there was no possibility of providing for all. Such a result is probably one of the most vexatious forms of failure, and it is in order to guard against any repetition of such an unfortunate circumstance that we desire to call the attention of our readers to the requirements of the case.

It is satisfactory to find that these requirements have not been lost sight of by the Secretaries, and we have much pleasure in complimenting them on the admirable manner in which they have provided for obtaining the information they are in need of. For the information of those who are not members of the Conference, we may state that in the circular lately sent out to make known the order of proceedings during the meeting, it is stated that those who purpose attending either the conversazione given by the Pharmaceutical Society, the Conference dinner, or the excursion to which our provincial friends are invited, should communicate their intentions to the Secretaries. In order to facilitate this, a series of printed forms are sent with the circular, referring respectively to the several features of the meeting, as well as to the provision of hotel accommodation. By merely signing these forms and sending them to the Secretaries, all difficulties arising from uncertainty as to the number of guests to be provided for will be easily removed, and we trust that a request so reasonable as well as so especially necessary in the present instance will be generally responded to as early as possible by those who intend to be present at the meeting.

The time fixed as the latest for sending in these notifications is the 27th of this month, leaving just ten days before the meeting commences for the Secretaries to carry out their final arrangements. We understand that many have already availed themselves of the means provided for communicating their intention to attend the conversazione, dinner, and excursion, and in the course of the ensuing week we trust that all who contemplate taking part in the metropolitan meeting of the Conference will do the same.

THE IRISH PHARMACY QUESTION.

The Select Committee on the Apothecaries' Licences Bill has met twice during the present week, the sitting on Monday being devoted to the examination of Mr. G. W. Sandford, Mr. John Mackay, and Sir Dominic Corrigan; that on Thursday to the examination of Dr. Rawdon Macnamara.

Mr. Sandford, speaking with the experience of twenty years' service on the Council of the Pharmaceutical Society of Great Britain, during seven years of which he held the office of President, expressed his opinion that the Society would be willing to undertake the duties which would be imposed upon it by the extension of the provisions of the Pharmacy Act, 1868, to Ireland; and he did not think any insuperable difficulty would occur. Such an arrangement he considered would be advantageous to Ireland, and would conduce to uniformity of pharmaceutical qualifications in the two islands, whilst the establishment of another Society would probably lead to confusion, as it would be necessary that the titles granted by such a Society should differ from those given by the British Society. Mr. Sandford described the constitution of the Board of Examiners in Scotland and the identity of the examinations, and explained that the members of the Society residing in Scotland enjoyed rights the same in every respect as those of the English members. The topic of counter-prescribing was again raised, and Mr. SANDFORD said the practice had always been discouraged by the Society. Dr. BRADY having asked whether, as the Medical Council is the "fountain" of the Pharmacopœia, that body ought not to have some control over examinations in which the Pharmacopœia played so important a part, Mr. SANDFORD said that the Medical Council had always been desirous that the duty should be entrusted to the Pharmaceutical Society alone.

Mr. JOHN MACKAY, as Honorary Secretary to the North British Branch of the Pharmaceutical Society of Great Britain, said that the plan of having one Society for England, Scotland, and Wales had worked exceedingly well, and he thought it might well be extended to Ireland. He described the business of the Branch as being conducted by a committee chosen annually by the Scotch members, the recommendations being forwarded to the Council in London,—upon which Scotland was at present represented by two members. He said there had never been any difficulty; they had always been told to ask for whatever they wanted, and their expenses had always been allowed. The Society had a library and a museum in Edinburgh, and they had been able to make favourable arrangements for the attendance of students upon the lectures delivered by the University professors. He further said that the examiners for Scotland were nominated by the North British Branch, and resided in different parts of Scotland; the appointments being made by the Council meeting in London, and subject to the approval of the Privy Council. Mr. MACKAY said he thought the present chemists and druggists in Ireland ought to pass a modified examination before being placed upon the Register, although the chemists and druggists in business in England before August, 1868, had been admitted without one; because in England they represented the class who had previously been engaged in the dispensing of medicines, whilst in Ireland they are mere vendors of drugs, and are not now allowed to dispense. If a body of pharmacists were provided for Ireland, he would advise the apothecaries to stick as closely as possible to medical practice, and leave the sale of drugs and dispensing of medicines to the class specially educated for that purpose.

Sir DOMINIC CORRIGAN agreed with the preamble of the Bill as to the inconvenience existing through the absence of dispensers from some parts of Ireland, and he instanced the Saltbridge Union, a district containing 18,000 inhabitants, where formerly there was an apothecary in every town, but where now it was not possible to get a prescription dispensed. Sir DOMINIC CORRIGAN, however, thought it desirable to establish a separate Pharmaceutical Society in Dublin, having power to enact bye-laws regulating the examinations, subject to the approval of the Lord-Lieutenant of Ireland, and enjoying reciprocal rights with the British Society. His objection to the extension of the operations of the existing Society to Ireland appeared to be based upon a belief that examiners would be sent over from England, whilst the fees from Ireland would be devoted to defraying an extravagant expenditure upon objects from which Ireland would reap no benefit. Among the items of expenditure specially selected for condemnation were the expenses of the conversazione and journal, the fees of the examiners, the house expenses, and the salaries of the secretaries and clerks. When reminded by the Chairman that the members in Scotland did not appear to feel aggrieved, Sir DOMINIC said that this was probably because the subject had not attracted their notice, but that he thought now he had called attention to it they would be dissatisfied. He objected to all the portions of the Apothecaries' Hall scheme which would give that body any control over a new Society, but said he thought a good nucleus for such a Society would be found in the licentiate apothecaries. Sir DOMINIC said he would confine the legislation to the creation of a class for the dispensing and compounding of medicines, and he would not interfere with chemists and druggists, or with the Poisons Act for Ireland, which allows any person to vend poisons, subject to regulations similar to those of the Pharmacy Act, 1868, as to labelling and registration of sale. Being pressed upon this latter point, Sir DOMINIC said that he could give no other answer than that this Act had met with the general approval of the public and of coroners, and should not be disturbed. So far as this is a matter of opinion, of course Sir DOMINIC may be right; but, as a matter of fact, an Irish coroner has expressed himself in very strong terms respecting the policy of the Act.*

Dr. MACNAMARA showed a general unacquaintance with the details of existing and proposed legislation on the subject. He was ready to express an opinion upon the Apothecaries' scheme, "so far as he was acquainted with the details;" the last of the three clauses of Mr. ERRINGTON'S short Bill, respecting which he was supposed to give evidence, he was unacquainted with; and the Pharmacy Act, 1868, which the Bill proposed to extend to Ireland, he had never read. It may be presumed therefore that the decided opinions he expressed upon the subject were evolved from his inner consciousness. He said that he approved of the Bill so far as it went, but that it was faulty, in that it did not provide for the establishment of a Pharmaceutical Society in Dublin. The extension of the existing Society to Ireland would, in his opinion, paralyse pharmaceutical science in that country, since the appointments of Presidents, Vice-Presidents, Members of Council, Professors, Examiners, etc., would always be confined to the "head-quarters" in London, and there would be no stimulus to Irish pharmacists. This opinion was not affected

* See vol. iv., p. 16.

by the reading of Mr. Mackay's evidence respecting the North British Branch, and Dr. Macnamara said he could not conceive that courses of lectures delivered mainly for medical students could be made available for pharmaceutical students. As to the probable financial position of a new Society, Dr. Macnamara thought it would be self-supporting; but he had not considered whether the examination fees would require to be supplemented by annual subscriptions from the members. He admitted that a fund would be required to start the new Society, and being, as he expressed it, "put into a corner" to say where this money was to come from, replied that, as the object would be *pro bono publico*, he thought a grant might be made from the public funds. Dr. Macnamara agreed with Sir Dominic Corrigan, that a suitable nucleus for the proposed Society might be chosen from the licentiate apothecaries, and also in objecting to a mercantile body like the Apothecaries' Hall having any control over a scientific society. He considered that it was essential there should be reciprocity between the two Societies in Great Britain and Ireland, and, upon the syllabus of the Minor examination being shown to him, said that it appeared to be a satisfactory test to enforce before admitting a person to the right of dispensing physicians' prescriptions.

After Dr. Macnamara's opinions had been placed upon record, strangers were requested to withdraw, and the Committee proceeded to the consideration of its report.

THE JURIES BILL AND THE ADULTERATION ACT.

Chemists and druggists who have been looking forward to the passing of the Juries Bill to place them in the same position with pharmaceutical chemists in respect to exemption from jury service, will regret to learn that there is little probability of the measure becoming law during the present Session. On Tuesday night, in replying to a question in the House of Commons, Mr. Lopes said that having regard to the late period of the Session, and the amount of business which remained to be got through, he had no hope of passing the Bill this Session. But he added that he felt sure, considering the principles of it had been sanctioned by the House, the public would not be satisfied until some such measure had been enacted.

It would appear also that, notwithstanding the prompt report of the Select Committee on the Adulteration Act, there is no prospect of early legislation to carry into effect its recommendations. Mr. Sclater-Booth, the President of the Local Government Board, said on Monday evening that it would be impossible for him to make any proposal on a matter of so much difficulty and interest in the limited time now available before the prorogation of Parliament.

Proceedings of Scientific Societies.

TENNESSEE PHARMACEUTICAL ASSOCIATION.

At the second annual meeting of the Tennessee Pharmaceutical Association, the President, Mr. Wharton, delivered the following annual address:—

If any one of you, my fellow members of the Tennessee Pharmaceutical Association, has ever had occasion, as I now have, to make a pharmaceutical speech, or read a pharmaceutical essay, you can bear sympathetic testimony as to the difficulties to be met in attempting to select a suitable theme, and still further in setting it forth in an attractive style.

Practical pharmacy, as a topic, is not prolific in ideal abstractions or poetic fancies. It opens to us no broad and boundless field of elocution, and supplies us with but little food that may be dispensed as oratorical dainties; but it is gratifying to know that in the multitudinous details of our every-day experience we often meet with much to entertain and instruct us. Which one of us, in reviewing his days of apprenticeship, cannot recall some mischievous use of hartshorn that delighted him at somebody's expense? or who has not a more vivid recollection of somebody's delight at his expense? Has any one of us failed to play the trick with chlorate of potassa and sulphur, and have all of us failed to shiver into fragments mortars, pill tiles, and various other breakables in the neighbourhood of such a charge as overdid the work a trifle? Who has not been tested or tested some one else with incompatible prescriptions that would make liquids of solids and solids of liquids? But taking a stride beyond these, do we not come to a period of thoughtfulness, when we begin truly to realize that our occupation or profession is not so easily grasped and mastered as at first it seemed; yet, withal, it is still more attractive. We see it expanded and spread out as a sea, fed and sustained by many streams. It is embraced in the network of the sciences, and is part and parcel of the same. With one arm it lays hold on geography, and we have drawn in to us a host of acquaintances from every department of physical nature. Here are minerals, vegetables, and also animals from various countries. Europe, Asia, Africa, small islands and great continents, have on our shelves or in our drawers their representatives. Torrid, temperate, and frigid zones, fields and forests, oceans, rivers, plains, mountains, volcanoes, and even meteors, possibly from other worlds, unite their products in our stores.

With another arm our profession lays hold on chemistry, and who can detail the wonders and beauties that are here unfolded? Almost daily we hear or read of new discoveries in this domain of science, impressing us with the conviction that its boundaries are unknown and its depths unfathomed.

With another arm we are connected with the science of numbers, and learn to calculate the nice adjustment of compounds, to weigh invisible substances, and measure imponderable forces.

To make a general statement: Pharmacy is now or has been in the course of its development connected in some way, more or less obvious, with almost every science and art. Astronomy, or astrology, in former times, appeared almost at the foundation. Alchemy nurtured it. Geology, mineralogy, meteorology, zoology, botany, horticulture, agriculture, floriculture, all combine to make up this system, and man, in search for curative agents, has seemingly tried everything visible and invisible that ingenuity could apply. He has made tributaries of all knowledge and all speculations, of all trades and occupations. He has studied "physic" and physics, mechanics, natural, mental, and moral philosophies, and everything else that holds out a shadow of hope as to the discovery of the "elixir of life." Hence a well-informed pharmacist should be a man of varied knowledge and versatile talents. He should comprehend the elementary principles of many sciences, the rudiments of many arts. He should somewhat embody the qualifications of many trades and professions, be able to use himself mentally and physically, and to do "whatsoever his hand findeth to do." He should possess energy, patience, and courage to overcome difficulties, to acquire competent knowledge and information, without which he must prove a disgrace to himself, a dishonour to his profession, and a dangerous man to the public. He should also strive for such originality as will enable him to improve himself and his fellows, and advance the character of his calling. If he is thus faithful to his duties he cannot be idle nor indolent, and must exert a useful influence in his community. May it not be said that in no respect does it stand more prominently forward than in its philanthropic attitude, as the science of healing the sick and alleviating human sufferings? How careful, then, should we be that our preparations are well made with good materials; and when elegance of appearance and pleasantness of taste may be combined with efficient remedies, should we not prefer to have them so? To this end we should, as a united association, and as individual members of the same, take some pains to inform ourselves and each other in every one of its many branches. Should we not read, reflect, and experiment, in order to improve, and wherever we can suggest a genuine advantage in working out a published formula, should we not do so for the benefit of all? It is often the case that a little thing is worth knowing, and a great thing needs simplifying. Are we not familiar with some processes that are cumbrous and difficult that might be made easy and expeditious by the application of thought and skilful experiment? Let us endeavour to add something to the stock of knowledge already attained, and strive to be of some use "in our day and generation." We must be vigilant, lest at some inadvertent moment we do some careless act that will destroy life instead of imparting health. Let us always feel less of an inflated dignity than of serious responsibility. Moreover, let us take no undue advantages of our patrons, but charge reasonable prices, since in most cases they are wholly ignorant of the value of what we render them, and trust us to deal fairly with them. Let us scorn bribery and "percentages," and stand or fall on our merits, with a consciousness of having endeavoured to discharge our duties to our fellow-men. May it never be said of us that we desire epidemics and sickness in order to increase our sales of medicines. Let us prove that we no more thrive in seasons of calamity than do others. And now it may be appropriate to put in our plea as to the charge sometimes made against us, that we make our livelihood off of the necessities of others. We say, so does almost every honest dealer. The grocer, that sells flour for bread, does; the butcher, that sells meat, does. The merchant, the mechanic, the farmer, all make their living off of the necessities of the people, and why should it be a reproach to a pharmacist to do the same, unless he extorts from the suffering? Is not his labour as valuable as another's, and are not his earnings as honest as others? If he takes pay from a man that would die without *medicine*, does not the man that sells flour take pay from one that would die without *bread?*

In conclusion, I must tender to you my kindest regards, and express my sincere appreciation of the high compliment that I have received at your hands in the promotion to this office. I also offer my regrets at not having served more efficiently and actively during the term about to expire, and I hope that many anniversaries may dawn upon the Tennessee Pharmaceutical Association.

ROYAL INSTITUTION.

THE CHEMICAL CHANGES ACCOMPANYING THE SMELTING OF IRON IN BLAST FURNACES.*

BY DR. C. R. ALDER-WRIGHT, F.C.S.

Notwithstanding that the operation of iron-smelting is one dating from a very early epoch, and in spite of its magnitude at the present day, and the consequently numerous series of observations and experiments made thereon by various chemists, it is nevertheless true that until recently our knowledge of the chemical changes which occur during the process was extremely limited.

It will not be necessary for me now to enter into any detailed description of the apparatus and machinery now in use in this manufacture; the blast furnace, as most are aware, is virtually a gigantic vertical tube into the top end of which the materials used are continually inserted; these consist of the ore to be smelted, the fuel, and lime or limestone as a flux. At the lower end of the tube, air usually heated to 300°-500° is continually injected by a blowing engine through nozzles termed *tuyeres*, whereby the fuel is burnt and the necessary heat generated: the earthy materials of the ore and the lime of the flux unite, forming a fusible "slag," which is continually drawn off at the base, whilst the molten reduced iron accumulates below the slag, being specifically heavier, and is drawn off from time to time into moulds of sand, when it constitutes the pig-iron of commerce.

Ordinarily the air injected, or "blast," is previously heated by passing through tubes of iron or piles of brickwork, themselves heated by the combustion of the waste gases that escape from the furnace itself; to collect these, the top of the furnace is closed by a bell-shaped valve which serves for the introduction of materials when open, but which when closed compels the gases to issue through an orifice in the side of the furnace near the top, whence they are led away through pipes to the heating stoves, furnaces of boilers, etc.

The nature of the ore used necessarily exerts a great influence on the chemical changes that take place; the following table indicates the general composition of several of the chief descriptions of ore used. In some instances the iron exists naturally as ferric oxide; in other cases chiefly as ferrous carbonate.

	Hæmatite.	Magnetic Ore.	Spathic Ore.	Clay Ironstone.	Brown Ore.
Fe_2O_3 ...	90-100	30-70	0-3	0-3	40-70
FeO......	...	13-33	36-50	35-55	0-5
Al_2O_3 ..	0-2	0-5	0-2	1-7	1-7
CaO......	0-3	0-5	0-4	1-14	1-7
MgO ...	0-1	0-2	0-4	1-9	0-2
MnO ...	0-1	0-1	1-25	0-2	0-3
SiO_2 ...	0-10	0-10	0-5	2-17	1-35
CO_2......	0-1	0-10	37-42	22-37	0-5
P_2O_5 ...	0-1	0-2	trace	0-2	0-2
SO_3......	0-1	trace	,,	0-3	trace
H_2O ...	0-1	0-4	—	0-1	6-18
Essential Composition.	Fe_2O_3 with little or no earthy matter.	Fe_2O and FeO with earthy matters.	$FeCO_3$ and $MnCO_3$ crystalline.	$FeCO_3$ and much earthy matter.	Hydrated Fe_2O_3 and earthy matters.

When ferrous carbonate constitutes the ore used, the smelting process is usually facilitated by submitting it to a previous calcination in a kiln like a lime-kiln, whereby the ferrous carbonate becomes transformed into ferric oxide; when, however, the carbonate is not calcined before use, it speedily loses the carbon dioxide present therein, leaving behind an oxide of iron; this occurs in the top portion of the furnace, so that virtually the ores used may be regarded as consisting essentially of some form of iron oxide, with a varying amount of earthy matter of variable kind intermixed therewith.

The fuel used is ordinary coke or charcoal; when, however, raw coal is employed, it is completely coked in the top portion of the furnace, so that the fuel burnt at the tuyeres is invariably carbon.

As the blast enters the furnace it comes in contact with

* Lecture delivered at the Royal Institution of Great Britain, Friday, March 13th, 1874. Reprinted from the 'Proceedings.'

a mass of incandescent carbon, whereby its oxygen is firstly converted into carbon dioxide, and next into carbon oxide, the nitrogen for the most part remaining unchanged; not impossibly, a good deal of the carbon is burnt directly to carbon oxide, without passing through the intermediate stage of carbon dioxide; any moisture present in the blast is similarly converted into a mixture of carbon oxide and hydrogen; the amount of the latter necessarily varies with the hygrometric state of the atmosphere. Although hydrogen is a powerful reducing agent, the influence of the small quantity present in the blast furnace gases appears to be practically *nil*; the gases issuing at the top of the furnace contain on an average about as much free hydrogen as is brought in by the blast, whence it is evident that the hydrogen has contributed little or nothing to the reduction of the ferric oxide; and again, practical experience shows that the more moisture enters the furnace at the base, the more fuel is requisite to do the work, *i. e.* the development of hydrogen is injurious to the action rather than auxiliary.

What I shall have the honour of bringing before you to-night is the history of the changes that occur as the mixture of carbon oxide and nitrogen formed in the vicinity of the tuyeres rises through the furnace. This action has usually been described hitherto as a very simple one; the carbon oxide being viewed as simply removing the oxygen from the higher oxide of iron, forming successively a lower oxide and metal, carbon dioxide being evolved in accordance with equations (1) and (2), *infra.*

Table of Chemical Changes taking place in Different Parts of the Blast Furnace.

[A] Reduction of higher oxide to lower oxide and metal by gaseous carbon oxide:—

$$(1)\quad Fe_xO_y + CO = Fe_xO_{y-1} + CO_2$$
$$(2)\quad Fe_xO_y + yCO = xFe + yCO_2$$

[B] Oxidation of metal to lower oxide and higher oxide by carbon dioxide:—

$$(3)\quad xFe + yCO_2 = Fe_xO_y + yCO$$
$$(4)\quad Fe_xO_{y-1} + CO_2 = Fe_xO_y + CO$$

[C] Reduction of carbon oxide to carbon:—

$$(5)\quad xFe + yCO = Fe_xO_y + yC$$
$$(6)\quad Fe_xO_{y-1} + CO = Fe_xO_y + C$$

[D] Reaction of reduced carbon on iron oxide, forming carbon dioxide:—

$$(7)\quad 2Fe_xO_y + C = CO_2 + 2Fe_xO_{y-1}$$
$$(8)\quad 2Fe_xO_y + yC = yCO_2 + 2xFe$$

[E] Reaction of carbon dioxide on reduced carbon:—

$$(9)\quad CO_2 + C = 2CO$$

The changes that really take place are, however, much more complicated; it is true that those reactions do take place, but firstly carbon dioxide has a tendency to act on metallic iron, re-forming an oxide, and reproducing carbon oxide by reactions that are just the converse of (1) and (2), viz., in virtue of equations (3) and (4).

Nextly, metallic iron acts on carbon oxide, setting free carbon and forming successively a lower and a higher oxide in virtue of equations (5) and (6).

Again, the carbon deposited in virtue of reactions [C] reacts on the higher oxides of iron, producing lower oxides and metal, with evolution of carbon dioxide, in accordance with equations (7) and (8). And finally, carbon dioxide reacts on the deposited carbon, giving rise to the formation of two proportions of carbon oxide in virtue of equation (9).

Changes [A] and [D] may be referred to as *iron-reducing*, [B] and [C] as *iron-oxidizing*: changes [C] may be termed *carbon-reducing*, [D] and [E] *carbon-oxidizing*.

At any given point in the blast furnace all these chemical tendencies are at work simultaneously with more or less vigour according to circumstances; the action actually taking place at this point is, therefore, that due to the single resultant of all the multifarious forces at work; before, therefore, it is possible to enter into any explanation of the chemical changes occurring in the furnace itself, some knowledge must be gained of the relative magnitudes of these several forces. Considerable additions to our knowledge on these points have recently accrued, chiefly through the labours of I. Lowthian Bell, Esq., M.P., with whom I had the pleasure of co-operating in his researches.

As regards tendencies [A]. Although carbon oxide exerts no action on ferric oxide at ordinary temperatures, yet its influence is appreciable at temperatures far below the limit of the mercurial thermometer; the precise point at which the action commences varies with the physical condition of the ferric oxide; thus the following table illustrates this point.

Temperature at which Carbon Oxide begins to reduce Ferric Oxide.

Substance.	Minimum Temperature at which Carbon Dioxide is formed.	Temperature at which action is well marked.
Precipitated by ammonia ..	141°	149°
Calcination of ferric nitrate	145°	154°
Average calcined Cleveland ironstone	199°	210°
Ditto, more highly calcined	200°	206°
Calcination of ferrous sulphate	208°	216°
Pumice-stone soaked in ferrous sulphate solution and calcined...............	211°	227°

The fact that the action is perceptible at so low a temperature may be conveniently illustrated by passing a current of pure carbon oxide over precipitated ferric oxide in a flask heated to 150° in a paraffin bath, and passing the gases subsequently through baryta water, when the formation of a turbidity denotes the production of carbon dioxide.

It is noticeable that a specimen of ferric oxide that has been already slightly reduced in this way is first acted upon only at a higher temperature than that required in the first instance.

As regards equation (2) it may be remarked that it is impracticable to reduce *the whole* of any sample of iron oxide by means of gaseous carbon oxide at any temperature short of a white heat; in fact, metallic iron decomposes carbon oxide, becoming itself more or less oxidized at all temperatures below this in virtue of equation (5).

In reference to the converse changes [B], the oxidizing effect of carbon dioxide on iron is scarcely appreciable at a temperature of 300°, but is noticeable at 400° and upwards, being very considerable at about 600°: this may be illustrated by passing a current of carbon dioxide over fragments of metallic iron in a tube heated to a bright red heat, when much carbon oxide is evolved, so that the issuing gases may be inflamed.

The physical condition of the iron employed necessarily exerts a considerable influence on the rapidity of the reaction, the more finely divided the metal the more energetic being the action; thus pyrophoric iron is readily acted on by the air at the ordinary temperature, whilst more massive fragments of metal are unaffected under the same circumstances.

It is noteworthy that carbon dioxide is not capable of acting on all metals alike in this way. Copper, for instance, is unaffected at a red heat or upwards by carbon dioxide, whilst nickel and cobalt are oxidized with the production of carbon oxide, the change, however, taking place with less ease than with pure iron. The following table illustrates this point.

Comparative Action of Carbon Dioxide on Iron, Nickel, and Cobalt, at about 600°.

Iron	100
Cobalt	44
Nickel	11

Iron first begins to act	.	below 420°
Cobalt " "	.	about 550°
Nickel " "	.	above 550°

The consideration of the causes that lead to the possibility of the occurrence of the inverse reactions [A] and [B], and the different behaviour of iron and copper towards carbon dioxide, introduce us to some general principles in chemical dynamics. Whenever a body unites with oxygen, heat is evolved; thus the following table illustrates the quantity of heat produced by the union of 16 parts by weight of oxygen with various substances, the materials and products being all viewed as being examined at the constant temperature 500° C.

The numbers are calculated from the so-called "heats of combustion" of the bodies (at 15°) by means of the formula.

$$H_{500}=H_{15}+h_1+h_2-h_3,$$

where H_{500} = the heat of combustion at 500°.
H_{15} = " " at 15°.
h_1 = the heat required to raise the combustible from 15° to 500°.
h_2 = " " the oxygen through the same range.
h_3 = " " the product of combustion through the same range.

Combustible.	Product of Combustion.	Kilogramme heat units evolved at 500°.
Iron	Magnetic (and probably any other) oxide*	66·7
Carbon oxide	Carbon dioxide	68·8
Carbon	Carbon oxide	27·4
Carbon	Carbon dioxide	48·1
Hydrogen	Steam	58·9
Copper	Cuprous, Cupric oxide*	37·6

The evolution of heat during these actions may be exemplified by sprinkling iron filings into a large gas-blowpipe flame, when a brilliant shower of sparks is produced, heat and consequently light being developed by the oxidation of the iron. Similarly by burning carbon oxide at a jet through which a stream of oxygen can be forced, a blowpipe flame is produced equal in heating power to the oxyhydrogen flame, and like it capable of igniting lime, and thereby giving off a bright light, melting platinum, steel, etc., etc. Although carbon oxide actually gives out more heat than hydrogen in uniting with a given weight of oxygen (68·8 kilogramme units as against 58·9 when the action takes place at 500°), it is nevertheless much more difficult to obtain the same calorific effects from a carbon oxide-oxygen flame than from an oxyhydrogen flame. With a small flame, platinum may be readily fused and lime heated to intense brilliancy with either; but the latter gives a much more compact, and therefore hotter, flame when larger amounts of gas are used: the comparative slowness with which the carbon oxide oxidizes is illustrated by the circumstance that a jet of this gas issuing under some slight pressure from a narrow orifice will not continue to burn in the air, the flame as it were blowing itself out; whilst a jet of hydrogen or of coal-gas burns readily under the same circumstances.

It seems to be a general rule that no reaction of replacement coming under the general form

$$x+yz=y+xz$$

can take place if the reaction is attended with any considerable absorption of heat; *i. e.* the heat given out by the substances x and y, in uniting with the same weight of z, must either be approximately equal, or else that given out by x in uniting with z must be greater than that evolved by y in combining with z. Some few exceptions to this rule are known, notably reactions [D] and [E]: generally, however, the converse is the case, *i. e.* in reactions of this class there is usually an evolution of heat.

Now, copper and carbon oxide are not thermally equal as regards combination with oxygen; the latter evolves nearly double the heat given out by the former in uniting with a given weight of oxygen; hence the action of carbon oxide on copper oxide, producing metallic copper and carbon dioxide, must be attended with a large evolution of heat; thus at 500°:—

Heat produced by oxidation of carbon oxide to dioxide	+ 68·8
Heat absorbed during the reduction of copper oxide	− 37·6
Heat evolved	+ 31·2

Carbon oxide, therefore, reduces copper oxide to metal, forming carbon dioxide in accordance with the above rule; whilst the converse reaction, viz., oxidation of metallic copper by carbon dioxide and conversion of the latter into carbon oxide, does not take place, as it would be attended with a large absorption of heat, viz., 31·2 kilogramme units.

The evolution of heat during the reaction of carbon oxide on copper oxide, may be readily illustrated thus:—A tube filled with lumps of copper oxide is heated to a temperature short of visible redness, and a stream of carbon oxide is passed through it; the copper oxide immediately begins to glow brightly from the heat evolution that ensues during the reduction of the metallic oxide; on leading oxygen through the tube, when the reduction is over, and the mass has cooled down so as to be no longer visibly red hot, a still brighter glow is produced from the heat evolution during the reoxidation of the metal; the glowing is less bright in the first instance, for the threefold reason that there is somewhat less heat evolved (31·2 units as against 37·6), whilst the resulting carbon dioxide escapes while very hot, and consequently removes heat; again, it dilutes the carbon oxide, and makes its action less energetic.

In reference to the general rule just referred to, relating to the connection between the heat evolution on combination and the relative actions of bodies on one another, one particular case is noteworthy, of which reactions [A] and [B] afford a good example; if in a reaction of the form

$$x+yz=y+xz$$

there is little or no evolution of heat (*i.e.* if x and y both evolve approximately the same amount of heat in uniting with the same weight of z), it often happens that the converse reaction

$$y+xz=x+yz$$

may be brought about by modifying the circumstances, so that the following is the general rule for all cases as regards the equation

$$x+yz=y+xz$$

Case (1).—x evolves more heat in uniting with z than y does.

The reaction takes place under suitable conditions.

Case (2).—x and y evolve approximately the same amounts of heat in uniting with z.

The reaction may take place or its converse, according to circumstances.

Case (3).—x evolves considerably less heat than y in uniting with z.

The reaction (usually) does not take place, but the converse reaction frequently can occur under suitable conditions.

Thus in the case of reactions [A] and [B], there is but little heat evolution or absorption in either case.

---

* When a body forms more than one *solid* oxide corresponding to a class of stable well-defined salts, the heat produced for a given weight of oxygen consumed is identical with each oxide; this is not the case when *gaseous* oxides are formed as with carbon; nor even when solid oxides are formed when they do not correspond to classes of stable well-defined salts, *e.g.*, some of the oxides of manganese.

[A] Heat evolved by oxidation of carbon oxide to dioxide	+ 68·8
Heat absorbed by reduction of iron oxide	− 66·8
Heat evolved	+ 2·1

[B] Heat evolved by oxidation of iron . .	+ 66·7
Heat absorbed by reduction of carbon dioxide to oxide	− 68·8
Heat absorbed	− 2·1

In this respect reactions [A] and [B] may be compared with another well-known pair of inverse reactions, viz., the oxidation of iron by passing steam over it, hydrogen being evolved; and the reduction of iron oxide by passing hydrogen over it, steam being produced. In each of these cases, also, the thermal disturbance is not great, *i.e.*, hydrogen and iron are thermally approximately equal in reference to their combination with oxygen at 500°.

Steam and Iron.

Heat evolved by oxidation of iron	+ 66·7
Heat absorbed by reduction of steam . . .	− 58·9
Heat evolved	+ 7·8

Hydrogen and Iron Oxide.

Heat evolved by oxidation of hydrogen . .	+ 58·9
Heat absorbed by reduction of iron oxide .	− 66·7
Heat absorbed . . .	− 7·8

From the existence of the inverse reactions [A] and [B] it results that when a mixture of the two oxides of carbon acts either on metallic iron or on iron oxide, oxidation of the one or reduction of the other takes place until a definite relation exists between the iron and oxygen present in the resulting substance and the two oxides of carbon in the gaseous mixture; the composition of the inert substance necessarily varies with the temperature and the nature of the mixture of carbon oxides used; the higher the temperature and the more carbon dioxide is present, the larger is the amount of oxygen present in the inert substance. Thus Bell obtained the following numbers:—

CO_2 per 100 volumes of CO.	Temperature.	Oxygen in inert Oxide, $Fe_2O_3 = 100$.	Carbon deposited per 100 of Fe.
600	Red heat	90·0	nil
100	Bright red heat	67·5	"
47	Full red heat	8·2	"
11	Approaching whiteness	11·9	"
Nil (pure CO)	Bright red heat	1·0	0·3

Reactions [C]. The oxidation of carbon to carbon oxide evolves less heat than the conversion of iron into iron oxide; hence it might be inferred that iron will probably decompose carbon oxide with the evolution of heat, carbon being set free and an oxide of iron formed; thus thermally

Heat evolved by oxidation of iron . . .	+66.7
Heat absorbed by reduction of carbon oxide to carbon	− 27·4
Heat evolved . . .	+39·3

The circumstances attending this change have been studied at great length by Bell; at temperatures not higher than 200° it is possible to obtain small quantities of deposited carbon in virtue of these reactions; but the action is at a maximum at about 420°–450°; at higher temperatures but little carbon can be obtained in this way, owing to the carbon-removing influences [D] and [E]; a few tenths per cent. of carbon, however, are always deposited, the same result being arrived at whether metallic iron or ferric oxide be employed in the first instance. The oxygen communicated to the iron is for the most part removed again in virtue of reactions [A] and [D]; a minute quantity, however, is retained at all temperatures up to about 1000.° Since carbon is also present in the product, it might be supposed that the oxygen is present as occluded carbon oxide; that this is not the case, however, is shown by the circumstance that the whole of the carbon present is left behind in the free state on dissolving the impregnated iron in iodine water, or copper sulphate solution. Moreover the oxygen present is, under these circumstances, left behind in the form of an oxide of iron.

The process of acieration depends in the first instance on the occurrence of reactions [C]; carbon oxide is absorbed by the bars of iron, and is decomposed, particles of iron being deposited and iron oxide formed, this latter being immediately reduced again, either by carbon oxide (reactions [A]), or by acting on a part of the deposited carbon (reactions [D]); the blisters on blister steel are probably produced by the attempts at egress of the carbon dioxide thus produced.

When ferric oxide is exposed to the action of carbon oxide at about 420°, the time required to produce a given amount of carbon deposition varies greatly with the physical structure of the iron oxide, probably because this physical structure influences, as above described, the rate at which iron and lower oxides are formed in virtue of reactions [A]; thus the following table indicates the relative amounts of carbon deposited from various kinds of ferric oxide, by simultaneous exposure to the action of carbon oxide at 420°, for seven hours:—

	Carbon deposited per 100 of iron.
Calcined ferric nitrate	144·0
Precipitated by ammonia	95·4
Calcined ferrous sulphate	54·5
Pumice-stone soaked in ferrous sulphate and calcined	14·9
Calcined Cleveland ironstone . . .	0·3

After ten or twelve hours, however, the discrepancy is not so marked, as much carbon being then deposited with the Cleveland ore as is with the precipated oxide in seven hours.

The action of carbon oxide on certain other metals and their oxides has also been examined by Bell; the chief results arrived at are included in the following table:—

Comparative Action at 400°–500° of Carbon Oxides on various Metals and Oxides.

Higher oxides of iron, nickel, and cobalt;
  Reduced to lower oxides, and partially to metal; suboxides (Fe_2O, Ni_2O, and Co_2O) being formed, and much carbon deposited,

Spongy metallic iron, nickel, and cobalt;
  Partially oxidized, much free carbon being formed; iron most active, nickel least.

Higher oxides of manganese;
  Reduced only to monoxide (MnO); no free carbon being deposited.

Oxides of copper and lead;
  Reduced to metals; no free carbon deposited.

Oxides of zinc, chromium, and tin; metallic copper, lead, zinc, and tin;
  No effect.

In each one of these cases, where any action at all ensues it is uniformly of such a nature as to be included in the general rule above laid down; thus nickel and cobalt give out approximately as much heat in uniting with 16 grammes of oxygen as does iron, and therefore behave in analogous fashion, giving rise to converse reactions analogous to [A] and [B].

Reactions [D]. The occurrence of these reactions may be readily demonstrated by heating to redness an iron tube containing a mixture of carbon (as free as possible from hydrogen) and ferric oxide. As soon as the temperature rises to about 400°, carbon dioxide is evolved. The reaction, however, is complicated by the circumstance that the evolved carbon dioxide reacts on both the carbon present and the iron or lower oxides of iron formed by reactions [D], so as to give rise to the production of carbon oxide by reactions [E] and [A] respectively; hence as the action goes on, the amount of carbon dioxide in the mixture gradually lessens, and finally little but carbon oxide is evolved.

It appears exceedingly probable that the so-called "occluded carbon oxide" contained in malleable iron is really not occluded at all, but is produced in virtue of these reactions from a mixture of carbide and oxide of iron; as already stated, on exposing pure metallic iron to the action of pure carbon oxide at a bright red heat, a substance is obtained containing both carbon and oxygen, *not* in the form of occluded carbon oxide. On heating this product, in a Sprengel vacuum, a mixture of carbon dioxide and carbon oxide is evolved (the latter predominating greatly).

The whole process of "puddling" depends on the occurrence of reactions [D]; the carbon present in the iron (together with other impurities) is thus eliminated by the reaction on it of iron oxides formed in the puddling furnace by the action of the heated air.

Reactions [D] are thermally abnormal; although carbon displaces iron from its oxide, the reaction is attended not, as might be supposed, with an evolution of heat, but with a considerable absorption; thus at 500°,

Heat evolved by oxidation of carbon to carbon dioxide	+ 48·1
Heat absorbed by reduction of iron oxide	− 66·7
Heat absorbed . .	− 18·6

Reaction [E] is also abnormal, being attended with a still greater absorption of heat; thus at 500°,

Heat evolved by oxidation of carbon to carbon oxide	+ 27·4
Heat absorbed by reduction of carbon dioxide to carbon oxide	− 68·8
Heat absorbed . .	− 41·4

The physical structure of the carbon used has a considerable influence on the temperature at which both reactions [D] and [E] first take place; the lighter and more porous, the more readily is the carbon acted on; that deposited by reaction [C] is especially easily acted on; with ordinary charcoal or coke, reaction [E] does not appear to take place to any appreciable extent below 400°.

It is noteworthy that in some other cases besides reactions [D] and [E], where *solid* carbon is concerned, abnormal results are found to be produced; thus, by the action of carbon oxide on metallic zinc or tin, carbon should be set free even more readily than by iron, nickel, or cobalt, the oxidation-heat of each of the first two metals (per 16 grammes of oxygen) being greater than that of either of the latter three; in point of fact, however, no change at all ensues.

The gases of the blast furnace contain not merely carbon oxide and carbon dioxide, but also a large bulk of nitrogen; all experience, however, goes to prove that this acts solely as a diluent, and in no way interferes with the above-described reactions, saving in delaying them, *i.e.*, causing more time to be required for their performance; the presence of nitrogen is, however, of great importance as regards another set of chemical reactions taking place in the lower portions of the furnace.

It has long been known that when nascent potassium or sodium vapour finds itself simultaneously in contact with carbon and nitrogen, the three elements combine, forming a metallic cyanide; the following experiment illustrates this fact: a small charcoal furnace is fed with charcoal previously soaked in potassium carbonate solution and dried; a strong blast of air is then injected into the lower part of the furnace, all apertures being well closed up with clay: when the temperature attains a high enough degree cyanide of potassium is formed,* and escapes to some extent along with other potassium compounds in the form of white fumes carried up by the escaping gases: by diverting these gases through a lateral tube into a vertical tower filled with flints, the solid fume is to a great extent deposited on the surface of the flints; by pouring water down the tower the fume is dissolved and a solution of potassium cyanide (*inter alia*) trickles out at the base of the tower; on filtration and testing with ferrous and ferric salts and hydrochloric acid, this liquor gives an abundant Prussian-blue reaction, showing the presence of much potassium cyanide.

The cyanide thus formed acts on the last portions of unreduced oxide of iron, converting it into metal, and becoming itself changed to cyanate; at the high temperature of the furnace near the tuyeres this cyanate is probably decomposed with the formation of an alkaline carbonate, and the elimination of nitrogen. A portion of the alkaline carbonate is again converted into cyanide; the majority, however, escapes, and is carried upwards by the stream of gases, and condenses as a kind of sublimate on the surface of the materials in the upper part of the furnace: considerable quantities of cyanides are also carried up in this way. The alkaline salts thus condensed in the upper portions of the furnace are again brought down to the level of the tuyeres as the materials sink; hence each particle of alkali metal does duty over and over again, the alkalies introduced in small quantities in the fuel, etc., thus accumulating in the furnace to a very large extent. The enormous amounts of upwards of 4 cwt. of alkali metals and 2 cwt. of cyanogen per ton of iron made, have been repeatedly found in the gases near the level of the tuyeres. It appears very probable that the large excess of fuel required during the first few days of starting a new blast furnace is mainly due to the circumstance that cyanides have not formed to any great extent from the necessary want of this accumulation; after a very short time, however, considerable amounts of cyanides are found to be present in the gases.

These reactions afford an explanation of a circumstance which has for a long time been a difficulty in the minds of chemists who have studied the blast furnace. All observers agree that when the oxygen and carbon contained in the gases at various levels of the furnace are compared with the nitrogen, there is always more oxygen present than in ordinary air, and always more carbon than could be there were ordinary air burnt wholly to carbon oxide: thus the following Table illustrates the average composition by weight found by Bell in the case of an 80-foot furnace using calcinated limestone:—

Distance above Tuyere in feet.	0	6	12	25	37	50	60	76·5	Blast, if wholly burnt. To CO.	To. CO_2
Carbon dioxide	1·2	trace	0·8	1·2	1·6	1·2	3·5	7·9	—	29·2
Carbon oxide	37·6	37·1	35.9	34·9	34·8	34·8	33·2	33·0	34·4	—
Nitrogen	61·2	62·9	63·3	63·9	63·6	64·0	63·3	59·1	65·6	70·8
CARBON AND OXYGEN IN THE GASES AT DIFFERENT LEVELS, CALCULATED PER 100 OF NITROGEN.										
Carbon	26·8	25·2	24·6	23·9	24·1	23·8	24·0	27·5	22·5	11·3
Oxygen	36·5	33·7	33·3	32·6	33·1	32·4	33·9	41·6	30·0	30·0

The presence of this excess of oxygen is readily accounted for when it is remembered that even at the lowest portions of the furnace some oxygen is still left in

* The production of cyanide on the small scale in this way as a lecture illustration appears to be facilitated by the admixture of oxide of iron with the prepared charcoal, but is not always successful, the cause of failure being unknown.

the ore, which is eliminated only at that point, necessarily in association with carbon, and that at this level the nitrogen of the blast is partially removed in the formation of cyanides. The anomaly, however, presents itself that the amount of oxygen appears to *diminish* from the tuyeres to a point some 10-12 feet above them, whereas it might be expected to increase, since the reduction of iron oxide is going on in the interval between the tuyeres and this point; inasmuch, however, as nitrogen is probably eliminated from the cyanide by its reaction on the residual oxide of iron throughout the whole of this interval, it results that *the nitrogen increases relatively to the carbon and oxygen in the gases*; or, what is the same thing, these diminish in reference to the nitrogen.

We are now in a position to trace out the general chemical changes undergone by the oxide of iron in passing through the furnace; for this purpose we may divide the furnace into three regions: in the uppermost, tendencies [A] and [D] jointly are stronger than [B] and [C] jointly, and hence rapid reduction of ferric oxide takes place; in this region, too, tendency [C] is more powerful than [D] and [E] jointly, and hence carbon deposition takes place to a large extent. In this region, too, the limestone is for the most part calcined into quicklime, whilst if raw coal is the fuel employed, it is here coked: if carbonate of iron be used instead of oxide, it becomes converted into oxide in this region, the reducing and carbon-depositing reactions going on simultaneously with the formation of oxide.

In the middle region the iron-reducing tendencies are almost balanced by the iron-oxidizing ones, whilst the carbon-depositing tendencies are equalled and perhaps slightly excelled by the carbon-oxidizing tendencies; here reduction takes place, but only languidly, the chief effect produced in passing through this region being an increase of temperature.

In the lowest region, the reduction of the residual iron oxide is completed chiefly through the agency of the cyanides formed in the vicinity of the tuyere; the reduced iron melts, dissolving a certain amount of the finely-divided carbon in contact with it, together with small quantities of sulphur, silicon, and phosphorus reduced by subsidiary reactions. The earthy constituents of the ore and the lime of the limestone also fuse, forming "slag" as above described. In the act of cooling, this solution of amorphous carbon in molten pig iron undergoes a remarkable change, whereby the carbon is converted to a greater or less extent into the allotropic modification graphite, which is insoluble in molten iron, and so separates in crystals, thereby giving a crystalline structure to the pig, and forming "grey" iron of a quality varying with the nature of the foreign ingredients which retard the allotropic transformation: thus in white iron and in spiegel-eisen the transformation does not take place to any appreciable extent before solidification. This allotropic change is precisely similar to that undergone by a solution of yellow phosphorus in carbon disulphide by exposure to light; in each case the more stable allotrope formed (graphite and red phosphorus) possesses less "intrinsic chemical energy," *i.e.* gives out less heat on combustion, so that the allotropic change is attended with an evolution of heat.

This action of light on phosphorus is in several respects analogous to the changes produced in various attenuated vapours by passing a powerful beam of light through them, as ably described and illustrated in this room by your Professor of Physics on a former occasion.

Had time permitted, I should have wished to refer to the practical consequences of these researches of Mr. Bell. In order to effect the smelting of iron a certain definite amount of heat is required to perform the general work of the furnace; the various items in this amount are indicated by the following Table:—

Appropriation of Heat in an 80-foot Furnace, during the Production of 20 cwt. of Pig Iron from Cleveland Ore.

	Cwt. Heat-units.	
Constant requirements of furnace—		
Reduction of Fe from Fe_2O_3	33,108	
Impregnation with carbon	1,440	
Reduction of P, S, and Si	4,174	
Fusion of pig iron	6,600	
Radiation from walls of furnace	3,658	
Cooling tuyeres by water	1,818	
Conduction to earth, and other sources of loss not determined	3,202	
		54,000
Variable sources of loss of heat—		
Fusion of slag	16,720	
Expulsion of CO_2 from limestone	5,054	
Decomposition of ditto	5,248	
Decomposition of H_2O in blast	2,720	
Evaporation of H_2O in coke	313	
		30,055
Carried out by escaping gases		8,860
Total		92,915
Brought in by hot blast		11,919
Heat produced by combustion of coke		80,996

To produce this heat with a minimum expenditure of fuel, it is necessary that the whole of the carbon used as fuel should be oxidized in the furnace to carbon dioxide; the relative strength of the forces involved in the nine reactions above described are, however, such that it is not possible to convert more than about 35 or 40 per cent. of the carbon burnt into carbon dioxide, the rest necessarily escaping as carbon oxide. Hence much less heat is generated in the furnace than would be if the fuel could be wholly burnt to carbon dioxide; that is, more fuel must be used to do the work of the furnace. It hence results that if the exigencies of commerce or of nature should require that metallic iron should be obtained from its ores with the consumption of a materially less amount of fuel than is now necessary for the working of a blast furnace of the best description, some wholly dissimilar form of apparatus will be requisite for the purpose.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Adulteration of Food Act.

On Monday, July 13, Mr. R. Hill asked the President of the Local Government Board whether it was probable that he would be able to bring in a Bill during the present Session to give effect to the recommendations contained in the Report of the Committee on Adulteration of Food.

Mr. Sclater-Booth said when he moved in the early part of the Session for a Select Committee on the working of the Adulteration of Food Acts, he expressed an earnest hope that the Committee might be able so to restrict the number of witnesses to be examined, that it might be possible to legislate on the subject this year if legislation were found to be necessary. As the hon. gentleman was aware, that restriction was not found to be practicable, and the report of the Committee had only been in their hands within the last few days; it must be obvious, therefore, that it would be quite impossible for him to make any proposal on a matter of so much difficulty and interest in the limited time now available.

The Juries Bill.

On Tuesday, July 14, Mr. M. Lloyd asked the hon. member for Frome on what day he proposed to proceed with the Juries Bill, and whether he had any expectation that it would pass into law this Session.

Mr. Lopes said that, having regard to the late period of the Session and the amount of business which remained to be got through, he had no hope of passing the Bill this Session. He was sure, however, that, considering the principles of it had been sanctioned by the House, the public would not be satisfied until some such measure became law.

THE REPORT ON THE ADULTERATION ACT.—DEPUTATION TO THE PRESIDENT OF THE LOCAL GOVERNMENT BOARD.

A conference of the wholesale tea dealers of London was held on Monday afternoon at Messrs. Harrison and Crosfield's, Great Tower-street, "to consider the report of the Select Committee on the Adulteration of Food Act (1872), and to determine what steps shall be taken to urge the Government to suspend the operation of the Adulteration Act if it could not be amended this session." The chair was occupied by Mr. Smith Harrison. The Chairman briefly explained the object of the meeting, and said they had heard upon the very best authority that it was very unlikely that any amended legislation would be obtained this session. A very great portion of the trade thought it was their duty to at once go to the Government and ask for some relief for the retail dealers before an amended Act could come into operation. Prosecutions were still going on in various parts of the country, and the subject of those prosecutions had been exactly of the character for which the committee who recently sat upon the subject had recommended relief. What they wished the Government to do was, through the Local Government Board, to send out a circular to the various local sanitary authorities, informing them that until the Act has been amended all further prosecutions should cease.—Mr. Dummett (Messrs. Peek Bros.) then proposed the following resolution:—

"That this meeting desires to record its approval of the general tone and recommendations contained in the report of the parliamentary committee, and emphatically confirms the declaration of the committee that there is very little adulteration of tea in this country. It is believed it might safely have been said that there is no adulteration practised in this country."

Mr. Sanderson (Messrs. R. Davies and Co.) seconded the resolution, which was adopted unanimously.

Mr. Holborn then moved:—

"That this meeting resolves respectfully to recommend that in drawing the proposed amended Act, provision may be made to give substantial costs and damages to all defendants who prove themselves innocent of the charges brought against them. It is also strongly urged that an appeal be allowed to the analytical department at Somerset House before any local conviction be enforced."

Mr. Wilson seconded the motion, which was then put and adopted without opposition.

Mr. Samuel Edwards then proposed:—

"That this meeting also desires that the amended Act will definitely declare what per-centage of foreign matter shall be admitted for home consumption in those low-priced teas so largely consumed by the poor, which are not fraudulently adulterated by the Chinese grower, and are perfectly wholesome, though, from natural causes, they are not chemically pure. This meeting is of the judgment that 2½ per cent. would be amply sufficient to cover the facing of green tea, and that 5 per cent. is sufficient to allow for quartz and ferruginous sand in Canton-made scented teas."

Mr. Bransom seconded the motion. Messrs. Hilhouse, Steains, Bartlett, and others opposed the resolution, and upon being put to the meeting it was negatived.

It was then resolved that a deputation should be appointed to urge upon the Government the necessity of instructing the various local sanitary authorities who administer the Act to abstain from any further prosecutions until the Act has been amended in conformity with the recommendations of the parliamentary committee.

In compliance with the foregoing resolution a large and influential deputation waited upon the President of the Local Government Board, on Wednesday afternoon, to urge upon him the necessity for prohibiting any further prosecutions under the Adulteration Act until the Act is amended.

Mr. Alderman Cotton, in introducing the deputation, said the object of coming before him as the head of the Local Government Board was that when Mr. Crawford asked Mr. Gladstone to receive a deputation on the subject, Mr. Gladstone had said that there were no other means by which the object could be attained except through the Local Government Board, who had under their control all the appointments of analysts. Many persons had been convicted for selling adulterated tea, upon which the Customs had received 6*d.* per pound, and who were quite innocent of the act of adulteration.

Other gentlemen having spoken,

Mr. Sclater-Booth, in reply, said he must observe at once that the difficulty complained of was one which he was not then prepared to solve. It would be entirely out of his province to interfere with the decisions of the magisterial bench, which was more the duty of the Home Secretary, but he would consult with Mr. Cross and see what could be done in the matter, and whether he would be disposed to take any steps in the direction desired. With regard to the bodies who appointed analysts, it was quite out of the question to interfere with them. The statute law must be enforced, and there was no doubt in his mind but that the Acts had been of eminent value to the public generally, and if a few suffered it could not be helped. On the whole, he thoroughly believed with them that inconvenience and injury were done by indiscriminate prosecution, although he looked upon the passing of the Act as being productive of great benefit to the country at large. The deputation thanked the right hon. gentleman, and withdrew.

ALLEGED INFRINGEMENT OF A TRADE MARK.

At the Manchester County Petty Sessions, on Saturday, July 9th, before Sir John Iles Mantell and Mr. Peter Spence, A. Van Stan, cement maker, Bridport Street, Dorset Square, London, was summoned for infringing the trade-mark of Messrs. Samuel and Thomas Kay, chemists, Stockport. Mr. Cobbett was for the plaintiffs, and Mr. E. Atkinson for the defendant. It seems that in October, 1863, Mr. Samuel Kay invented a cement which he and his brother called "coaguline," and to give it notoriety registered a label with the word "coaguline" upon it. On the 25th May, Mr. Thomas Kay went to the Botanical Gardens, Old Trafford, where he saw the defendant selling cement in a tent, and in the tent, fixed in a conspicuous position, was a placard bearing the following words: "Coaguline Patent, for fixing flowers, mending relics and valuable china. Warranted to stand boiling water." Thomas Kay purchased a bottle, and then told defendant that he had better remove the card, but he refused, saying that he knew the law as well as the complainant. The summons was issued under the 25th and 26th Vict., cap. 88, section 7. Mr. Atkinson contended that the mere putting up of a placard in the tent bearing the word "coaguline" was not sufficient to amount to an offence under the section; the thing itself should be marked. Nor was there any intent to defraud shown. The defendant was fined £10, and 6d. for the bottle which he sold to the complainant.—*Manchester Evening Mail.*

PROSECUTIONS UNDER THE ADULTERATION ACT.

At the Westminster police court, Mr. Alfred Harvey, of 105, Buckingham Palace Road; Mr. Henry Hankin, of Lupus Street; and seven other persons, were summoned by Mr. Dixon, one of the sanitary inspectors for the vestry of St. George's, Hanover Square, for selling, as pure, coffee adulterated with chicory. Mr. Hitchen, solicitor to the vestry, prosecuted, and called William Banks, a messenger, who said that on the 18th of June he went to Mr. Hankin's shop and purchased a quarter of a pound of 16d. coffee, which was duly sent to the analyst. Mr. Smyth, who appeared for the defence, asked the witness what was said by the defendant's man at the time. Witness answered, he said, "You won't get coffee for 1s. 4d.; you will get a mixture of chicory and coffee." Mr. Bridge asked Mr. Hitchen if he would go on any further after that answer? Mr. Hitchen was afraid he could not. Mr. Smyth said not only was the witness told that it was a mixture, but the paper was labelled "chicory and coffee," and a written notice was served on the purchaser at the time that it was chicory and coffee. He therefore asked that the summons be dismissed with costs. Mr. Bridge said that he should give the defendant a guinea costs; when tradesmen were brought to the court on a flimsy pretext he should mark his sense of the matter by inflicting costs. Mr. Hitchen hoped that course would not be adopted, as the officer was only performing a public duty. Mr. Bridge said tradesmen were not to be harassed like this; the greatest possible carelessness had been exhibited. Mr. Hitchen said the costs would fall not on the inspector but the ratepayers. Mr. Bridge said the officer who took out these summonses was guilty of the greatest possible negligence, and the ratepayers or parish should make him pay the costs.

At Clerkenwell, William Odell, chandler, of 13, Great Warner Street, Clerkenwell, was summoned by Mr. William Thorn, sanitary inspector of Clerkenwell, for having sold vinegar which was adulterated with sulphuric acid. The defendant said he sold it as he received it. He was not aware that it was adulterated, for he bought it as pure and sold it as such. Dr. Redwood, professor of chemistry to the Pharmaceutical Society, said he had analysed the vinegar purchased at the defendant's shop, and he was of opinion that it had been adulterated by the addition of sulphuric acid. He was further of opinion that the adulteration was not necessarily injurious to health. Mr. Barker said he was quite willing to believe the defence set up, but still the defendant was liable. He then ordered the defendant to pay a fine of 20*s*. and 2*s*. costs.

James Corder, chandler, of 31, Cold Bath Square, Clerkenwell, was likewise summoned for selling vinegar that had been adulterated with sulphuric acid. The defendant said he sold the vinegar as he purchased it. He thought it was a great hardship that the retail dealer should be summoned and the wholesale dealer should escape with impunity. Mr. Barker fined the defendant 20*s*. and costs.

Obituary.

Notice has been received of the death of the following:—

On the 2nd June, 1874, Mr. William Short, Chemist and Druggist, of Tattershall. Mr. Short had been an Associate of the Society since 1868.

On the 2nd May, 1874, Mr. Thomas Fisher, Chemist and Druggist, of Horwich, near Bolton.

On the 10th May, 1874, Mr. Robert Atkinson Ryott, Chemist and Druggist, of Newbury.

On the 21st June, 1874, Mr. William Bicknell, Chemist and Druggist, of Ebury Street, London.

On the 27th June, 1874, Mr. William Balgaley Fletcher, Chemist and Druggist, of Rainford.

On the 1st July, 1874, Mr. William Benjamin Ward, Chemist and Druggist, of Little Lever, near Bolton-le-Moors.

Notes and Queries.

[403.] BLEACHING OF CORAL.—Wash thoroughly from all impurities, and then expose in the sun till perfectly bleached.—H. C. Baildon.

[403.] BLEACHING OF CORAL.—In answer to "*Incognitus*," I beg to state that coral may be rendered quite white by immersing it in a solution of hydrochloric acid, one part of B. P. acid to 30 parts of water, and keeping the coral in until it appears to be pure white; it should then be taken out, and well washed in cold water, and allowed to dry.—John C. Hunter.

[.] RESTORATION OF THE COLOUR OF FERNS.—A correspondent writes, that having been asked the best way to restore somewhat the colour of fern leaves which have become brown, he would be obliged to any person who could suggest any method of rendering them more sightly. They are a valuable collection of Indian ferns, the lady who has collected them having just brought them to England, and is rather disappointed at the appearance they present.

[.] CHARCOAL FOR FILTERING PURPOSES.—*W. Creig* asks for information respecting the best method of cementing granulated charcoal for filtering purposes.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Fluid Meat.

Sir,—In your review of Dr. Pavy's recent 'Treatise on Food, etc.,' having mentioned in terms of commendation my preparation called "Fluid Meat" (the suggestion to prepare which was first made to me by Dr. Pavy), you go on to state that "a similar preparation, though made by a different process, is now being employed in Germany."

Inferring the preparation thus referred to to be that of Dr. Leube, of Jena, and mentioned in 'Volkmann's Sammlung-klinischer Vorträge,' I would beg your permission to point out that *the two preparations are quite dissimilar*, and Dr. Leube's does not claim to possess the peculiar advantages of "Fluid Meat."

In "Fluid Meat" the albumen and *fibrin* are by the action of pepsin, in an acid solution and at a suitable temperature, rendered perfectly and permanently soluble in water, changed in fact to the condition known as peptone.

Dr. Leube's preparation I have not yet had an opportunity of examining, but it is described as a fine emulsion having a slimy consistence;—evidently meat in a finely divided state, but the fibrin of which will, I would submit, be mostly insoluble, and from the treatment it has undergone, in a condition most difficult for conversion by the digestive functions. It is obtained by the action of acid on meat at a high temperature. This treatment of meat is one with which I formerly gained some acquaintance when endeavouring to avoid the intensely bitter flavour *always* evolved when meat is *digested*, and which is removed only by the action of the pancreatic fluid. That portion of the fibrin of meat which by treatment with acid is gelatinized becomes, on removing the acid, again insoluble, unless the process has been carried so far as to effect its conversion into other compounds, the properties of which as nutritive agents would yet require confirmation.

The action which, severally or collectively, the various agents, coming in the digestive process, exert on the fibrine and albumen of flesh is of much interest chemically, to say nothing of the importance of this knowledge to the physiologist and physician.

The great power which "Fluid Meat" possesses as an article of nutrition, and for which it is highly valued by many medical men, some of them amongst the most eminent, is, I think, yet scarcely appreciated by a large majority of that profession to whom we look for alleviation and prevention of disease.

Trusting that the desirability of avoiding any misconception on a subject so important as dietetics will be sufficient apology for my requesting an insertion of the foregoing in your journal.

STEPHEN DARBY.

Leadenhall Street, July 6th, 1874.

[*₊* We have communicated with the reviewer of Dr. Pavy's work on the subject of Mr. Darby's letter, and learn that he is of opinion that the German preparation referred to does possess the same properties as the "fluid meat;" that is to say, they both consist of peplones. In regard to Mr. Darby's assumption that the fibrin in the German preparation is insoluble, he refers to the proof given by Von Wittich that fibrin is converted into true peplone by acid and heat, just as by acid and ferment. At the same time, he considers that "fluid meat" is a most valuable preparation, and that Mr. Darby is quite right in saying it is not sufficiently appreciated. We hope that Mr. Darby will shortly make known the results of his experiments with this preparation.—ED. PHARM. JOURN.]

SCAMMONY.

Sir,—It is not my intention to reply to Professor Attfield's taunts, for if I desired to repay him, I would do so in sterling currency, and not in tattered figments of worn-out coin.

My letter was addressed to you honestly, and I did not screen myself behind any anonymous cognomen. For Professor Attfield I entertain the respect which is due to a chemist of his standing; but I deny that I am obliged to accept the words of his mouth as infallible proof in regard to the genuineness of any article which he has examined. I mean no offence thereby. I have not failed to catch the true tenor of the trial; but I do not see through the tinted glasses of a paid witness.

I still maintain Professor Attfield failed to give the correct data. He was bound to give 90 per cent. as well as 80; but I suppose it would not have suited. I beg to remind Professor Attfield I quoted authorities, as will be seen on referring to my letter. I am inclined to think it would have been rather unpleasant information had the maximum percentage been given.

In this country we have nothing to do with the standards of the United States or French Pharmacopœia. In English law courts those books are no better than waste paper, so long as we have a national guide. Professor Attfield seems offended because I suggest the magistrates should be chary in receiving evidence from experts. I am sorry I cannot alter my views, and I hope the day is not far distant when magistrates will see the necessity of calling an accomplished chemist to consult with, and that independently of the evidence of public or paid analysts.

What a perfect farce it is to see medical men and chemists and analysts pitted against each other in our law courts. What a sorry figure is too often portrayed!

One swears one thing, and the next witness flatly contradicts his predecessor in the box.

And, behold! we are to expect justice and fair measuring out of equity from the commingling and jumbling caused by experts.

The system, as at present carried out, is the best possible one to frustrate the ends of justice, and it very seldom fails to do so.

As soon as a prosecution is contemplated, a war-cry is raised, and the question is, "Will the trade suffer?" not "Will justice be measured out?" I hope, Sir, your correspondent, Professor Attfield, will pardon my plainness of speech; and let me say there is no use indulging his proclivity for personalities any longer. We have seen what he can do, and the sight is not edifying.

HENRY BROWN, L.R.C.P., L.R.C.S.

Northallerton, 11th July, 1874.

EXCESSIVE LABOUR IN PHARMACY.

Sir,—The letter of "A Country Major Associate" is one which, I think, will be noticed by many who are similarly situated to himself; and I consider the term pharmaceutical slave is a most fitting one for a large per-centage of those engaged in pharmacy. If there is not a change for the better, both in hours of labour and remuneration, I would rather have a son of mine as a mechanic than a pharmaceutical chemist; as, in the former, he would not only be better paid but have greater scope for advancement, and not be compelled to keep up appearances under false pretences. Why should we work so long? Why, indeed? I firmly believe there is no necessity for it, and if a certain time for closing were adopted by all the chemists in a town, the public would learn to procure what they required. Medical men, also, would pay their visits earlier and give their directions; and there would be few cases of such urgency as to require attention, except in case of sudden illness in the night time, and then we are all liable to be called up. If chemists would be united, and do away with petty jealousies, of which, I fear, there is a large amount existing in most country towns; if they did not hold aloof from each other as they unfortunately do, but would meet, as members of other professions are in the habit of doing, and discuss matters of interest and mutual advantage, not only might the hours of labour be curtailed, but unremunerative prices and underselling might be stopped. The remedy is in our own hands, and if principals will not help themselves, the assistants and outsiders must be the ones to effect a reformation; and I would strongly urge all assistants in the country not to take a situation where the hours are longer than from eight a.m. to seven p.m.; and to parents I would say, Do not article your son to a chemist where longer hours are kept, but have the above time specified in the indenture. I do not agree with your correspondent's suggestion of one half-holiday in the week. This has been tried in many towns, and, as a rule, I believe has worked badly in all cases that I know of, and has been a source of annoyance to many. I hope to see more correspondence on the subject, and trust our efforts to do away with an abuse will not end in verbiage.

SEVEN O'CLOCK.

Lancaster, June 27th, 1874.

HUNTER *v.* FREELAND.

Sir,—The following subscriptions, in addition to those announced on p. 1052 of the last volume, have been received on behalf of the fund raised to re-imburse Mr. Freeland, Bathgate, for the heavy expenses—amounting to £267—incurred in defending himself in the case of "Hunter *v.* Freeland:"—

	£	*s.*	*d.*		£	*s.*	*d.*
—. Hunter, Aberdeen .	0	10	0	W. Andrew, Aberdeen	0	2	6
Stuart Merchant, Aberdeen	0	5	0	J. Duncan, ,, .	0	2	6
Davidson & Sim, ,,	0	5	0	Baillie Hugh Ross, Merchant. Aberdeen . .	0	10	0
D. M. Mackay, Aberdeen	0	5	0	Dr. Johnston, ,, . .	0	2	6
Wm. Paterson & Sons, Aberdeen	0	10	0	Wm. Eddie, Aberdeen	0	2	6
Souter and Shepherd, Aberdeen	0	10	0	Andrew Gall, ,, .	0	2	6
J. Sim & Co., Aberdeen	0	10	0	G. P. Cruickshank, Aberdeen	0	2	6
J. Forsyth & Co., ,,	0	2	6	A Friend, Aberdeen .	0	2	6
Wm. Wallace, Aberdeen	0	2	6	J. F. Macfarlan & Co., Edinburgh	2	2	0
D. A. Mortimer, ,,	0	2	6	T. & H. Smith, Edinburgh	2	2	0
G. Reid & Sons, ,,	0	10	0				
C. Davidson & Co., ,,	0	10	0				

G. Watt.—The specimen belongs to a species of cypress, but in the absence of fruit we are enable to say which.

J.—(1) *Torilis Anthriscus.* (2) *Chærophyllum temulum.* (3) *Ægopodium Podagraria.* Leaves and fruit of Umbelliferæ should always be sent.

G. C. Druce.—The specimen appears to be a variety of *C. divulsa.*

R. S.—Mr. Squire, in his 'Companion,' recommends a syrup containing 4½ grains of bromide of iron to the drachm.

J. J. Macaulay.—Yes.

A. Thomas, 11, *Union Street, Carmarthen.*—We are unable to comply with your request that we should return your 4½*d.* as it has been forwarded in the usual course to the publisher, to whom we refer you generally in regard to the subject mentioned in your post-card.

We take this opportunity of referring you to the publisher's announcements of the mode in which this journal may be obtained, tariff for advertisements, etc., which appear every week, in the earlier pages of the journal, and we are disposed to believe that a perusal of those announcements will enable you to perceive something more fitly calculated to merit your disgust than the way business is transacted at our office.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Bale, Conundrum, Inquirer, G. C. L., A. P. S.

THE OILS OF CHINESE PHARMACY AND COMMERCE.

BY DR. F. PORTER SMITH,

Honorary Member of the Pharmaceutical Society of Great Britain.

The word for oil in Chinese is written as a compound of the characters for liquidity and let. Oil thus means with them the "letting liquid," that which removes the hindrance of friction. The enormous demand for oil as an article of daily diet to counteract the binding qualities of rice and other cereal foods, and in pastry-making, and the extensive use of varnishes, putties, paints, and pigments in China, lead to the manufacture of oil from all sorts of sources. Oil is exclusively used for lighting purposes in all stationary situations. It also enters into the composition of quack and orthodox plasters, a very favourite application in Chinese medicine and surgery. By the use of night-soil, on an extensive scale, in the form of irrigation, the rapid growth of enormous breadths of Cruciferous plants (a populous order in China) enables the Chinese to obtain large quantities of oil from this source. These colza-oils are miscalled olive-oil in some European manuals on China. The olive-tree is not known in China. Certain extracts are sometimes called oils in Chinese nomenclature. Soy is called an oil.

OIL OF ALMONDS (SWEET).—A bland oil is said by Sir J. Davis to be obtained from the (mixed ?) kernels of the apricot or almond-trees in North China, but I have never met with it

OIL OF (STAR) ANISE.—This oil is said by Dr. S. Wells Williams to be prepared from the fruits in small retorts, a hundredweight yielding about seven pounds of the oil. It is pale, warm, and sweetish, and becomes solid at about 50°. It is used as a condiment and cordial in South China, and is exported thence to Europe and the United States. The common anise-oil has not been met with by me in China.

OIL OF APRICOT SEEDS.—See Oil of Almonds.

OIL OF BEANS.—This oil is expressed in large quantities in North China, and at Newchwang, from the Dolichos Soja bean, by both natives and foreigners. The oil is often miscalled pea-oil, is dark, not very palatable, and has some tendency to cause sickness. It is used in cooking very largely, and is very cheap.

OIL OF BENZOIN.—A fragrant, oily preparation is sold under this name, but it is not liquid benzoin. Dr. Williams says it comes from India. It is used in making ointments and plasters. It is probably liquid storax, or the rose-maloes of commerce.

OIL OF CABBAGE.—This oil, a kind of colza-oil, is expressed from the seeds of *Brassica Sinensis*, in increasing quantities, all through the valleys of the Yang-tsze and Han rivers. Very primitive machinery is used for this purpose. The seeds are crushed, steamed, and put into wooden cylinders, usually made by hollowing out the trunks of trees. The oil is squeezed out of the mass placed in coarse bags, by means of wedges driven down by mallets, or by an arrangement similar to that by means of which piles are generally driven into the earth in this country. In the last case water-power is sometimes employed. The proportional yield is very considerable. The oil is of a dark yellow colour, thick, and has a pleasant odour. It is used for lamps, in cooking, and as a hair-oil. It is laxative, or even purgative to some extent, and applied to swellings, sores, and ulcers.

OIL OF CAMELLIA.—This oil is prepared from the seeds of the capsular fruit of the *Camellia oleifera*, or mountain tea-tree, as the Chinese call this shrub, which grows in the same situation and soil as the tea-shrub proper, known by the same generic name, *Ch'a* or *Ts'a*. This tea-oil, as it is miscalled by foreigners in China, is thinnish, yellow, and less fragrant than cabbage-oil. Large quantities of this oil come from the hilly districts of Kiang-si and Hunan provinces, where the shrub grows in profusion.

OIL OF CAMPHOR.—Oily or uncrystallizable camphor is obtained in the island of Formosa, in the form of a yellow, strong-smelling liquid, which exudes from the crude native camphor, stored in tubs or vats, to the extent of some 3 or 4 per cent. It is scarcely saleable, and is altogether inferior to the oil obtained from the *Dryobalanops camphora*, on the west coast of Sumatra, where the oil dripping from the split timber of the tree, felled to procure the Borneo or Baros camphor, is sold at the price of a Dutch guilder for a large quart bottleful. It would be worth importing to England for use as a cheap substitute for the Lin. Camphoræ. It answers capitally as an embrocation in rheumatism and sprains.

OIL OF CHAULMUGRA. This oil is made from the seeds of the *Gynocardia odorata*, or lucrubau fruits. The oil is both cold-drawn and made by superheating the crushed seeds. It is used in leprosy as an outward application, with doubtfnl ben fit, and is *useful* in the treatment of pediculi and itch.

OIL OF CINNAMON OR CASSIA.—This volatile oil, obtained from the leaves and twigs of the cassia-tree by distillation, is made in Canton, and regularly exported. It is the *Oleum Malabathri* of commerce. This oil is nearly as good as the Ceylon oil.

OIL OF CLOVES.—A well-made, heavy, acrid oil, of a pale, reddish-brown colour, becoming very dark by age and exposure to light. None of these essential oils were known to the old medical writers in China, and are, therefore, not met with, as a rule, in their Pharmacopœia or Herbal. They are nearly all made at Canton, and are obvious imitations of European articles of commerce.

OIL OF COTTON SEEDS.—The oil expressed from the seeds of *Gossypium herbaceum*, and *G. religiosum*, is commonly used for purposes of illumination in Chinese country villages, where all wants are met on the spot in the most primitive fashion. It is also used in cooking, but the taste is unpleasant. It is prescribed as a demulcent remedy, and is applied to leprous, scabious, and other forms of skin disease, so fearfully prevalent in China.

OIL OF FISH.—The Chinese do not, as far as I can learn, extract oil from the liver of any fish, but there is an oil called *Yu-san*, prepared from the entrails, etc., of a fish. The cod has not been met with in Chinese waters. Large quantities of a fish resembling the cod are caught off the coast of the Chehkiang (or Ningpo) province, in the sixth or seventh (Chinese) months. The oil obtained from the porpoise (or "river-pig," as they call it), which frequents the Yang-tsze-Kiang river as far up as Hankow, is used to make putty for caulking vessels, and to burn in ship lamps. A yellow oil obtained from a fish, called *Hwang-ku-yu*, has a strong fishy smell, and is used to destroy lice. It is much used in veterinary medical practice, a department of the Chinese medical art which has been practised from an early period, and has an ancient and respectable literature of its own.

Oil of Ground Nuts.—This pale yellow oil, having an agreeable flavour, is expressed in large quantities from the seeds of the *Arachis hypogœa*, or underground nut. Hunan province supplies a good deal. It is very cheap, and makes a fair substitute for olive oil. The Chinese samples are much darker than the Indian, which are said by Dr. Waring to have a specific gravity of ·916.

Oil of Hemp Seeds.—Several hemp oils, derived from the seeds of a variety of the *Cannabis sativa*, are to be met with in Chinese commerce. Specimens examined were evidently oils obtained from sesamum seeds, or those of the flax plant, both of which are confounded with the hemp plant proper.

Oil of Lilies.—This is cabbage oil, in which the axillary buds of the lily plant have been digested. The oil is recommended to be applied to vesicular eruptions. This very same, or a similar, preparation was once in great repute in Europe. In fact, to read the Chinese Pharmacopœia of to-day is like reading the old dispensatories of the 17th and 18th centuries.

Oil of Linseed.—The oil of the seeds of a linum is used as a lenitive, pectoral, anthelmintic, and alexipharmic remedy, and as an application to scabbed heads. This oil is not easily procurable.

Oil of Myrrh.—A reddish oil, having the smell of myrrh, is said by Loureiro to be used in Cochin China to dress ulcers. The Chinese are fond of making empyreumatic oils of various substances.

Oil of Pine.—A sort of empyreumatic oil, or coarse turpentine, procured by heating the wood or knots of several species of *Pinus*.

Oil of Peppermint.—A very good essential oil is distilled at Canton from the leaves of *Mentha piperita*, *M. crispa*, *M. hirsuta*, and *M. Canadensis*. It is put up in small bottles holding about a drachm. It sells at about 30*s.* a pound. The Chinese bottles are very poor, and stand a good deal in the way of elegant pharmacy. There are several glass manufactories in the (north-eastern) province of Shantung and at Canton. The bottles are very small and brittle. The Chinese pharmacists decorate their shops with ginger-jars and small blue-ware bottles. An oil is prepared at Canton from the pennyroyal plant. Mint is largely used as a remedy in belly-ache, but the dried leaves are generally used as an infusion.

Oil of Persimmons.—A glutinous oily extract is prepared from the fruit of the persimmon, a large, soft, orange-yellow fruit, very sweet, and often somewhat acrid. The fruit chosen for making this oil is that of the *Diospyros Embryopteris* or *Embryopteris glutinifera*, which grows plentifully in Hupeh province. The fruits are crushed to obtain the dark, resinous, thick juice, which makes a very capital varnish for the paper kittysols, or umbrellas of China. It is very cheap. An extract might be prepared from the fruit, as directed in the Indian Pharmacopœia, where it is prescribed as an astringent.

Oil of Poppy Seeds.—The opium poppy is largely grown in Sechuen, Yunnan and every province of China. It was introduced from Persia, a great source of drugs sent as tribute to China. Several splendid varieties of the flower are given in old lists of plants. Oil is obtained from the seeds, but I have never inspected a sample.

Oil of Ricinus Communis.—The castor oil plant grows to the height of more than ten feet, and forms a woody stem in Hupeh, but never survives the winter there. There is a red-stemmed variety and a white-stemmed plant, both of which are used to make the oil, which is used in cooking, and is sold for use as a lubricant on board foreign steamers. It is used medicinally, but not very frequently, as it does not purge Chinamen much, if at all. Croton oil is used by Chinese physicians in apoplexy, a common disease in China.

Oil of Roses.—This essential oil is used mainly as a scent for hair oil, so plentifully used by all Chinese women.

Oil of Sandal Wood.—The Chinese employ this thick, yellow, fragrant oil to daub over common fans, which are then sold as genuine sandal-wood fans.

Oil of Sesamum.—The black and white sesamum seeds are used to make an agreeable oil, much used by the higher classes in cooking food and making pastry. It is credited in the Chinese Pharmacopœia with ecbolic, emmenagogue, and anthelmintic properties. It answers all the purposes of olive oil in the dispensary. It is the Til or Jinjili oil of India.

Oil of Sunflower.—This oil is known to the Chinese, but is not extensively used or known to be employed in pharmacy.

Oil of Spike.—A fine drying oil, is used in painting on porcelain and for varnishing. It is obtained from the Lavandula or an Ocymum. The Labiates do not abound in China, but they are held in great repute medicinally.

Oil of Tallow Seeds.—This oil, made from the albumen of the seeds of the tallow tree or *Excœcaria sebifera*, is clear but of a dark colour. It is obtained, in the proportion of from 15 to 16 lbs. from one hundredweight of the berries, by grinding, steaming, and pressing the refuse which results from the preparation of the vegetable tallow. The oil is used to varnish umbrellas, to dress the hair, and to mix with the tallow to make the candles which form so effective a part of the religious ceremonies of Buddhism, the Ritualism of China. It has emetic and purgative properties. It is one of the few remedies given by the Chinese in cases of poisoning. Efforts are seldom made to rescue those suffering from opium-poisoning, a common mode of suicide in China.

It will be observed that the oils of Chinese commerce are almost exclusively taken from vegetable sources. This is one of the effects of Buddhism on their national life and economy. As Buddhism teaches that mercy and pity are noble sentiments, it forbids the destruction of animal life. The flesh of the cow and the sheep is never eaten by orthodox Chinese members of the Buddhist Church. Their wax is, therefore, vegetable, their tallow is vegetable, and their oils are vegetable. Their gelatines are made from sea-weed. Their daily diet is fish, oil, and rice, with an occasional treat of pork.

There are many other vegetable substances, such as gourd seeds, the fruit of the *Aleurites triloba*, etc., from which the Chinese might prepare, or formerly have prepared, vegetable fats, in obedience to their strong religious teachings and highly economic tendencies. Mineral or rock oils are met with in Shansi, Sechuen, and Formosa, and in Corea. They are not used for illuminating purposes, as they are very inflammable, and are said to have been employed in warfare in the composition of a sort of Greek fire.

TARTAR EMETIC AND OTHER ANTIMONIAL PREPARATIONS.*

BY THOMAS WILLIAMS, F.C.S.

My object in taking up the investigation of antimonial preparations has been to ascertain the purity of trade specimens, especially as to the presence of arsenic. The great importance attached to their being free of this element is admitted on all sides. And yet when we look through the ordinary processes by which antimonial remedies are obtained, and to the one source they are drawn from, the probability of arsenic being present in all the resulting products strongly suggests itself to us. This view has moreover been confirmed by the researches of several authors, who state that they have frequently found arsenic in antimonial products; and from this circumstance they have devised special and reliable methods for its detection. The results I now bring forward do not, however, indicate the present produce to be of so unsatisfactory a quality. The questions here arise—how then has such a degree of freedom from arsenic been attained? and how is it that the antimony, in the tartar emetic especially, stands out so high? These are points that I am as yet unable to explain, but I have arranged to continue a further investigation into the matter.

Antimony occurs in nature in a variety of combinations; occasionally it is found native, also alloyed with the metals nickel, silver, arsenic, etc. Some natural oxides and oxysulphide, or Kermes mineral, are also obtained. Its sulphide occurs abundantly, associated with sulphides of lead, silver, iron, etc. Our commercial supply, however, consists exclusively of the natural sulphide known as antimonite, stibnite, black antimony, etc. This exists at various places in the United Kingdom and foreign countries. The earthy matter, or gangue, that accompanies it into the manufactory is chiefly quartz, lime, and alumina. From these it is freed by charging a crucible, through the bottom of which a hole has been pierced, and placing it in a furnace. A moderate degree of heat liquefies the sulphide, and it runs into a receiver below, leaving the earthy impurities as a solid refuse or slag in the crucible. Thus we obtain, out of the rough ore, the B. P. antim. nigrum, or the commercial crude antimony. This substance, when ground and mixed with a definite amount of iron, yields by fusion the metal antimony or the crude regulus of commerce.

Some of the antimonial compounds were known and utilized in the earliest times. The regulus, or the metal, however, was not known until towards the end of the 15th century, when a method of preparing it was discovered by Basil Valentine. The sulphide, from the most remote antiquity down to the present time, has been used as a pigment for staining the eye-lids, making the eyes appear large, a feature, considered by those who practised it, of great splendour. Basil Valentine has the credit also of being the first to apply antimonial and other metallic remedies for internal administration; though tradition tells us that unlucky results happened from his first experiments upon his brother monks. The reputation of antimonial preparations stands, however, foremost to this day, as affording the most valuable and active metallic medicines in practice. We turn our attention now, then, to the one source they are derived from—the antimonite. The evil complained of in the sulphide, usually, is arsenic in particular; and we read besides that specimens have been found adulterated with smithy scales, and in other instances with galena or lead sulphide. My own analysis of sample No. 1 antimonite shows a minimum of silica and iron. A close examination qualitatively upon sample No. 2 enabled me to consider it equally good: from lead and arsenic they might, practically, be pronounced free. Whence these came from originally I cannot tell, but it is generally believed that we are supplied from abroad. Ure's Dictionary of Arts, Mines, etc., gives the quantity imported into this country during 1856, as follows, Ore 1750 *tons*, Crude 3121 *cwt.*, Regulus 1004 *cwt.* The annual mineral statistics of the United Kingdom, though they include our home produce of arsenic, bismuth, tungsten, cobalt, etc., do not mention antimony in any form. On the other hand, we read that the principal sources abroad are in France and Germany, with the statement that most if not all the sulphide raised at those places contains from $\frac{1}{60}$ to $\frac{1}{20}$ its weight of arsenic—that the regulus obtained from it holds $\frac{1}{200}$ to $\frac{1}{35}$ its weight of arsenic, and the Kermes $\frac{1}{100}$ to $\frac{1}{300}$. There are practicable methods for the purification of the sulphide from the metallic matters it contains; but I am not aware that this is done, except when the object is to obtain pure antimony metal. The prepared sulphide (antimonium nigrum), by fusion, is used by pharmaceutists to make the oxysulphide (antimonium sulphuratum). The B. P. process takes 10 oz. of the sulphide; this is boiled with 4½ pints soda solution over two hours, the volume of liquid being maintained constantly by the addition of distilled water from time to time. It is then strained through calico, and to the liquid, before it cools, dilute sulphuric acid is added in slight excess. A precipitate is thus formed; it is collected upon a filter, washed with distilled water, until the washings no longer precipitate barium chloride solution, dried at 212° F., and this is the orange-red powder sold. The other pharmaceutical preparation obtained direct from the sulphide is the liquor antimonii; chloridi. The B P. process takes of the sulphide one pound; this is placed in a porcelain dish, along with 4 pints hydrochloric acid, and heated gently, with constant stirring, beneath a chimney, until the liquid boils and all the sulphuretted hydrogen is driven off. It is then filtered through calico, the filtrate boiled down to the bulk of two pints, and the result is a liquid of 1·47 s.p.g., coloured more or less according to the amount of iron contained in the sulphide.

Reaction :—$Sb_2S_3 + 6\ HCl = 2\ SbCl_3 + 3H_2S$.

This solution is used for obtaining antimonii oxidum, B. P. We take 16 fluid ounces of it, and pour into 2 gallons of water, shaking them well together; a precipitate of antimony oxychloride subsides. The supernatant acid liquid is syphoned off, then it is well stirred up with distilled water, repeating this and the syphoning of the wash-water away. Next a solution of 6 ounces sodium carbonate in 2 pints of distilled water is added to the precipitate, and left together half an hour, with frequent stirring; the deposit is then collected upon a calico filter, washed with boiling distilled water, until the washings cease to give a precipitate with silver nitrate solution acidified with nitric acid. Lastly it is dried at 212°.

The reactions are :—

$$12SbCl_3 + 15H_2O = 2SbCl_3,\ 5Sb_2O_3 + 30HCl$$
$$2SbCl_3,\ 5Sb_2O_3 + 3Na_2CO_3 = 6Sb_2O_3 + 6NaCl + 3CO_2.$$

---

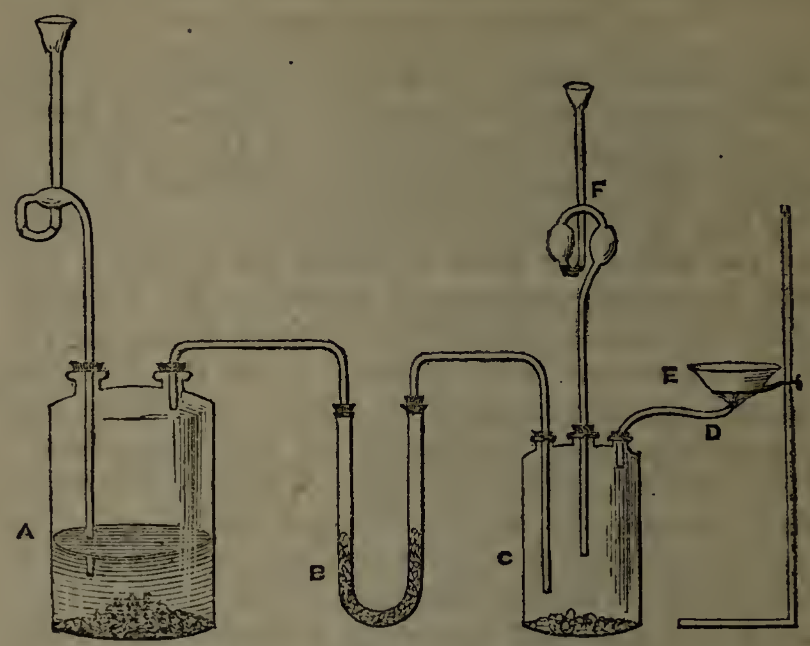
* Paper read at a meeting of the Liverpool Chemists' Association, May 17th, 1874.

With this oxide, tartar emetic is made. The official method takes five ounces of it and six ounces of acid tartrate of potash in fine powder; to these distilled water is added to form a paste, which is set aside for 24 hours. It is then made with distilled water to the bulk of two pints, boiled for 15 minutes, with constant stirring, filtered, and set aside to crystallize. Tartar emetic crystals lose, upon exposure to air, a portion of their water of crystallization, and become opaque. At 212°, the whole is driven off; and upon being heated still higher, the elements of water unite, incurring a further loss, varying according to time and temperature.

This salt is generally stated to have been discovered about the year 1631 by Mynsicht, but it was previously mentioned by Basil Valentine towards the end of the 15th century. Tartar emetic dissolves in 15 parts of water at 60°, and in about two parts at 212°. The B.P. test allows 21·8 parts of water at 60° for its solution. Even that quantity affords abundant facility to detect a somewhat large excess of, or adulteration by, cream of tartar, for this latter takes above 200 parts of water at 60° for its solution.*

Metallic antimony combines very energetically with most of the non-metals, thus if it is in the state of powder introduced into chlorine it burns instantly and produces chloride. It also readily alloys with most of the metals; arsenic behaves similarly, producing alloys. Thus antimony or arsenic may be alloyed with metallic potassium direct; or we may submit to a high temperature, in a covered crucible, any arsenical or antimonial compound in admixture with an organic potassium salt, and we obtain in the case of antimony an alloy containing about 12 per cent. of potassium. If this alloy is placed in water, the potassium leaves the antimony, and, acting upon the water, it liberates hydrogen gas only; when, however, arsenic is either alloyed alone with potassium, or conjointly with antimony, we have arseniuretted hydrogen gas evolved upon contact with water. From this fact, one standard author, at least, recommends this as "one of the best methods of detecting the presence of the least trace of arsenic in antimonial substances," giving a diagram of an ordinary capacious hydrogen bottle, for the guidance of his readers. I would mention, however, that the first trial I had of this method proved a failure. I made an alloy from two ounces of tartar emetic (with this substance it is not necessary, of course, to add any separate organic potassium salt), and placed it aside in a tightly corked bottle, until I had an opportunity to proceed further. After three days I pounded it and placed it in the hydrogen bottle with some water, and there was only the minutest quantity of gas produced. I repeated the test with another two ounces of tartar emetic, placing the alloy, immediately the crucible was cooled sufficiently to be broken, in the hydrogen generator, with very little water; the action in this instance was evidently more lively, but the amount of hydrogen evolved was so small that there was no hope of anything but an explosion occurring if a light were applied to the jet. After repeated experiments I have devised the following apparatus, a diagram of which, with the *modus operandi*, is given below. I may state that this method, with due precautions, will indicate the presence of the minutest trace of arsenic.

* Mr. Hennell states—*vide* 'Philips's Pharmacopœia Londinensis,' 5th edition—that tartar emetic may contain even 10 per cent. of cream of tartar, and still be dissolved in the prescribed quantity of water.



METHOD A FOR ARSENIC.

In the above diagram, A represents the hydrogen generator; B a U-tube, containing fragments of pumice stone, moistened with strong sulphuric acid; C the bottle which contains the alloy; D the jet tube; E glazed porcelain dish, against which the flame is depressed; and it should contain cold water, so that the arsenical mirror once deposited may not volatilize away by a prolonged contact of the flame and overheating of the dish. *Modus operandi*—an ounce of tartar emetic, or about half-ounce of other preparations of antimony, mixed with equal weight or rather more of cream of tartar, is introduced into a clay crucible, covered and subjected to a bright red heat for forty minutes. As soon as the crucible is cold it is carefully broken, and the alloy button, cleaned of its slag, is pounded and placed in bottle C. Hydrogen is now generated in bottle A, by zinc and dilute sulphuric acid; the gas is dried by passing through the tube B, and is allowed to go on until all the air is displaced from the apparatus. A light is at this stage applied to the jet tube D, to establish the purity of the hydrogen; and then some half-an-ounce of water is introduced down the double-bulbed funnel-tube F to the alloy, when an arsenical mirror will be produced, if arsenic is present in the original sample. For the success of the experiment, it is necessary that the bottle C is of the smallest possible capacity, and, with its funnel, absolutely dry when the alloy is placed in it. To prevent the escape of gas through the funnel-tube, as little mercury as will plug the bend is poured down the funnel.

Method B is founded on the fact, that recently precipitated arsenious sulphide is soluble in potassium bisulphite, while antimony sulphide is insoluble. A gramme of the substance, mixed with half its weight of sulphur, is digested in a tolerably strong solution of potassium protosulphide, filtered, the filtrate diluted, and a strong solution of sulphurous acid added, in excess, and boiled for a length of time. The antimony sulphide is then filtered off; and sulphuretted hydrogen, passed through the filtrate, will produce a yellow precipitate of arsenious sulphide, if present in the substance.

Method C.—Two grammes of tartar emetic is dissolved in four grammes of chemically pure hydrochloric acid, sp gr. 1·124, in a test tube; 30 grammes of hydrochloric acid, saturated with sulphuretted hydrogen, is then added; the solution, after standing some time, will yield a yellow precipitate of arsenic sulphide, if arsenic is present in the substance.

Antimonite.

(Sb_2S_3).

Tests.	No. 1.	No. 2.
Quantitative, using dried sample:—		
Antimony	71·82	
Sulphur	27·90	
Silica	·16	
Iron	·10	
	99·98	
Qualitative:—		
Lead	trace	trace
Arsenic, by Method A	none	trace

Antimonious Oxide.

(Sb_2O_3).

Tests.	No. 1.	No. 2.
20 grains, weighed as Sb_2S_3	22·59	22·61
Calculated to dry sample	22·87	
By theory	23·28	
Moisture, 220° F. (20 grs.)	1·23	1·29
Arsenic, by Method B	trace	none
20 grains, boiled in distilled water. $AgNO_3$ solution, added to filtrate, produced	slight turbidity	slight turbidity

Antimony Oxysulphide.

(Sb_2S_3, Sb_2O_3).

Tests.	No. 1.
60 grains, dissolved in HCl, water added, precipitate collected on filter, washed, dried at 212° F., and weighed, gave	57 grains
By British Pharmacopœia	53 "
Arsenic, by Method A	none

Tartar Emetic.

($C_4H_4K(SbO)O_6$, H_2O, or, $KSbC_4H_4O_7$, H_2O).

Tests.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
20 grains in one ounce of distilled water, 60° F.	dissolved	with difficulty disso v'd	dissolved	with difficulty dissolved	dissolved
20 grs. weighed as Sb_2S_3	11·305	10·97	11·32	11·29	11·02
By British Pharmacopœia	9·91	9·91	9·91	9·91	9·91
Moisture, 212° F. (20 grs.)	·09	·45	·11	·08	·49
$AgNO_3$ in dilute solution	no change	no change	no change	slight turbidity.	no change
$BaCl_2$ in dilute solution	no change	no change	no change	no change	no change
A solution of 10 grs. in cold water, afterwards brought to boiling, produced, with one drop of strong Na_2CO_3 solution.	permanent precipitate.	permanent pp.	permanent pp.	permanent pp.	permanent pp.
One grain (=10 per cent.) of $HKC_4H_4O_6$, added to a solution as above, and treated similarly, gave	no pp.	no pp.	no pp.	no pp.	no pp.
Arsenic, by method A	none	slight trace	none	none	slight trace
Arsenic, by method C	none	trace	none	none	trace

In the above table the samples experimented upon were obtained from the following sources:—

No. 1. Sulphide	low neighbourhood in Liverpool.
" 2. "	wholesale house in Liverpool.
" 1. Tartar Emetic	wholesale house in Liverpool.
" 1. Kermes (oxysulphide)	highly respectable shop in Liverpool.
" 2. Tartar Emetic	highly respectable shop in Liverpool.
" 2. Oxide	highly respectable shop in Liverpool.
" 1. "	moderately respectable neighbourhood in Manchester.
" 3. Tartar Emetic	highly respectable shop in Manchester.
Nos. 4 and 5. Tartar Emetic	two different wholesale houses in London.

IDENTITY OF SCAMMONIN PREPARED FROM THE ROOT OF CONVOLVULUS SCAMMONIA. WITH THAT OBTAINED FROM ALEPPO SCAMMONY.*

BY PROFESSOR H. SPIRGATIS.

Some time since† the author published an account of an investigation of the chemical constitution of scammonin, the resin of *Convolvulus Scammonia*, Linn. The scammonin used by him on that occasion was obtained from so-called Aleppo scammony,—*i.e.*, the milky juice of the above-named plant hardened in the air,—the latter substance being at that time the only material containing scammonin that could be supplied. But as at the present time the root itself of *C. Scammonia* comes into commerce from Asia Minor, and as the German Pharmacopœia requires that the officinal Resina Scammoniæ should be prepared from it, the author considered it desirable also to prepare scammonin direct from the root, and to compare it with that formerly prepared by him from scammony. This inquiry seemed to him to be the more desirable since it has been affirmed that the two bodies are not identical.

The scammonin was prepared from the roots in the ordinary way, by exhausting them with water, removing the resin with spirit, decolorizing the alcoholic solution with animal charcoal, distilling off the spirit, and repeated washing of the separated resin with hot water. Professor Spirgatis was not able to observe any difference between the scammonin so prepared and that previously obtained from Aleppo scammony, some of which he had still in his possession. Both bodies are amorphous, colourless, transparent, without smell or taste, presenting the same phenomena in combustion, and presenting also precisely the same behaviour to solvent and chemical reagents, such as alcohol, ether, chloroform, petroleum, oil of turpentine, acetic acid, concentrated sulphuric acid, caustic potash and soda and their carbonates, ammonia, and in alcoholic solution with acetate of copper, acetate of lead, nitrate of silver and chloride of iron.

Finally the scammonin prepared from the root, dried at 100° C., gave in three experiments the composition—

* *Neues Repertorium für Pharmacie,* xxiii., 260.
† *Annalen der Chem. und Pharm.*, cxvi., 289.

	1.	2.	3.
C	56·62	56·59	56·62
H	7·75	7·70	7·88
O	—	—	—

Whilst a fresh combustion of some of the old resin under similar conditions gave, as on the former occasion, the figures—

C	56·60
H	7·76
O	—

The author considers it, therefore, unquestionable that the scammonin prepared direct from the root is identical with that formerly prepared by him from Aleppo scammony.

THE MUTUAL RELATIONS OF DRUGGISTS AND PHYSICIANS.

BY DR. C. E. BUCKINGHAM.

(*Concluded from p.* 45.)

Another picture of the way in which meanness can be shown, and in which its dangers might be shown, is in the substitution of drugs. There are shops at which you can find anything you may ask for, even if it is not in the shop. Some years ago, having just risen from a sick bed, being taken with vertigo in the street, I stepped into a drug store, where I was not known, and took a seat. Not wishing to intrude without making payment, I asked for a chemical preparation; was told that they had it, and, after a long hunting about, a package was made up for me and paid for. When I got home, I tested it, and found it to be an entirely different article from that asked for, and sent it back, with my compliments to the one who put it up. I never had any notice of its having been received. A short time after this, I wrote a prescription for four pills, which were made and taken. It was thought best to renew them, by the number on the box. The messenger by mistake took the box to that same shop Eight pills were put up in place of four, and an active cathartic would have been taken in place of a narcotic, if the patient had not seen the box and its contents before the pill was put in some jelly for him to take.

Twice within a few weeks, I have had sugar-coated quinine pills, made by machinery, sent to patients in place of pills of quinine and hyoscyamus, as directed.

It is the duty of the physician to write his prescription plainly, and to put his directions for use upon the paper. It is the druggist's duty to put up the medicine precisely as directed, or not to put it up at all. If there be anything directed which he has not, the druggist has no right to substitute anything else without consultation with the prescriber; and this, whether the articles be inert or active, whether they be costly or cheap. You have no right to think that a sulphate or an acetate will answer the purpose as well as a muriate. You have no right to add more acid to a mixture than is directed, even if it be necessary to make a perfect solution; and even in so slight a matter as an excipient, you violate your duty, if you make the simple substitution of one dry powder for another, or one mucilage for another. If the mixture be vile in its appearance, absurd in its composition, a liquid when the ignorant prescriber thought it would be dry, that is a blunder which it is not your business to correct. You might, in courtesy, notify him of the fact, but you have no right to change the mixture. You do not know, and cannot know, why a particular article is prescribed. This peculiar fault, peculiar impudence, if you please, is so common at one very popular drug store in this city, that for a couple of years past I have invariably cautioned patients not to have my prescriptions put up there.

Neither has the druggist the right to suggest to the purchaser that the dose prescribed is too large or too small. Within a very short time, a timid, nervous young lady, suffering from hæmorrhage from the lungs, and being miles from her physician, who had sent the prescription, accompanied with written directions for its use and his name appended to it, was frightened into long and dangerous neglect of herself by a druggist, who informed her that fluid extract of ergot, the best article known to-day for the prevention of hæmorrhage, is a slow poison and dangerous to use.

On the other hand, I contend that physicians have no right to prescribe unusually large doses of so-called poisons without intimating, in some way, upon the prescription, that they are aware of what is written. Should I write for half a grain or larger doses of morphia, I consider it my duty to write upon the prescription that "I have read over this prescription, and it is written as intended." Should I write for a medicine not often used, and about which there might be a mistake made, it is my duty to write down its other name also, if it has one, that the druggist may be sure of the article written for. Chloride of mercury should never be abbreviated, so that its identity with chloral hydrate may be questioned; and croton chloral should be so manifest upon the prescription that croton oil should not be substituted for it, when repose is intended as its effect.

With the best of care, every man is liable to make mistakes. Loss of sleep, or an attack of indigestion, either of these may make you or me commit an error. Under such circumstances, I have found it my duty and pleasure to thank the druggist's boy for bringing me a prescription to be completed.

The wisest course for me is to keep a copy of every prescription that I write. Copying it makes me more likely to see an error. The proper course for you is to read over the prescription, and if it is to be copied, copy it then, before it is put up. The plan of delivering up the original to him who presents it is a bad plan. In case of doubt as to the author of an error, whether it be the writer or the compounder, the evidence of the original prescription should be in your hands for your protection. He who dispenses should have the writer's authority at hand for easy reference.

There is one matter of interest to all of us, and to the public as well, which I am not sorry to have an opportunity to allude to. I refer to the habit which some druggists have of prescribing. "Well," say you, "if a man calls on me to give a dose of medicine for diarrhœa, or constipation, or cough, or sore-throat in a child, why should I not give it to him? Why is not my prescription as good as that of any old nurse, or any other neighbour who has strayed in?" It is exactly as good, and no better. The sore-throat, of which you know nothing, may be the result of insufficient dress, or of almond candy. The diarrhœa may be the beginning of a typhoid fever, or from want of flannel drawers. The constipation may be owing to too little food, or approaching disease of the brain. All of them may be simply symptoms of dyspepsia. One dyspepsia may require an acid, another an alkali; one needs a dose of physic, another requires food; one wants out-of-door air, and another a warm bed. One needs to have the patient stop his head-work, and another would be benefited by any change from his present style of life. Cough may have its cause in the head, in the throat, in the lungs, in the stomach. The very medicine which you give, without knowledge of the particular patient, and how to examine him, may be the means of aggravating the disease.

To say that this medicine is very simple, and, if it does no good, cannot do harm, is one of the most common of mistakes. If no other harm is done by it, there may be serious loss of time. But what is a simple remedy? You, perhaps, will say, "Tolu, ipecac, castor-oil, salts, rhubarb." Neither of these is so simple as morphia, or strychnia, or Prussic acid. The simplicity of an article or of its combinations has nothing to do with the usefulness or the hurtfulness of a medicine. If a man asks you for a compound cathartic pill, or for a dose of paregoric, that is all very well. I know of no reason for refusing him. If he asks you what the best cathartic for him is, or what would do his cough the most good, that is a very different matter. You know, and can know, nothing about it. If one man's meat is another's poison, and this is literally true, the parallel comparison will hold equally good concerning medicines.

The effect of the same medicine upon different individuals is very remarkable. And this cannot be wondered at by those who have seen the effect of different articles of food. Some of us know that so pleasant a fruit as the strawberry will produce difficult respiration in some who eat it. The clam and the oyster have similar effect upon others; and I have known the eating of poultry to do the same. Even the passing near enough to inhale the odour from a wheelbarrow of lobsters, I have seen followed by asthmatic breathing, and an eruption which could not be distinguished from erysipelas. So an opiate stimulates one and depresses another.

I have a case on my books, which is a fair but ludicrous illustration of the value of such prescriptions as are "simple, and can't do any harm." I was called to see a little girl, who had been kept at school on Saturday till after her usual dinner hour. When she got home, vexed and tired, notwithstanding she had a slight headache, a slice of beefsteak would have relieved her. The headache led the mother to give a dose of castor-oil, and to offer gruel, which was refused. Sunday, no improvement, and tincture of rhubarb was taken. On Monday, no better; senna and salts. Tuesday, no better, and a dose of elixir pro. On Wednesday afternoon I was called in and informed by Mrs. —— that, having no other medicine in the house, she had given the little girl an emetic, and it had brought up a great deal of bile, and she feared the child would never recover. The advice given was to feed the child and let medicine alone. Yet these were all what are called simple medicines. With the exception of great weakness and loss of flesh, the child was in her usual health in twenty-four hours.

This case is a fair illustration of the value of prescriptions made at random, and although you might not be foolish enough to go through so long a list, why should you not? If not competent to examine the patient, you are not competent to prescribe for him; and if it would be improper to continue prescribing ignorantly, so it would be improper to begin. Remember that many diseases have common symptoms at times, and it is only after days of suffering, in some cases, that the real nature of the disease is declared. The medicine which might be of service in a pleurisy or pneumonia, would be absolutely injurious to an overloaded stomach; still, the case is by no means uncommon in which chest pain, or irregular action of the heart, originates in indigestion. The delirium and exhaustion, which seemed to foretell death, has, perhaps, originated in a roasted partridge. The apparent paralysis is not infrequently the effect of liquor. Not infrequently, on the other hand, men have worn the name of drunken sot, when an early autopsy showed that disease of the brain had existed for no little time. I knew one of your profession to be the means of sending a patient to a smallpox hospital, whose eruption was caused by the balsam of copaiba which the druggist had prescribed. The simple medicine does harm, if you do not know how to use it; and, if in no other way, it may produce harm by taking the place of that which might have done service, and the use of which has been put off too long.

Another matter occurs to me, which was worth speaking of. Not that any of your number is likely to err in this way, for no gentleman can act otherwise than as a gentleman; but you may have those in your employ to whom a word of caution may be useful. No one but the patient or the writer of the prescription knows for what purpose the prescription is written. A look at the patient, as if there were the shadow of knowledge in regard to the disease, is an insult. The slightest intimation of suspicion that one knows for what disease a particular remedy is prescribed, entitles the seller of the drug to be kicked out of his own door. Yet I have known a druggist to insinuate to a modest girl, to whom copaiba was given for a cough, that he knew for what other disease it was used; and to another, that ergot was not always given to *check* hæmorrhage.

And still another word. The drug store is not the proper place for a news-room. It is no place for unemployed physicians to gather in and talk over the political affairs of the day. It is no place for medical or other loafers behind the druggist's counter. No one should be allowed there except upon business. No one should be allowed to speak with him who is weighing out and measuring medicines; and if your visitors do not know this, it would be as well to say it in unmistakeable language, or, which would be better, perhaps, to have the compounder of medicines closeted by himself alone.

And now, gentlemen, having said what has occurred to me during the short time which I have been able to spare for the purpose, if I have given you anything which you consider of any value, I shall feel very well satisfied. If these matters appear to you to be of comparatively little consequence now, the day is coming when some of you will appreciate them. It is impossible that science can be held back, and in any business where a head is wanted, as well as a hand, there must be progress. See to it that your labour does not retard it.

BROMIDE OF IRON AND ITS PREPARATIONS.*

BY M. PRINCE.

According to a calculation based upon the chemical equivalent of bromine compared with that of iodine in combination with iron, the author was induced to try the following formula:—

Unoxidized Iron Filings	100
Distilled Water	768
Bromine	210

After having introduced the iron fillings and the water into a vessel having a capacity of about two litres, 40 or 50 grams of bromine were added, and the mouth of the vessel promptly stopped with a good cork, in order to avoid loss of the latter, which escape quickly in reddish-yellow vapours due to the development of heat when the first portions came into contact. These vapours disappear and are replaced by others of a violet colour, which, like the former, only last a few seconds. A fresh portion of bromine was then added, and this operation was repeated until all the bromine had been used.

When this was effected, the whole (including the excess of iron contained in the solution, which is indispensable to its preservation,) was transferred to a stoppered bottle.

The first operation being completed, the author sought to ascertain whether the solution so obtained contained the estimated quantity of protobromide of iron. Thirty grams were filtered and rapidly evaporated to dryness, when it yielded one-third of its weight of the anhydrous salt. The author, therefore, gave it the name of normal titrated solution of protobromide of iron, and has used it in three different preparations, of which the following are the formulæ:—

Bromide of Iron Lozenges.

Normal Solution (filtered)	18 grams.
Powdered Gum Tragacanth	1·50 „
Finely Powdered Sugar	100·50 „

Evaporate the solution in a porcelain capsule to half its weight (9 grams); pour it then into a marble mortar, add the gum previously mixed with a small quantity of the sugar; after mixing, add the remainder of the sugar and bray the paste well. Afterwards spread it out upon a

* Extract from a paper read before the Society of Pharmacy at Lyons (*Bull. Soc. Pharm. Bord.*, vol. xi., p. 138).

marble slab, and divide it into lozenges weighing one gram each, which should be dried promptly and put in a dry place. Each lozenge will contain five centigrams of protobromide of iron.

Bromide of Iron Pills.

Normal Solution (filtered) . .	12 grams.
Iron filings	0·10 „
Powdered Gum Arabic . . .	q. s.
Liquorice in Powder	q. s.

To make 80 pills.

Pour the solution with the small quantity of iron into a porcelain capsule, and evaporate quickly until the liquid has lost two-thirds of its original weight; then pour it, still warm, into a well-dried and slightly-warmed porcelain mortar. Add at the same time the two powders previously mixed and in sufficient quantity to form a consistent pill mass, which should be divided equally into eighty pills, and kept in a well-stoppered bottle sheltered from damp. Each pill will contain 5 centigrams of the protosalt.

Syrup of Bromide of Iron.

Normal Solution (filtered)	12 grams.
Syrup of Gum and Orange flowers . .	620 „

M. S. A.

This quantity will represent a demi-litre of syrup containing four grams of protobromide of iron, or 20 centigrams of the active principle to each 31·60 grams of the syrup.

REMARKABLE POLYPORUS FROM CANADA.*

BY SIR R. CHRISTISON, BART.

A short time ago I came accidentally upon a mysterious specimen—mysterious, I mean, to myself—which I had put aside in 1843 till I should receive farther information about it, and of which I had lost sight during other and very different pursuits. The label on it bears that it is "a fungus from the White Pine" of Canada, presented to me by Dr. James Johnston, at the time Assistant-Surgeon in the 71st Highland Light Infantry. On presenting it to the Botanical Museum, I found that it seemed as novel and strange to Dr. Balfour and other experienced botanists as it was to myself; but a small fragment, evidently of the same kind of substance, was subsequently found in the collection of the garden.

As a cursory examination proved it to be an object of interest, I applied to Dr. Johnston for farther information; and fortunately, considering the long period which has elapsed since he parted with it, he was able to turn up in a memorandum-book the following note, taken on April 28, 1841, when he got it at "Penetangingshine, Georgian Bay, Lake Union," viz., "Bought a Wahbodo—Indian Rhubarb—a fungus growing on top of White Pine—very scarce—thirty-three years' growth. Indians say it lives—cries like a child—bleeds when wounded—and does not fall unless killed. This specimen was brought down by three rifle-balls. A tonic bitter, recommended as an application to wounds. It was brought to me from a distance of upwards of 50 miles."

The Wahbodo is still in a state of perfect preservation, as when I got it thirty-one years ago. It is 18 inches long, from 22 to 26 inches in girth, firm in external texture, and very fibrous, the fibres longitudinal. It is very white. It weighs thirteen pounds. It is strongly marked by thirty-three parallel rings, or seems to be made up of so many circular superimposed cakes, somewhat more than half an inch in thickness. At one side of its thicker end there is attached, over a space as large as the palm of the hand, a quantity of the outer bark of a smooth-barked pine. On cutting out with the saw a quarter section along its whole length, it was found that the rings outside penetrate a very short way inwards; that the texture everywhere is in general spongy, white, and fibrous; but that there are also many long, longitudinal, rudely parallel lines on the surface of the section, which are brownish, harder, not at all fibrous, and which obstructed the saw by adhering to it like a resin. The powder has a strong, pure, almost aromatic, bitter taste, very like that of sulphate of quinia.

Dr. Maclagan made a rough analysis of it for me, and found that it consists, in 100 parts, of 64·59 resin, 25·79 cellulose, and 9·62 watery extract. The bitterness he found to reside, not in the resin, but in the watery extract, and it therefore must depend on some other proximate principle, possibly crystalline.

On consulting the opinion of the most eminent English authorities on the subject of the fungi, Dr. Balfour found that all considered this substance, from an examination of small fragments of it only, to be ligneous texture degenerated and much altered by the presence of a species of Polyporus, which Mr. Berkeley thinks will probably prove to be *P. Pini canadensis* (Schweinitz).

* Read at the July Meeting of Edinburgh Botanical Society. Reprinted from the *Gardeners' Chronicle* for July 18, 1874.

THE PROBLEMS AND FUTURE OF PHARMACY IN GERMANY.*

BY FRED. HOFFMANN, PH.D.

It appears to be of interest and utility to take notice of the problems which are now being discussed in Germany, where pharmacy has been, for over two centuries, the main cultivator of natural sciences, and as such, and as a branch of the healing art, has attained a position not reached in any other country, and where not only its sphere and import, but even its very existence, seems to be at stake. Though the political, social, and industrial conditions of Germany and the other European countries differ in many respects from those of North America, it will be found that the aims and interests of pharmacy, and its relations to other trades, are the same everywhere; and for this reason the crisis into which pharmacy has entered in Germany merits a wider attention. With the radical changes of popular views, in consequence of general intellectual advancement and the popularization of all branches of physical and sanitary sciences and of rational medicine, the former state and practice of medicine, and also of pharmacy, have undergone considerable changes in Germany and in Central Europe. Although difficult to comprehend outside of Germany, the most important necessary consequence has been the removal of all restrictions formerly placed, on the part of the State, upon the practice of medicine and hygiene, in Germany as well as in Switzerland. Medicine, in consequence of its extent and its unlimited sphere of application, has separated into several parts, which, in study as well as in practice, have more or less become specialities, while some branches have become the common property of all well-educated men, and have occasionally been successfully practised also by others than physicians. Notwithstanding these innovations, modern medicine progresses; "with the higher aim that its object is not so much the cure, as rather the prevention of disease." (Virchow.) As another consequence of these tendencies the fact was lately stated, that "modern medicine has ceased to resort to and find its centre of gravity in the pharmacies." (Pettenkofer.) How far these assertions represent the reality may be judged not only from the pharmaceutical papers, but far better from the number and quality of popular science publications covering the field of hygiene and sanitary and medical sciences; the widely known popular works which have passed through many editions and translations, of Professors Bock and Reclam, of Leipzig, may be mentioned as instances.

The medical schools have sceptically discarded a large portion of the old array of remedial agents, and retained comparatively few substances of certain chemical composi-

* Reprinted from the *American Journal of Pharmacy* for July.

tion, and hence proportionable with exactness; these are more and more administered by subcutaneous injection or in minute concentrated doses, and in forms which are more handsomely prepared by the confectioner than the apothecary, while the preparation of the chemicals has been transferred from the laboratory of the latter to that of the manufacturer,* so that the sphere of the apothecary has been materially narrowed and simplified, and a chemical knowledge, though always desirable, is not in the same degree requisite as heretofore.

When, therefore, we hear of a decline of pharmacy and of a decrease of its efficiency in Germany and other European countries, as yet not a degeneration of pharmaceutical education and proficiency nor of the status of pharmacy is intended, but principally the reaction of the conditions briefly sketched above upon pharmacy. An increase of medical scepticism and a lessening in the public mind of the value of remedies must certainly be followed by the lowering of the importance of pharmacy. Medicine cannot well be subject to such a retrogression, because its successful practice lies in an unalterable path, concerning the instability of human nature and life, and presupposes, besides actual knowledge, an individual fitness, technical skill, experience and judgment, with which the educated physician can always successfully encounter the ignorant or half educated competitor, while the competition amongst pharmacists scarcely exists upon the scientific, but almost exclusively upon the mercantile, field.

The future status of pharmacy in Germany, as influenced by these factors, and in consequence of the rapid intercourse of nations and the generalization of ideas, their influence upon pharmacy in other countries has been for some time the subject of deliberations in the pharmaceutical journals and in the meetings of pharmaceutical societies. To this must be added the pending abrogation of the protective grants, an institution antiquated in its origin and nature, but which has been one of the most important factors through which German pharmacy has reached its high status and its pregnant co-operation in the advancement of the physical sciences. The nature of these grants has been explained by me in a former paper, entitled "Pharmacy in Prussia and the German Empire."† Latterly, besides many reforms in relation to arts and industry, the grants and concessions have been abolished, and since the release of the practice of medicine, that of pharmacy appears to be merely a question of time and a financial problem, the solution of which is attended with so many difficulties, because upon these grants large amounts have been invested, which, with the legal abolition of the former, would be lost as far as they exceed the real value of the business. This question of national economy, which is now being discussed and is under consideration before the Government and the Legislature (Reichstag) in Germany, has been apparently satisfactorily solved in Sweden in this manner, where every newly established pharmacy has to contribute a certain sum, in accordance with fixed principles of valuation, towards the redemption of the capital invested in pharmacies, as far as its value is lessened in the same place. It is probable that a similar way will be chosen in Germany for the inevitable solution of this problem.

These are, in brief, the principal causes of impediment to the progress and prosperity of pharmacy in Germany, and which have tended to keep talent and capital from being invested in pharmaceutical pursuits, and to induce many young and promising pharmacists to leave their chosen avocation for others more remunerative.

Among the recent publications on this subject, those of three pharmaceutical authorities, equally prominent by experience, knowledge and standing, have attracted a wide attention, namely those of Professor Dr. Phoebus, of Giessen,* of Professor Dr. Hlasiwetz, of Vienna, and of Mr. W. Danckwortt, of Magdeburg, formerly Chief Director of the North German Apothecaries' Association. The following synopsis of the remarks of the two last-named men may serve to elucidate more fully their views of these vital questions and their bearings upon the future of pharmacy in Germany.

Prof. Hlasiwetz, formerly an apothecary, now Professor of the Imperial Polytechnic School of Vienna, in a recent lecture on Modern Pharmacy,"† said in substance:—

"Until recently, chemistry had its ablest and most useful representatives among the pharmacists, and for a long time this profession has pre-eminently supplied the chairs of chemistry of the universities with professors to whom we owe the vast amount of labour and discoveries which were necessary to bring practical and theoretical chemistry to its present scope and position. But this has greatly changed by degrees, the consequent rapid progress has called forth a chemical industry of the most varied description and extent, which, in its rapid strides, has substituted the methods of manufacturing on a large and commercial scale for those on a small scale in the laboratory of the pharmacist. This change in the scope and drift of pharmacy has deprived the pharmacist of one of the principal objects and profits of his legitimate business, and since the fact has become fully established that he cannot enter into competition with the manufacturer, either in regard to quality or price, there is nothing left to his share than to dispose and retail the products of the former. Not only the whole series of medicinal chemicals and alkaloids are now supplied by the manufacturer cheaper and, as regard the latter substances, better, but also those pharmaceutical preparations which belong pre-eminently to the province of the pharmacist; as, for instance, fluid extracts, tinctures, syrups, ointments, plasters, etc.

"Since the inauguration of this sweeping change dates the decline of the so-called pharmaceutical chemistry, and all that the pharmacist yet applies is a moderate degree of analytical skill for the establishment of the identity and quality of the preparations as supplied by the manufacturer. And even this limited sphere of proficiency is encroached upon by the manufacturers, by offering on the labels of their preparations brief instruction, for ready tests, and by supplying pure and ready made reagents, so that the tests may be made by any skilled and informed person.

"Our schools and universities still furnish a sound pharmaceutical education and a stock of chemical knowledge; but the truth is that these attainments, as a rule, do not bring fruit, for the reason that pharmaceutical practice has ceased to afford any longer the former compass and opportunity of application, or a sufficient impetus to practically cultivate the acquired proficiency.

"Moreover, the advanced state of rational medicine has discontinued the use of many remedial agents, and has greatly limited not only the list of materia medica, but also the former liberal administration of medicines; the consequence of this restriction is a decrease of the legitimate business and income of the pharmaceutist; being formerly a remunerative pursuit, it hardly furnishes, any longer, a respectable living to a great many highly educated men, and we see, therefore, the pharmacist enter more and more upon mercantile resources for subsistence. With the aim to gain, on the other hand, as a dealer, what the professional scope of his business falls short to supply, he enriches his stock with homœopathic and with patent medicines, and enters into competition with the dealer in fancy articles, with the perfumer, the confectioner, etc.

"The business of the pharmacist depends for the

* See synopsis of lecture in *Druggists' Circular*, 1874, March, p. 57; and *Pharm. Journ. and Trans.*, March 28, 1874, p. 781; also Prof. Redwood's lecture on the "Past, Present, and Future of Pharmacy." *Ibid.*, April 25, 1874, p. 852.

† *American Journal of Pharmacy*, 1871, p. 389.

* *Pharmac. Zeitung*, Nos. 17, 35, 47, 67, 85, and 89, 1873.

† *Pharmac. Zeitung*, No. 8, 1874.

future largely upon the drift of the manufacturing business, which, when it should also extend its aim and scope to the production of the medicinal substances in ready-dosed and elegantly-prepared forms, will deprive the pharmacist, more or less, of the last remnant of his proficiency. This inroad has already commenced, and bids fair way to an increasing extent and to success; it tends to relieve the physician from the necessity of prescribing so many grains of Dover's powder, of quinia, of calomel, etc., to be rubbed up with sugar and divided into so many doses; he will merely have to direct his patient to buy a number of dosed capsules or tablets. He will soon find all the chief formulæ of his dispensatory provided in elegant forms and envelopes, disguising smell and taste, and both the physician and the patient will gladly dispense with the old, repulsive forms of mixtures, decoctions, powders, etc. The great number of vegetable drugs of uncertain value and variable quality will be discarded, and will be replaced by the active principles, obtained from them in a pure and stable form, so that the materia medica of the rational physician will henceforth be like that of the homœopathist, ready prepared and dosed, and all emanating from the manufacturing establishment.

"When system and method will extend and consummate this mode of administration of the remedial agents, nothing will be left of the pursuit of the pharmacist than a retail dealer of the products of the manufacturer of medicinal articles."

Mr. W. Danckwortt expresses himself in an article "On the Future of Pharmacies,"* thus:—"I believe that after forty years pharmacy will have greatly changed its physiognomy; I do not entertain pessimistic views, and consider it an honour to have served for forty years in a profession which I esteem highly, but when I compare its present condition and prospects with those of forty years ago, I cannot but admit that pharmacy is on the decline and will henceforth degenerate far more rapidly. But thirty years ago chemistry and botany were pre-eminently the sciences of the pharmacist; Berzelius, H. Rose, Liebig, Fresenius, Berg, Henkel, Mohr, and many others of equal fame, emanated from pharmacy. Nowadays, chemistry has grown in extent and volume so vastly, and its practical application embraces such a wide compass, as completely to leave behind the pharmacist's sphere. Yet the pharmacist has maintained a comparatively high status of chemical knowledge and learning, and a comparatively wide compass of attainment is still required from him. But the fact is that these accomplishments have to be attained mainly to enable him to pass the examination which the State makes yet obligatory; after this, he has not any more the old arena to practically apply and profitably enlist his attainments, nor the former impetus, so that, in many cases, the knowledge acquired at the universities is gradually lost for want of application and encouragement. Formerly, the pharmaceutist used to be the legitimate expert in all forensic investigations: now the extent of knowledge and experience required are such as to exclude him in preference of the professional chemist. The pharmaceutical laboratory of yore has become a myth, and we must admit that most of the medicinal chemicals and pharmaceutical preparations can be obtained cheaper and better when manufactured on a large scale; many of them are now furnished by the manufacturer already dosed and labelled for ready dispensation and retail sale. And when we compare the prescriptions of our days with those of forty years ago, what a change, what a remarkable simplification! The whole array of the old-fashioned decoctions, infusions, and mixtures have been discarded; morphia, codeia, quinia, digitalin, chloral-hydrate, atropia, and a number of other principles, are the consummation of materia medica, and even the prescriptions for these disappear more and more from the pharmacies, inasmuch as the physician carries their minimal solutions in his pocket for ready administration by subcutaneous injection, or orders them in tablets or sugar granules as supplied by the manufacturer or confectioner in lieu of the pharmacist.

"Moreover, the rapid progress of general culture, of the knowledge of the rational principles of life and health, and the conditions of their maintenance, of the sanitary sciences and of hygiene and medicine, exercise a considerable influence upon the decrease of the use of medicines, for it cannot be denied that knowledge and culture counteract the principles and conditions upon which, to a great extent, the prosperity of pharmacy rests.

"When we have witnessed such changes within the comparatively brief space of forty years, who has the assurance to predict what, or if anything, will be left of pharmacy after another equally progressive lapse of forty years?"

(*To be continued.*)

* *Pharmaceut. Zeit.*, No. 20, 1874.

THE REPORT OF THE SELECT COMMITTEE ON THE APOTHECARIES' LICENCES (IRELAND) BILL.

Although the report of this Committee has been presented and ordered to be printed, it had not at the time of our going to press been yet published, but it will probably be issued within a few days. Meanwhile, by the courtesy of a correspondent, we are enabled to give an extract from the letter of the London correspondent of the *Freeman's Journal* of July 21, which professes to give the conclusions arrived at by the Committee, though upon what authority the report of the Committee is thus anticipated we are unable to gather from our Irish contemporary.

"Mr. Errington's Apothecaries' Licences Bill Committee have to-day decided upon their report, of which I am able to give you a *résumé*. Admitting at the outset that a Pharmaceutical Society for Ireland is much required, and that the country possesses ample material for the constitution of such a body, the Committee recommend that the Government should introduce a bill (in lieu of Mr. Errington's original bill) empowering the Lord-Lieutenant in Council to appoint, in the first instance, a certain number of foundation members, who shall form the nucleus of, and draw up rules as to qualifications, examinations, etc., for an Irish Pharmaceutical Society. Such society, when constituted, shall be a perfectly independent body, on a footing equal to the English society, possessing co-ordinate and reciprocal powers with the latter body—that is to say, that while itself independent, members of the English society may practise in Ireland, and members of the Irish body may practise with equal rights in England and Scotland. The new Society will be formed mainly on the basis of the English body, and members of the Governing Council will be elected for three years. With regard to dispensary chemists, the Conservative members of the Committee carried a resolution recommending that in future licences should be required for the compounding and sale of poisons, but by the action of the Liberals a suggestion is made by which those now compounding and dispensing poisons need not take out licences, but that this system shall apply to such chemists as may hereafter wish to dispense such articles. When the report has been presented you will be able to publish its *ipsissima verba*, but it may be added that the bill recommended by the Committee will not be introduced until next session."

The Pharmaceutical Journal.

SATURDAY, JULY 25, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE HOURS OF LABOUR IN PHARMACY.

WE noticed that one of the signs of improvement among pharmacists which attracted the attention of Señor KYLE, during his recent visit to England, was the shorter time daily during which many of them now keep their establishments open. This is in accord with the opinion expressed by the Council of the Pharmaceutical Society in its last Report, that "recently the early closing movement has spread among chemists." But, however gratifying it may be to read these statements, it is subject for regret that the improvement is as yet only a partial one, and it is evident that further efforts will be required before it reaches that degree of prevalence with which pharmacists and their assistants will "rest and be thankful." In the belief that former discussions in this JOURNAL have contributed towards smoothing the path of this reform, its columns have again been opened to one of those bursts of correspondence which are periodically excited by this subject.

Although the questions of the charges which pharmacists should demand from the public, and of the salaries they should pay their assistants, are invariably raised in this discussion, we prefer not to deal with them here, believing that their settlement in each case depends too much upon the individual estimate of the seller as to how much he can get for what he has to sell, and of the buyer as to the price at which he can afford to buy, for such settlement to be ever permanently affected by *ex cathedrâ* utterances.

But the number of hours during which pharmacies should be kept open is so purely a matter in which the interests of employers and assistants perfectly coincide, and, under proper arrangements, are not in conflict with those of the public, that with a body like the chemists and druggists, which, although large, is limited by registration, there must be a possibility of reducing the time of business within reasonable limits. We thoroughly endorse the opinion expressed by the President, Mr. T. H. HILLS, at the Annual Meeting of the Society, in May last, that pharmacists have inflicted these long and tedious hours upon themselves, and that it will be their own fault if the evil is not rectified.

But how? In the first place, it is essential that every member of the body should intelligently recognize the existence of the evil as well as the necessity for its removal, and of himself doing something more than grumbling and bearing it. The acknowledged variation of the circumstances attending the business in different neighbourhoods probably renders adherence to any hard-and-fast line impracticable; but this indicates the necessity for local efforts to arrive at an understanding, rather than that further improvement is hopeless. We think that Mr. CARDELL gives sound advice when he says, "Let some one who takes real interest in the trade, and in the welfare of those engaged in it, canvass the town or neighbourhood in which he lives, and ascertain what the majority wish to be done." We would add to this the expression of a hope that, where such work is undertaken, the volunteer canvasser may not be "assisted" with objections, but may meet with the hearty help and sympathy of those whom he visits.

We are sorry to note that some of our correspondents appear to look to the Legislature as the Jupiter to help the waggon out of the rut. For while respecting the motives of Sir J. LUBBOCK's Bill, and admitting that the principle of State control of the hours of labour has been beneficially applied in factories, we believe that the ever-fluctuating conditions and needs of a retail business would render such interference intolerable, and moreover that it would be evaded by innumerable subterfuges. Neither are we disposed to look with more favour upon the proposal to establish such a Society as suggested by one or two of our correspondents. It could not be hoped that any Society would include nearly all the employers and assistants in the trade; there would probably always be a large proportion of non-members who would ignore or refuse to be controlled by its regulations, and, even if it had more than an ephemeral existence, that would probably be due to its drifting from the purpose for which it was originally formed, into the trades-union, either of employers or employed, which has been generally deprecated.

At any rate, before resorting to such extreme measures, we think it is desirable that a vigorous and sustained effort should be made with the weapon we have at hand,—the exertion of individual personal influence and example.

THE MEETING OF THE MEDICAL COUNCIL.

THE session of the Medical Council, which terminated on Saturday last, was, of course, mainly devoted to business too medical in its bearings for detailed description in these columns; but some few incidents involved a wider interest, and such were those which referred to the British Pharmacopœia and the Adulteration Act.

Dr. PAGET, the President, in his opening address, alluded to the compiling and publication of the "Additions to the Pharmacopœia" as work done since the last meeting, and mentioned that a Report would be presented by the Pharmacopœia Committee. Before that Report was presented, however, a motion on the subject was brought forward by Dr. A. SMITH, embodying a series of fourteen propositions. Their purport was that a Committee of five members should be appointed to prepare a new edition of the British Pharmacopœia, to be ready for publication in January 1877, and that the Medical Council should appoint three of the members of that Committee, and request the Council of the Pharmaceutical Society to appoint the other two, who should be associated, on equal terms, with those appointed by the Medical Council. This Committee was to be authorized to prepare three lists, (1) of such articles and preparations in the British Pharmacopœia as ought to be expunged; (2) of such preparations in the Pharmacopœia as might be modified with advantage; and (3), of articles and preparations to be introduced. It was also to be empowered to employ a chemist, from time to time, to make such investigations as might be deemed necessary. The lists were to be submitted "for discussion in the Pharmaceutical Society, etc., in order to ascertain the opinion of all branches of the profession respecting the propositions of the Committee." The proposed Committee were to make all the corrections deemed necessary for the new edition, subject to the approval of the Medical Council. Dr. SMITH, in support of his motion, said that there was a general feeling that in this country, as in the United States, there should be an edition of the Pharmacopœia published every ten years, and that if so it was not too soon now to enter upon the matter. The motion, however, fell to the ground through not being seconded, after Sir W. GULL had expressed an opinion that it was premature, because, before 1877, "*fui*" would apply to many a now popular remedy. A letter from the Council of the Pharmaceutical Society, enclosing the resolution passed at its last meeting, was afterwards read, but no motion was made respecting it.

The Report of the Pharmacopœia Committee stated that five thousand copies of the reprint of the Pharmacopœia, including the Additions, and ten thousand separate copies of the Additions, had been prepared at a cost of £738 18*s*. 6*d*.; of these nearly one thousand of the former and six thousand five hundred of the latter had been sold, realizing £376 13*s*. 6*d*., and leaving on hand a stock valued at £891 16*s*. The Report recommended that the Pharmacopœia Committee should be re-appointed and consist of five members. This was agreed to, and Drs. QUAIN, BEGBIE, BENNETT, SHARPLEY and SMITH were chosen. Upon the motion of Sir D. CORRIGAN, a resolution was passed requesting the attention of the Committee to the "desirability of correcting, in any future edition of the Pharmacopœia, the approximate solubilities of salts and other substances, under characters and tests, instead of the present indefinite information afforded." Sir D. CORRIGAN said that he experienced occasionally great difficulty in prescribing, on account of the solubility of salts not being fully stated.

A Report from a Committee appointed to consider the Report of the Select Committee of the House of Commons on the Adulteration Act in connection with qualifications in State medicine and public health, was received and adopted. The views of the Committee were set forth in a series of resolutions to the following effect:—

(1) That no one should be eligible for the office of public analyst unless he be possessed of a certificate granted by an examining board of competency in analytical chemistry, in the use of the microscope, and such other subjects as the Medical Council shall from time to time determine, or a qualification as an officer of public health, which shall include these subjects. (2) That the office of public analyst may be held separately, or in conjunction with that of an officer of health. (3) That it is desirable that the granting of such qualifications should not be confined to any single examining board, but that one or more examining bodies for that purpose should be established in England, in Scotland, and in Ireland. (4) That the Medical Council should have authority to define the course of instruction and the examination required for the said purposes, and to publish a list of the bodies which comply with the conditions laid down. (5) That it is desirable that it should be made lawful that the qualifications of public analyst and of officer of health should be entered on the Medical Register as additional qualifications when the holder is already a registered medical practitioner.

It was resolved that a deputation from the Medical Council should be appointed to obtain an interview with the President of the Local Government Board for the purpose of conferring on the subject of the above resolutions.

MR. SIMON'S ANNUAL REPORT ON THE PUBLIC HEALTH.

WITHIN the last few days, the report of Mr. SIMON as Medical Officer of the Privy Council and Local Government Board has been issued. Notwithstanding that the year 1873, to which it refers, was a "period of official and administrative transition," consequent upon the Acts of Parliament of 1871 and 1872, which militated against a comprehensive report on the subject, it contains much valuable matter, not the least important being a sketch of the purpose which Mr. SIMON thinks the reports under the Act of 1858 must in future be expected distinctively to fulfil. Mainly, this is the exposition of the knowledge which the Local Government Board, through its department of sanitary inquiry, obtains with regard to the practical effect of the laws which are in force for the prevention of disease throughout England.

The year is especially noteworthy in that, by the appointment of health officers under the Act of 1872, the medical profession, for the first time, was brought into official use with a view to the better prevention of disease. Several local inquiries were made in cases of much sanitary interest, and others have been devoted to an examination of the sanitary conditions under which certain industries are now carried on. The steps taken to ward off the approach of Asiatic cholera, which in the latter half of the year 1873 was prevalent in many parts of the Continent, are referred to, and it is stated that three times in the Thames, twice at Liverpool, and once at Swansea, the local arrangements were tested by infectious arrivals. One of these cases will illustrate what London probably owes to the prompt action of the health authorities. A ship from Hamburgh landed at Blackwall 82 emigrants in destination for New Zealand, apparently in good health. Immediately afterwards, whilst waiting reshipment in some lodging-houses in Whitechapel, it became evident that cholera was among them. Notice having been given by a local practitioner, the health officer of the port, Mr. Henry Leach, with the co-operation of the emigration agent, had the emigrants collected and isolated on board the hospital ship "Rhin," where the disease developed in 28 cases, and there were eight deaths.

We notice that nothing is said in this Report as to the relation of the Adulteration Act to the public health, and it may account for some of the confusion which has attended this piece of domestic legislation that the official probably best qualified to give advice on the subject does not appear to have been consulted.

ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

In the week succeeding that in which the British Pharmaceutical Conference is to gather in London, the British Medical Association is to hold its forty-second annual meeting at Norwich. The proceedings are to commence with a service in the Cathedral, on Tuesday morning, August 11th, and to wind up, on the following Saturday, with excursions to geological and botanical stations and places of antiquarian and general interest, in Norfolk and Suffolk. A Museum will be formed in the Assembly Rooms, for the exhibition of the latest inventions in medical and surgical instruments and appliances, pathological specimens, new chemicals and drugs and their preparations, new articles of diet, etc. Sir William Fergusson, Bart., F.R.S., is President of the Association, and Edward Copeman, M.D., of Norwich, the President-Elect.

THE PROFESSORSHIPS AT THE YORKSHIRE COLLEGE OF SCIENCE.

At a meeting of the General Council of the Yorkshire College of Science, held last week, Mr. A. H. Green, M.A., late Senior Fellow of Gonville and Caius College, Cambridge, was elected Professor of Geology and Mining, and Mr. A. W. Rucker, Fellow of Brasenose College, Oxford, as Professor of Physics and Mathematics. The appointment of a Professor of Chemistry is to be made to-day (Friday).

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

The following is the result of the Preliminary Examination, held on the 6th inst :—

ENGLAND AND WALES.

Three hundred and twelve candidates presented themselves for examination, of whom *one hundred and fifty* failed. The following *one hundred and sixty-two* passed, and have been duly registered as "Apprentices or Students":—

FIRST DIVISION.

	Whigham, Robert Laing	Cardigan.
	Scott, Jeffers Wilson	Douglas.
	Crompton, Henry	Bury.
	Tipping, William Thomas	London.
	Thomas, John	Crosswell.
Equal.	Hern, John	Plymouth.
	White, Charles	Southborough.
Equal.	German, Frederick Francis	Burslem.
	Williamson, James	Ash.
Equal.	Beacock, Joseph Henry	Barton-on-Humber.
	Roberts, Frank Nixon	Woburn.
	Goodchild, Alfred Clarke	London.
	Crompton, Alfred, junr.	Bury.
	Pink, James Henry	Ford.
	Morgan, William	St. Clears.
Equal.	Ashton, Charles Sampson	Yeovil.
	Austin, George Leonard	Ashford.
	Parsonson, Thomas	Wath-upon-Dearne.
Equal.	Cooke, Samborne	Nottingham.
	Harding, Sarah Margaret	Birmingham.
	Goss, Sidney George	London.

SECOND DIVISION.

	Marshall, Joseph Jewison	Beverley.
Equal.	Crawley, John	Wotton-under-Edge.
	Emmerson, George John	Barnes.
	Jones, Henry	New Milford.
Equal.	Allen, Samuel	Worcester.
	Tod, John	Coventry.
	Torrance, John Turnbull	Uttoxeter.
	Jones, William Parry	Everton.
Equal.	Bush, Arthur	Barnes.
	Morris, Humphrey	Dolgelly.
Equal.	Beadle, Joseph	Stockton-on-Tees.
	Peters, Leonard George	Tunbridge Wells.
Equal.	Hunter, William Sisson	London.
	Williams, Samuel Roskelly	Devonport.
Equal.	Nason, Edward	Birmingham.
	Petter, Walter	Newport, Mon.
	Remfry, Samuel Alfred	London.
Equal.	Raynes, Sidney Herbert	London.
	Thornley, Frederick	Devizes.
	Williams, Morris James	Aberayon.
	Tozer, Frederick Early	Maidenhead.
Equal.	Barker, Charles	Taunton.
	Llewellyn, David	Cilcerin.
	Pyefinch, John	Shrewsbury.
	Shepley, Frederick Thomas	Peckham.
	Wilkins, Frank	Norwich.
	Wilkinson, William Halse	London.
	Williams, Thomas	Llwynpiod.
	Carr, John Allen	Lancaster.
Equal.	Scarborough, Henry Willson	Grantham.
	Tibbits, James Reginald	Rugeley.
Equal.	Davies, Thomas	Bridgend.
	Rees, John	Maesteg.
Equal.	Roberts, G. W.	Manchester.
	Withers, Oliver	Manchester.
	Richards, Philip	Bury St. Edmunds.
Equal.	Charters, John	Workington.
	Cordiner, Richard	Heslerton.
	Fryer, Harry	Leeds.
	Newton, Rupert William	Kenilworth.

Hodgson, Ralph, ...Brixton.
Equal. Calvert, Arthur ....Thornton.
Clarke, Ethelbert ....Maidstone.
Dods, John Henry ....Market Deeping.
Fielder, Arthur Buckley ....Winchester.
Clement, George .. ..Swansea.
Equal. Branson, William Mitchell......West Hartlepool.
Gill, Sutton Dudley....................West Bromwich.
Howard, Wilkins Rigg ....Burnley.
Linscott, Samuel ....Leeds.
Hutton, Harry ....Warwick.
Equal. Hildyard, William....................Woodbridge.
Megginson Charles William ...Driffield.
Dester, Dester ....Warton.
Equal. Foster, William....................Whitehaven.
Whittles, John Dencer..............Birmingham.
Gibson, George Edward ....Hull.
Equal. Eckersley William Henry ....Oldham.
Hayes, Frank....................Gainsborough.
Hoare, William Parker ....Cirencester.
Hodgson, Albert ....Harrogate.
Plumer, William Cork..............St. Albans.
Potts, Walter....................Oldham.
Rose, Charles....................Birmingham.
Tidswell, Frederick ....Bradford.
Tock, John Thomas ....Louth.
Ward, Josiah ....Brighton.
Willett, Algernon John ....London.
Equal. Cowgill, Benjamin Rangdale ...Bingley.
Thomas, Henry ....Merthyr Tydvil.
Equal. Mushens, Robert Heslop ....Sunderland.
Parker, William ....Derby.
Thompson, John Tatham..........Scarborough.
Norton, Alfred James ....Swansea.
Equal. Clough, Alfred ....Northwich.
Morris. Caleb Gwion....................Saint Clears.
Orry, John George....................East Kirkby.
Equal. Allen, John....................Hyde.
Daulton, Jesse ....West Keal.
Lodge, George Henry ....Rotherham.
Equal. Newton, Frederick Harriss ....Trowbridge.
Owen, Henry William ....Gravesend.
Bilson, Frederic Estall ....Newark.
Buchan, John Greig. ....London.
Equal. Ackerman, Henry ....Chipping Sodbury.
Alpe, Robert Bird....................East Dereham.
Bates, Frederic William ....Crowle.
Beaulah, William ....Manchester.
Beech, Joseph, junr. ....Birmingham.
Belsher, Robert Aitkin..............St. Helen's.
Blewett, Edward ....Penzance.
Bovill, Edmund.................... Whitby.
Budden, Frederick .... Bootle.
Bunting, Herbert ....Nottingham.
Burman, George Alfred ....Towcester.
Butters, Robert ....Leeds.
Cook, Stanley ....Turnham Green.
Culley, Charles ....Leicester.
Eccles, Robert Burton ....Brigg.
Feaver, William ....Truro.
Felce, Harry Foster ....Norwich.
Gell, Henry ....Douglas.
Gregson, Robert ....Manchester.
Hughes, Benjamin Longmore...Chichester.
Jessup, Robert Markham..........Manchester.
Jones, James ....Newcastle Emlyn.
Leicester, Thomas....................Chester.
Lonnon, Frederick ....Plymouth.
Mackenzie, Thomas Daniel......St. Helens.
Mather, John Henry ....Newcastle-on-Tyne.
Morgan, John Daniel ....Swansea.
Murray, William Henry ....Surbiton.
Palmer, Richard Mawn .. ..Swaffham.
Parks, Henry....................Stoke-on-Kent.
Pickles, George William ....Bradford.
Powell, William.... ....Swansea.
Equal. Radford, Matthew....................Sutton-in-Ashfield.
Richards, Edwin ....Oldham.
Roberts, George ....Dalston.
Rogers, Charles ....Nottingham.
Searle, Samuel ....Newton Abbot.
Smith, Joseph ....Sneinton.
Stafford, Owen ....Hyde.
Steer, William ....Plymouth.
Taylor, Thomas....................Walton-on-the-Hill.
Ward, Thomas William ....Towcester.
Wheeler, Joseph ....Chatteris.
Wilde, Frederick ....Macclesfield.
Williams, Edwin ....London.

SCOTLAND.

Forty-three candidates presented themselves for examination. Of these *fifteen* failed. The following *twenty-eight* passed, and have been duly registered.

FIRST DIVISION.

Stewart, Donald ....Forres.
Caven, William Alexander ......Dalbeattie.
Adams, John ....Glasgow.
Equal. Bremner, James ....Aberdeen.
Edward, John Hutchison..........Edinburgh.
Dickson, William ....Kirriemuir.
Purves, Peter....................Edinburgh.
Smith, Andrew Lees...... ....Selkirk.
Taylor, Robert Allan ....Glasgow.
Charteris, Thomas.. ....Dumfries.
Fowlie, John....................Turriff.
Walker, James ....Auchmull.
Brown, William .... Middlesborough.
Findlater, William Gammie......Aberdeen.
Porteous, Arthur Alexander ...Kirkwall.
Wilson, Peter .. ..Edinburgh.
Dick, James Stewart. ....Edinburgh.

SECOND DIVISION.

Maitland, John....................Aberdeen.
Drummond, John Alexander ...Elgin.
Maxwell, William ....Glasgow.
Easton, John....................Moffat.
Waldie, Robert....................Innerleithen.
Fairlie, John, jun....................Glasgow.
McAllay, Robert ....Edinburgh.
Carruthers, Robert ....Dumfries.
Jouves, Robert....................Edinburgh.
Glen, Robert....................Greenock.
Lyle, W. R. T. ....Edinburgh.

The following is a list of the Centres at which the Examinations were held, with the numbers of Candidates annexed :—

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberystwith......	3	3		Doncaster.........	1	1	
Berwick	2		2	Exeter	3	1	2
Birmingham......	22	9	13	Hull	12	6	6
Boston	4	3	1	Leamington	2	2	
Brighton	1	1		Leeds	14	8	6
Bristol	5	4	1	Leicester	4	1	3
Cambridge	7	1	6	Lincoln............	5	2	3
Canterbury	3	2	1	Liverpool	16	6	10
Cardiff	7	4	3	London............	58	23	35
Cardigan	5	3	2	Lynn...............	1		1
Carlisle............	3	2	1	Macclesfield	3	2	1
Carmarthen	5	4	1	Manchester	22	13	9
Carnarvon.........	2		2	Newcastle.........	6	3	3
Cheltenham	2	1	1	Norwich	7	4	3
Chester............	5	2	3	Northampton ..	4	2	2
Colchester.........	2	2		Nottingham	11	6	5
Darlington	7	2	5	Oxford	1		1

	Candidates. Exa-mined.	Passed.	Failed.		Candidates. Exa-mined.	Passed.	Failed.
Peterborough ...	4	1	3	Southampton ...	1	1	
Plymouth	7	5	2	Stafford	6	3	3
Portsmouth	2	1	1	Swansea	6	4	2
Preston............	7	2	5	Taunton	2	2	
Reading	2	1	1	Truro	2	2	
Scarborough......	2	2		Worcester.........	5	1	4
Sheffield	6	2	4	York...............	2		2
Shrewsbury	3		3				

SCOTLAND.

Aberdeen 10	6	4	Glasgow 11	5	6
Dumfries 5	4	1	Inverness 2	2	
Dundee......... .. 3	1	2	Perth 1		1
Edinburgh 11	10	1			

FIRST OR PRELIMINARY EXAMINATION,

JULY 6, 1874.

Time allowed: three hours.

SPECIAL INSTRUCTIONS TO CANDIDATES.

The attention of candidates is invited to the following points:—

The method of conducting these examinations is arranged essentially for the convenience of candidates generally throughout the country.

It is, however imperative that they should be conducted with strict impartiality and honesty, and candidates are requested to comply in every respect with the required regulations, and assist the Superintendent in securing faithful results.

The least infringement may imperil not only the paper of the individual offender, but also that of every other person present.

The regulations will be read aloud by the Superintendent.

One side only of each sheet of paper is to be written on; the reverse side may be used for scribbling and calculations, but no other scribbling paper or blotting paper is allowed to be used.

In framing answers, candidates should not enlarge upon the questions, but confine themselves to giving, as briefly and clearly as they can, the information required.

LATIN.

N.B.—*Candidates are not required to translate more than two paragraphs, and are recommended to select either Nos.* 1 *and* 2, *or Nos.* 3 *and* 4.

1. Nam. etsi sine ullo periculo legionis delectæ cum equitatu prælium fore videbat; tamen committendum non putabat, ut, pulsis hostibus, dici posset, eos ab se per fidem in colloquio circumventos.

2. Qui suum timorem in rei frumentariæ simulationem angustiasque itinerum conferrent, facere arroganter; quum aut de officio imperatoris desperare, aut ei præscribere viderentur.

3. Macera per horas quatuor in vase operto prope ignem; dein Semen exime, et contunde in mortario lapideo; contusum liquori redde. Tum decoque ad octarios quatuor, et liquorem adhuc calentem cola. Denique ad idoneam crassitudinem consume.

4. Probe commisceantur. Indatur nari ex quâ sanguis stillat, turunda ex linteo raso, humectata hoc liquore et relinquenda illic per dies duos.

5. State the genitive plural of "ovis, canis, ovum, pes, flos, and urbs."

6. What cases do the following verbs take? "Oportet, pudet, curo, debeo, dico, doceo, muto."

7. Parse "Mihi negligenti esse non licet."

ARITHMETIC.

8. The charge for carrying the mails by railway to Birmingham is £28 4*s.* 4*d.* per day, how much is this in 365 days?

9. Add together $\frac{3}{5}$, $\frac{7}{8}$, $\frac{9}{10}$, and $\frac{7}{32}$ both as vulgar fractions and as decimals, and show that the results agree.

10. What is the cost of a box which measures 6ft. 8in. long, 3ft. 9in. wide, and 3ft. deep, at 1*s.* 9½*d.* per cubic foot?

11. If 18 men can dig a trench 30 yards long in 24 days by working 8 hours a day, how many will dig a trench 60 yards long in 64 days, working 6 hours a day?

ENGLISH.

12. Add *able* to change, cure, dispute, charge.
 ,, *ly* to due, safe, wide, true.
 ,, *ed* to prefer, limit, offer, fulfil, stem.
 ,, *ment* to judge, refine, argue.

13. Parse the following:—

"Man's inhumanity to man
Made countless thousands mourn."

14. Write from fifteen to twenty-five lines on one only of the following subjects:—

Printing.
Universal Suffrage.
Happiness.

Provincial Transactions.

IRISH ASSOCIATION OF CHEMISTS AND DRUGGISTS.

A meeting of the above Society was held in the Society's rooms, Molesworth Street, Dublin, on Monday evening, the 20th inst., Professor Tichborne, V.P., in the chair. Several new members having been proposed, the Hon. Secretary, Mr. Hayes, proceeded to read the evidence given by him before the Select Committee of the House of Commons. Mr. Hayes' evidence was very much approved by the meeting, and a cordial vote of thanks was passed for his zeal and energy in the interests of the Society. After some conversation on the position of the Chemists and Druggists in connection with the proposed change in the pharmacy regulations of the country, Mr. Holmes said that he had come prepared with a motion, which he thought would meet the unanimous support of the Society. The motion was as follows:—

"That this Society approves of the extension of the English Pharmacy Act to Ireland as a fair and satisfactory settlement of the pharmacy question, with these provisoes:—

"1. That all at present engaged at the business, whether on their own account or not, be entitled to register themselves as Chemists and Druggists.

"2. That all at present engaged at the business, whether on their own account or not, be allowed to compound prescriptions and become members of the Pharmaceutical Society by passing the Modified examination.

"3. That a branch of the Society be established in Dublin similar to the one in Scotland."

Mr. Greenfield had great pleasure in seconding the resolution. A conversation took place on the subject, and several of the members considering the motion premature, inasmuch as it would be better to wait and see the report of the Select Committee, Mr. Holmes withdrew the motion for the present. After some further business connected with the financial affairs of the Society, the meeting adjourned.

Parliamentary and Law Proceedings.

ALLEGED ADULTERATION OF NATAL ARROW-ROOT.
DISMISSAL OF SUMMONS.

On Wednesday, July 8, Messrs. Johnson and Woolrich, chemists, of Uttoxeter. attended at the Uttoxeter Police Court, in answer to a summons issued at the instance of Mr. M. Richards, inspector under the Adulteration of

Food Act, for having sold two ounces of arrowroot as pure, which Mr. Scott, one of the county analysts, had pronounced to be adulterated with starch other than that of true arrowroot. On a previous occasion, the accuracy of the analyst's deductions was disputed on behalf of the defendants, the certificates of three other analysts (who, the defendants alleged, had been supplied with specimens from the same bulk) being submitted, all of which stated that the article in question was pure and good in quality.

The Bench, of course, could not accept these latter certificates as evidence, but under the circumstances they agreed to the remaining portion of the arrowroot bought by the inspector being submitted to Dr. Voelcker, the analyst of the Royal Agricultural Society, Lord Waterpark undertaking to deliver the sample. Dr. Voelcker's certificate was now produced, and was to the following effect:—

"11, *Salisbury Street, London,*
"*June* 20, 1874.

"My Lord,—I beg to enclose a copy of an analysis of the sample of arrowroot which your lordship sent me. It is pure arrowroot, and, like all arrowroot, consists of starch, with scarcely a trace of gluten and mineral matter.

"COMPOSITION OF SAMPLE OF ARROWROOT SENT BY LORD WATERPARK.

"Moisture	11·28
Starch	88·69
No gluten	
Mineral Matter	·03
	100·00

(Signed) "AUGUSTUS VOELCKER."

The Bench at once dismissed the case.

ACTION AGAINST A CHEMIST AND DRUGGIST FOR SUPPLYING A WRONG MEDICINE.

At Barnstaple, on Tuesday, the 14th July, an action was brought in the County Court by William Rice, of West Buckland, farmer, against John Hames, of Boutport Street, Barnstaple, chemist, for £2, claimed as the value of a dog alleged to have been poisoned by a deleterious drug improperly supplied by defendant as medicine. The case had been before the court on two previous occasions, and was adjourned in order that an analysis of the medicine might be made. Mr. J. A. Thorne was for plaintiff, and Mr. R. I. Bencraft for defendant.

Mr. Thorne explained that the case had been brought to a standstill on the last occasion by the absence of Mr. Curtis, the chemist, who had made an analysis, but who did not wish to appear against a brother tradesman. He was now furnished with the evidence of a most unexceptionable scientific witness. The first witness was Chapple, the rural postman between Barnstaple and West Buckland, who deposed that on the 24th day of February last, after returning from West Buckland, he went into the shop of the defendant, in Boutport Street, for something for the plaintiff to cure the distemper in a dog. He had forgotten the name of the drug he was to ask for, and had lost the ticket, but it was threepenny-worth of some mineral, and defendant gave him a little packet, for which he paid 3*d*., and took it the next day to plaintiff, who, on opening it, said it was not the right thing, and gave it to him back again, with a note bearing upon it the name of what was wanted, which was Turpeth mineral. He took back the former packet, and gave it with the note to the defendant, who gave him a packet labelled "Turpeth, mineral—Poison," which he took and delivered to plaintiff next day. Some time afterwards he took the same packet, with some of the stuff in it, and left it with Mr. Curtis, druggist, on the Strand.

William Rice, the plaintiff, deposed that he received the packet brought on the second day by the last witness, and administered a portion of the contents of it to a dog which was suffering from distemper. This was on the Sunday. After taking it, the animal seemed to be in great pain, and died on the following day. It was a valuable dog, a cross between a spaniel and a terrier, and he considered it worth £2. He had administered turpeth mineral a great many times, and always with good effect until this occasion. Went to see the defendant, and asked him to pay for the dog, which he refused to do. He told him he had sent him the wrong article. Defendant asked him to show him what he had left of it, but he would not do so, although he had it in his pocket. Defendant refused to show it him, because he thought he would perhaps keep it. Afterwards submitted it to Mr. Curtis, and also to Mr. Blyth. Gave the dog the same dose he had often given before, which was about a third of the 3*d*. worth. In cross-examination by Mr. Bencraft, witness said the first packet was not properly labelled. He opened it, and saw that it was not the thing he wanted. It was a black powder, and he returned it, and sent for turpeth mineral on a written note. Had not given the dog anything else, nor sent to Dr. Jackman for anything.

Mr. Alexander Winter Blyth was then called, but declined to be sworn until he had been paid his fee, which, as a scientific witness, his Honour said he had a right to require to be prepaid. Asked what his fee was, Mr. Blyth said two guineas, and the amount was handed to him after some little hesitation. He deposed that he was public analyst for the county of Devon. On the 8th of July there was a packet delivered to him by the Rev. J. H. Coplestone, rector of West Buckland, the contents of which he was requested to analyse. It was a red powder, labelled, "Turpeth mineral—Poison." He had analysed it, and found it to be red oxide of mercury, commonly called red precipitate. Turpeth mineral was a different thing altogether. That was a sub-sulphate of mercury. Had had experience in the treatment of dogs. Turpeth mineral was a very common medicine for the cure of distemper. Both red precipitate and turpeth mineral were poisons, but he would not say equally dangerous. They might both be called irritant poisons. A very small portion of either would produce sickness, but a large dose of red precipitate would infallibly produce death.

His Honour asked Mr. Thorne how he proposed to prove that the powder analysed by Mr. Blyth was the same as sold by the defendant.

Mr. Thorne said he was in some difficulty, as the clergyman of West Buckland, who had handed it to Mr. Blyth, was not present. But he proposed to send for Mr. Curtis, who had some of the powder from the postman, and who, he had no doubt, would attend under the circumstances.

The case was deferred for a while for Mr. Curtis's appearance. On his arrival it was resumed. On his going into the box to be sworn, Mr. Thorne asked him if he also required to be prepaid his fee; to which he replied that he did not—he would "trust in Providence" for it. The witness said he had received a packet from the postman, and had examined the substance it contained, which certainly was not turpeth mineral. He analysed the powder, roughly in the first instance, and afterwards more carefully, and found it to consist of red oxide of mercury or red precipitate—altogether a different substance from turpeth mineral. Turpeth mineral was the ordinary medicine administered to dogs suffering from distemper, for which, indeed, it was a specific. Red oxide of mercury was not a proper medicine to administer: a considerable dose of it would be sure to kill. Thirty grains of turpeth mixture would be sold for 3*d*. You might administer 15 grains to a large dog, but 10 grains would be the dose for an ordinary dog, which would be one-third of 3*d*. worth. Fifteen grains would not kill. In cross-examination by Mr. Bencraft, the witness said he certainly should not sell a quarter of an ounce of turpeth mineral for 3*d*. Had never known more than 30 grains sold for that price. A dose of 15 grains would not kill. He should call turpeth mixture an irritant poison. He should say there might have been 30 grains in the packet. A third of 30 grains of red precipitate would not kill, but a third of two drachms would certainly kill in one or two days.

In answer to his Honour, Mr. Thorne said he must put aside the evidence of Mr. Blyth, and rely on that of Mr. Curtis, who received the powder from the postman's hands.

Joseph Vickery was called to prove the dog was worth £2.

This was the case for the plaintiff.

Mr. Bencraft addressed his Honour for the defence, and contended that the charge was not made out that the death of the dog arose from want of due care on the part of his client. In all probability the cause of death had been an overdose of the medicine, administered by unscientific hands. He called in evidence the defendant, Mr. John Hames, who deposed that the witness Chapple came to his shop, accompanied by another rural postman called Cowell, and asked for something, he did not know what, for he had lost the paper, but that it was a mineral, and was for the cure of distemper in dogs. Witness suggested Ethiop's mineral, and he said he thought that was it. It was a preparation of mercury and sulphur, and witness was in the habit of selling it as a dog medicine. Witness gave him ¼ oz. of it for 3*d*., and wrote on the packet "Ethiop's mineral." He did not add the word "poison," because it was not required for that article. The next evening the postman brought it back and said it was the wrong powder, and he had a ticket with him with the name of "Turpeth mineral" upon it. Accordingly he gave him 3*d*. worth of that article from a bottle he had bought with the stock of a chemist called Weeks, in this town, several years ago, and which was labelled "Turpeth mineral for dogs." He gave him ¼ oz. of that mineral, and labelled it, as had been seen, "Turpeth mineral—Poison." He had used it the last six years, and had never had it complained of—on the contrary, he had known of its beneficial effects as a medicine for dogs in distemper. Some time after the plaintiff called on him, and said he had come about the dog. Witness asked, "What dog?" He said, "The dog you killed. I want £2 for it." Plaintiff had stated in his evidence that he had not shown him the remainder of the powder; but that was not true—he had shown him what remained in the same paper which he (witness) had sent out, and had given him a portion of it, which he had compared with the contents of his bottle. It was turpeth mineral, and he had for the last six years sold it as such.

His Honour said it would be important to show whether the powder which was brought back by Rice was the same with that in the bottle in defendant's shop. After some conversation on the point, defendant was desired to go for his bottle of the article, and the Court in the meantime heard another case. On Mr. Hame's return after a short time he produced the bottle. (He had before produced to his Honour the portion of the powder he had received back from Rice, as well as a sample of red precipitate.)

The witness continued his evidence:—What he had supplied the postman he had taken out of that bottle. Ethiop's mineral was mercury and sulphur. He gave that article because he thought it safer for the purpose, for he did not like to sell poison to a customer when he did not know exactly what he wanted. The postman brought it back to him the next day, and he put it back into the bottle. He believed his bottle of turpeth mineral to be a somewhat impure sample of the article. It was turpeth mineral, but it was not thoroughly washed. It was precisely as he received it from the chemist whose stock he had bought off.

His Honour said the question was, as the customer had applied for turpeth mineral, was the article sold by the defendant a fair average compliance with the order?

Mr. Blyth was recalled, and said that turpeth mineral was basic sulphate of mercury. He could not agree with defendant that the contents of the bottle might be an impure sample of turpeth mineral, unless he tested it by analysis. The colour was different, but that, of course, determined nothing.

Mr. Hames said the colouring matter did not essentially vary the chemical properties of the article.

His Honour asked Mr. Blyth if he could analyse a sample of the contents of the bottle; to which he replied in the affirmative: he could get it done in an hour or an hour and a-half. A sample was therefore given to Mr. Blyth by the defendant, and he retired to make his analysis, the Court taking some other cases in the interval. After an hour or two Mr. Blyth returned, and the case was again resumed.

Mr. Blyth said he had analysed the sample given him by defendant from the bulk, and found it to be what was commonly called red precipitate, the technical name for the article being red oxide of mercury. It was exactly the same with the sample given him by the clergyman of West Buckland. It did not contain one particle of basic sulphate of mercury, which was turpeth mineral. It followed that turpeth mineral was wholly wanting from the article sold.

His Honour: Was the supplying of the article a substantial compliance with the order? or is it substantially a different article?

Witness: Absolutely different—different altogether. (Taking the label into his hands.) It should have been labelled "red precipitate." It is entirely another article.

His Honour was about to give judgment; when Mr. Bencraft said he should wish to call evidence as to the value of the dog, which had been greatly over-estimated by the plaintiff. He called Robert Cure, who said he had been a dog-fancier all his days, and that the value of the dog as a mongrel, judging from the description given of it, was 4*s*. or 5*s*.

His Honour, in giving judgment, said the article supplied by the defendant to the order of plaintiff was in no way whatever identical with the commodity asked for. If a person went into a chemist's shop, and requested to be served with a certain article, and it turned out that the article supplied to him was one of essentially different properties, the chemist must be held liable for the consequences of his mistake. At the same time he felt bound to state his full belief that Mr. Hames supplied the commodity precisely as he had bought it, and that he had been for years selling the article in good faith, supposing it to be what it had turned out not to be. As to the value of the dog, it had probably been as much over-estimated on one side as under-estimated on the other. His judgment was for 30*s*. for the value of the dog, and the costs, including those of witnesses.—His Honour begged the samples before him might be taken away, adding archly "that he had no wish to *take* them."—*North Devon Journal.*

Poisoning by a Vermin Killer.

An inquest was held at Bradford, on Friday, July 17, respecting the death of Ada Bolton, who died on the previous day from the effects of poison administered by herself.

Evidence was given that the deceased was seen to mix with some beer a white powder which she said was a "purging powder," and afterwards drink the mixture. One witness said that her conduct on the previous day had led her friends to think something had gone wrong with her; but that she had had four teeth drawn some two years ago, when "gas" was administered to her, and that since that time she had occasionally conducted herself strangely, and had said that the "laughing gas" had affected her head.

Dr. Ellis saw the deceased in bed. She was then suffering from violent tetanic spasms, which continued uninterruptedly for thirteen minutes, when she died. He asked her what she had taken, and the only words she uttered were "vermin killer." The symptoms were those of poisoning by strychnine. In answer to a juror, Mr. Ellis added that it was just possible for a highly nervous person to be slightly affected by nitrous oxide gas, administered in the process of tooth-drawing.

Phœbe Stephens stated that on the Bradford Fair Saturday, at the request of the deceased, she went with her to the shop of Mr. Parker, druggist, Leeds Road, and bought a sixpenny packet of vermin killer. *Neither of them was asked to sign a paper;* but the druggist told them it was poison. Deceased said she wanted it to kill rats with, and witness had no idea that she intended to do anything else with it.

After a long consultation the jury returned a verdict, "that deceased committed suicide by poison while in a state of temporary insanity."—*Bradford Daily Telegraph.*

Notes and Queries.

[406.] SOLUTION FOR BLOWING SOAP-BUBBLES.—*G. C. L.* asks for a formula for making a good solution for exhibiting the coloured rings, etc. The following will supply his want :—

Take of :

Marseilles Soap (cut in thin slices) .	1 part.
Distilled water	40 „

Dissolve with heat, and when cold, filter the solution.

Take of :

The above solution	3 parts.
Glycerine	2 „

Put them into a bottle and mix them by continued shaking, then leave it at rest. The mixture which at first is clear becomes turbid, and separates into two parts; the lower of which is clear, and this is to be separated for use. Bubbles blown with this solution will remain unbroken for hours or even for days.

Review.

ILLUSTRATIONS OF THE PRINCIPAL NATURAL ORDERS OF THE VEGETABLE KINGDOM; prepared for the Science and Art Department of the Council of Education. By Prof. OLIVER, F.R.S., etc. London: Chapman and Hall, 1874.

This work has long been expected, and will now be eagerly welcomed by science teachers and students. It has long been felt to be a desideratum in botanical literature that we have had no work the object of which should be to give in a short space, and in as few words as possible, the leading characters of each of the principal natural orders of plants. This plan has been admirably carried out in the volume before us, and the description of the greater number of the orders is further illustrated by a large plate, plain or coloured, representing the structure of the flower, fruit, seed, or other organ which presents distinguishing characters. A few lines are also given to the distribution and uses of the orders, the more important medicinal or economical plants belonging to it being named in each case, and, in the case of the larger orders, the characters of the tribes or suborders are also given. Special pains have been bestowed on those orders which often present such difficulty to the beginner, the Compositæ and Grasses. The work is intended for students of European and especially of British botany; the extra-European orders having no plates and much shorter descriptions devoted to them, and in the case even of some interesting orders, as Dipterocarpeæ, Gnetaceæ, Balanophoraceæ, etc., none at all. We might indeed well have spared the diagrams and plates of such orders as Droseraceæ, Frankeniaceæ, Halorageæ, Lemnaceæ, etc., to have made room for much more important ones, as Cycadeæ, Proteaceæ, Menispermaceæ, Melastomaceæ, Scitamineæ, etc. Defects of omission are, however, the only ones which it is possible to allege against the work. It is most valuable to the student, and absolutely indispensable to the teacher.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

SCAMMONY.

Sir,—I see from the Pharmacopœia that after exhausting the scammony with ether the residue should be "chiefly soluble gum with a little moisture." Mr. Brown says Prof. Attfield's analyses (after exhausting the resin) "show 20 or 24 per cent. of extraneous matters, as chalk, starch, or flour, earth, moisture, etc." Will Mr. Brown be kind enough to inform me whether the gum in scammony is to be considered as an extraneous substance? or does he agree with Mr. Piesse that the gum is dissolved out by the spirit or ether used to extract the resin, so that the residue will contain only the above impurities?

Mr. Piesse increases the difficulty by saying that gum and gum-resin are the same things, and that after removing the resin from scammony there would be no gum in the residue; also about the residue, he says in one place, it would consist of "vegetable tissue and so on," and in another place he would expect to find about 20 per cent. of bark, scraped off with the exuded scammony, and his answer to the next question is that the 20 per cent. would not be bark, but *foreign substances*, not actual scammony resin.

I therefore gather from Messrs. Brown and Piesse that gum is a *foreign substance*, and not a *natural constituent* of scammony, but the Pharmacopœia leads me to suppose the contrary is the correct view.

My only object in thus troubling you is to get at the true state of the case.

W. G. GORDELIER.

Sittingbourne, July 16th, 1874.

Sir,—One cannot but admire the eclecticism of Mr. Brown's persistent maintenance of the 90 per cent. standard for scammony. It would be well if every chemist could satisfactorily reply to a humorous remark I once heard a customer make,—"I suppose all your goods are 'Opt.'" But in other matters than things pharmaceutical, the error is often made of confounding the ideal of excellence, the attainment of which should be every man's ambition, with the standard of judgment to which all men must submit. It is to be hoped that reaction will never go so far as to deprive an accused Englishman of his supposed right to the benefit of a doubt; on which principle he is palpably entitled to be judged by the lowest standard which can be called genuine. Prof. Attfield showed his common sense by quoting the lowest authoritative standard of the Pharmacopœia. It is one thing to purge our own store by the highest standard, but another thing to ask the policeman to take the same standard into our neighbour's.

I am neither an advocate for adulteration, nor an admirer of second qualities, but only a lover of justice, which, in the recent prosecution, did not need the tempering of mercy (so far as the evidence went) to acquit the accused.

HENRY H. POLLARD.

140, *High Street, Ryde, I. W., July 20th.*

THE IRISH PHARMACY QUESTION.

Sir,—In your Editorial Notes on the Irish Pharmacy Question, in the PHARMACEUTICAL JOURNAL of the 18th inst., you conclude a *résumé* of Mr. Mackay's evidence before the Select Committee on the Apothecaries' Licenses Bill, thus:—"If a body of pharmacists were provided for Ireland, he would advise the apothecaries to stick as closely as possible to medical practice, and leave the sale of drugs and dispensing of medicines to the class specially educated for that purpose."

While recognizing, with profound thankfulness, Mr. Mackay's no doubt well-meant advice, will you permit me, in the hope of removing some misapprehensions, to state briefly a few indisputable facts?

1. The licentiate apothecaries in Ireland are "the class who, hitherto, have been specially educated for the dispensing of medicines and the sale of drugs."

2. A very large number of Irish apothecaries confine their attention entirely to the practice of pharmacy; they are, in fact, pharmaceutical chemists.

3. Very few of them, indeed, practise medicine on the strength of the licence of the Apothecaries' Hall alone; those who do so, in nearly every instance, possess a qualification from some other medical or surgical licensing body.

I may be allowed to mention my own case as an extreme illustration. I possessed qualifications in medicine, surgery and midwifery; but preferring, for private reasons, to practice pharmacy only, I had to take the licence of the Apothecaries' Hall also to enable me, among other things, to obtain a public appointment as apothecary, and for the last seven years have avoided medical practice, though qualified to engage in it.

Referring to the subject of the Select Committee on Pharmacy, I wish to mention that two gentlemen representing the Licentiate Apothecaries in Ireland, one from Belfast, the other from Cork, presented themselves for examination before the Committee, but were informed that their evidence was not considered necessary.

I believe I express the feeling of those whom they represented when I characterize the refusal of their testimony as most unfair to the class whose prospects would be most materially affected by a change in the law respecting pharmacy in this country.

I enclose you two circulars, the contents of which, I trust, will explain the views the Irish apothecaries generally entertain.

REUBEN BOLTON, M.D., ETC.,
Hon. Sec. Association of Licentiate Apothecaries of Ireland.

Belfast, July 20th, 1874.

[*** We understand Mr. Mackay's remark as expressing his sense of the desirability of a thorough separation of the practice of medicine from that of pharmacy proper. We do not perceive in regard to this point what misapprehension there is to remove, and we look upon our correspondent's statement as to the course adopted by a very large number of Irish apothecaries as being quite in accordance with the view expressed by Mr. Mackay, in fact a practical endorsement of the propriety of that view. But however much we may approve the course taken by the Irish apothecaries in avoiding medical practice, we cannot overlook the fact that it is optional for them to do so or not, and we are disposed to think that in any legislation affecting the practice of pharmacy in Ireland that option should not be allowed to remain.—ED. PHARM. JOURN.]

THE PURITY OF DRUGS AND PHARMACEUTICAL PREPARATIONS.

Sir,—My attention has been drawn to an article in your journal of 27th June last, page 1033, in which reference is made to a parcel of quinine and cinchonidine offered in London.

As the 2000 ounces in question have been offered through my agency, you will allow me to lay the facts of the case before you, which I trust you will be kind enough to publish in your next edition.

You are doubtless aware that in the manufacture of quinine on a large scale different barks are used, containing, besides quinine, other alkaloids in various proportions. It so happened that the makers of the quinine in question obtained from certain parcels of bark a mixture of quinine and cinchonidine, which it proved to be rather troublesome to rectify; the question arose naturally whether this produce might not be used *tale quale*, in the manufacture of other quinine preparations, in the process of which the two alkaloids might be more easily separated. It was with this view alone that I offered the parcel in this market, in proof of which I may mention that I did not submit the offer to a single drug house in London. It is not correct that I represented the article as containing only a trifling admixture of cinchonidine. Not knowing the exact proportions of the two alkaloids, I could only advise to have it tested and examined.

I beg to enclose my card, and trusting you will publish the above explanations.

FREDERICK THOMAE.

9, *Gracechurch Street, July 18th,* 1874.

[*** The fact that Mr. Thomae identifies himself with the parcel of mixed sulphates of cinchonidine and quinine, referred to at p. 1033, entitles him to the publication of the foregoing explanatory letter although no names were mentioned in this Journal. At the same time we think it is only justice to Mr. Thomae to state that it was not his house that was referred to as having offered the parcel for sale under the representation that it contained a very trifling percentage of cinchonidine.—ED. PHARM. JOURN.]

EXCESSIVE LABOUR IN PHARMACY.

Sir,—I have read with interest the letters that have been written respecting the excessive labour in pharmacy. They put the case of pharmacists in a very fair light; much stronger things might be said, but sufficient has already been mentioned to show there is scarcely a parallel where a class of men required by law to be well educated, impose on themselves solitary confinement. It seems to me we look after everybody's health but our own.

I deny there is any necessity for such long hours. The gentleman ("Seven o'Clock") in last week's Journal hoped it would not end in verbage. It is our own fault if it does. I would suggest immediate action. Let some one who takes a real interest in the trade, and in the welfare of those engaged in it, especially those who have to meet the Examinations, canvass the town or neighbourhood in which he lives, and ascertain what the majority wish to be done. I shall be happy to do my part.

Perhaps a petition could be presented to Sir John Lubbock to support his bill. I feel sure it would be signed by almost every employer who has to attend to his own business, and every employee desires it. I speak thus confidently of success, beaause I have not seen a word written in defence of the present state of things, nor can there be, I think.

If any gentleman thinks the present hours, etc., are satisfactory, I would ask him to send me as a favour a reply to these questions, as often put to chemists by parents before they apprentice their boys. What are the prospects in your trade? What are the drawbacks?

RICHARD CARDELL.

Bodmin, July 21st, 1874.

Sir,—This subject appears to have the attention of a few well-meaning chemists.

"Seven o'Clock" says that there must be a change for the better, or he would prefer the position of a mechanic to that of a pharmaceutical chemist.

"Country Major Associate," comes to the conclusion that the appropriate name for chemist is Pharmaceutical Slave, and gives the minimum term of labour as twelve hours a day. It delights me to hear him say that the scarcity of assistants will compel him to close his business at a reasonable hour, viz., seven o'clock. Now, if there are 500 such assistants in the country as the one who has caused "Country Major Associate" to think of closing earlier, they may also secure for themselves better treatment at the hands of their employers, shorter hours and higher wages; then, as a natural consequence, chemists' prices would go up. Chemists appear to be sorely perplexed to find some means of raising their prices. Assistants can teach them one way, an orthodox one too, by demanding adequate salaries, and thus compel them to advance prices. When mechanics demand and obtain higher wages, do their employers suffer loss? Can it be true that chemists' assistants are too poor to support a trades-union? They are poorly paid as a class, but, if they wait till employers spontaneously raise their wages they will wait a long time.

Don't compare them to mechanics. A joiner can earn 8*d.* an hour, which in a lucky twelve-hours-a-day chemist's week, excluding the holy Sabbath, amounts to 48*s.*, taking no account of the item overtime. That is at the rate of £125 per annum. Where is the class of chemists' assistants commanding an equivalent salary.

In the City of Edinburgh three years ago, out-door assistants wages were something very like one-third of that sum, £40, or at the most £50, being the rule and not the exception.

I know of one instance where, on £40 a year an increase of £5 was promised after six months' service, but only on condition that in the interval "he shall have passed the Minor examination of the Pharmaceutical Society of Great Britain." There must be some cause for all this low remuneration and excessive labour.

I have an idea that there are even now too many chemists and far too many chemists' assistants in the country. If anyone can produce statistics to show that the number of masters and assistants has been either increasing or decreasing since 1868, he will afford valuable information. Assistants may then calculate the distance of the "good time coming," which they sometimes talk of. If the number of assistants is decreasing at the rate my observation leads me to believe, better times are at hand.

To secure shorter hours, "Seven o'Clock," recommends individual action on the part of assistants. Let there be such action, combined with united effort, and nothing can prevent the removal of such true grievances as low remuneration and excessive labour in Pharmacy.

ANTI-SQUASH.

18*th July*, 1874.

Sir,—Having read with much interest the communications to the Journal on this topic, I venture to add my trifling stimulus, and to offer a few remarks, with the hope that the subject now broached may be duly ventilated, and saved from the too frequent process of "shelving."

With respect to the sentiments of your "seven o'clock" correspondent relative to the immediate necessity of reducing the hours of toiling behind chemists' counters, they are undoubtedly worthy of consideration, but his suggestion that all assistants in the country should refuse a situation where the hours are longer than from 8 a.m. to 7 p.m., would be, if adopted, tantamount to a "strike," and that, I fancy, is extremely distasteful to the majority of those who are striving to keep a respectable position in the public mind. Besides, we must not forget that employers, for the most part, would be glad to accept any reasonable means for curtailing their own as well as their assistants' hours of drudgery, if some definite scheme were proposed; but, unfortunately, little progress is made at present, either that way or in the direction of better remuneration, owing to the want of a system of organization.

Now, Sir, I wish respectfully to suggest for consideration the desirability of a Society being established, with London for its centre, and branches in all towns throughout the kingdom, having for its object the regulation of prices, hours, and all matters connected with trade improvement; and admitting to membership every individual on the Register, whether employer or assistants, on payment of a very nominal annual subscription. By this means greater facility would be offered for the interchange of opinion, and much usefulness achieved in the way of suppressing those petty jealousies, which have hitherto frustrated any attempt at combination.

Trusting abler hands will come to the front,

"FESTINA LENTE."

The old adage "all work and no play, etc.," needs but very little alteration to make it applicable to "Pharmaceutical Slaves" as "Seven o'Clock" most justly termed chemists' assistants. If we said all work and no pay, I think it would be very nearly the truth, and express the true state of the generality of assistants at the present time.

I think the best mode of helping ourselves out of the difficulty would be to form some kind of an association, then we could have a stronger voice by unity. Why should we not combine and form a sort of society where we could discuss this kind of matter? A committee might be formed and then they could fix a salary for the Juniors, Minors and Majors, so that the subscribers to the affair would not take less salary than that arranged by the committee. I feel sure that we can raise our position without striking as has been suggested. If the several grades of assistants would not take less than that arranged, the employers would of necessity be compelled to give the required salary, and not offer to a Junior, as they do (who has perhaps paid 100 guineas for his apprenticeship), a paltry £15 or £20 per annum. Then, perhaps, after we get one thing, we shall be able to do something for early closing. I hope to see some suggestions in the Journal from those that are interested in the matter.

JUSTITIA.

Battersea, 21*st July*, 1874.

Sir,—Up to a tolerably recent period your Correspondence pages have been replete with letters touching on the question of higher remuneration for chemists' assistants. We are glad to see that lately the masters have brought forward their claims before the public. If we look at principals and assistants in their relative position with an impartial eye, it is not unlikely that it will be for the most part admitted that the chemist has more cause to complain than his assistant. The latter has, in the first place, the option of entering a service or not. The master cannot shift his locality without entailing great risk to himself. The assistant, as long as he is in the service of his superior, is always entitled to his full salary as agreed upon, no matter how dull business may happen to be, or how small the profits of the season. A few weeks ago there appeared in the PHARMACEUTICAL JOURNAL a letter from a master, who told how he was, perforce, as it were, bound to the counter for nearly the whole day through want of an effectual assistant, and how, while he could not find time for a walk for weeks together, his assistant had entered into an agreement, on first coming into his service, for three hours recreation per diem, and having no alternative, he could not but comply with this arrangement. Then looking at the responsibility of both parties, in nine cases out of ten, if the assistant makes a mistake, perhaps depriving someone of life, all the blame falls upon the master, who loses his reputation and business while the assistant may retrieve his character in some distant neighbourhood. At any rate the latter would not have the stigma of disgrace wherever he went. "Allowances," people say, "must be made for men in that position of life." Must, then, no allowance be made for a harassed and weary master, worn out by care and anxiety, striving to maintain a respectable appearance in the midst of troubles known perhaps only to himself? In conclusion, of course there is right and wrong on both sides, but it seems hard that the argument should be such a one-sided one as it is generally put forth.

VIR PRO BONO PUBLICO.

G. N. Robins.—The erasure would probably be a difficult operation; at any rate it would trench too much upon the surgeon's domain to admit of advice from us.

"*Hyoscyamus.*"—(1) We find upon inquiry that the statement made to you is quite correct. (2) Yes, it will be increased in stringency. (3) *Aconitum Napellus* is not unlike *A. ferox*; but the latter has a slightly downy appearance, and it is not a plant that would be likely to be shown to a candidate.

C. Johnson.—Clearly Tinct. Cinnam. Co. of the last London Pharmacopœia. It would not be justifiable to use the preparation of catechu mentioned.

J. W. (who should have enclosed his name).—We are unable to supply you with the information you ask for.

D.—The knowledge of materia medica required for the modified examination is essentially practical, and consists in the recognition of specimens and the estimation of their quality and freedom from adulteration.

W. G. Parkyn.—See the correspondence relating to Army Dispensers in vol. iv., p. 79.

W. F. C.—We do not know that it would be illegal, but it would be decidedly improper.

NOTICE.—Considerable inconvenience and disappointment is frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly in the advertising pages by the Publishers as to letters respecting advertisements or the sale of Journals, and over our Editorial columns, as to communications for the Editor, or for the Secretary, in reference to the transmission of Journals to members, etc., will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Welborn, Mr. Curtis, Messrs. Blackwood, Mr. Warwick, Mr. Goss, Professor Fluckiger, S. B., W. F. C.

CHEMICAL INVESTIGATION OF THE AIR IN ROOMS COVERED WITH ARSENICAL WALL PAPERS.

BY N. P. HAMBERG, M.D., OF STOCKHOLM,

Hon. Mem. of the Pharmaceutical Society of Great Britain.

The injurious effects of arsenical pigments as applied to the walls of apartments have been observed by physicians in almost every civilized country. The poisoning which occasionally results has been explained in very different ways. Several illustrious scientific men, as Taylor, Bunsen, and Pettenkofer, consider that it is due to fine particles, removed by mechanical causes from the paper, which, mixed with the air of the apartment, enter into the respiratory and digestive organs, and thus set up poisonous symptoms; consequently that danger could arise only from paperhangings to which arsenical colours were but loosely attached, and that the air is not contaminated by such colours, when varnished or applied as oil paints.

On the other hand, we have many observations of poisoning occurring in rooms, where the arsenical paper was covered with other paper completely innocuous, or where the walls were painted with an arsenical pigment ground in oil. It is therefore probable that a gaseous arsenical compound, arsenide of hydrogen, or oxide of kakodyl, escapes from the colour; and the experiments performed by Professor H. Tleck in Dresden (*Zeitschrift für Biologie*, Bd. viii.) induced me to make further investigations, which I think may interest the readers of the PHARMACEUTICAL JOURNAL. I therefore communicate the results of an examination which I commenced during last summer and have lately completed.

The experiments were performed in a summer residence, which was let to me and my family during the summer of 1873.

The room taken for the experiment was a large one, with two windows opening to the west; its walls were dry, and the papering of the room had according to report been put up 25 to 30 years before. No smell of damp was perceptible; and the persons who let the rooms said that they had not observed, either in themselves or others, any injury to health which could be ascribed to the green papering.

The apparatus used by me is represented below and consisted of the following parts:—

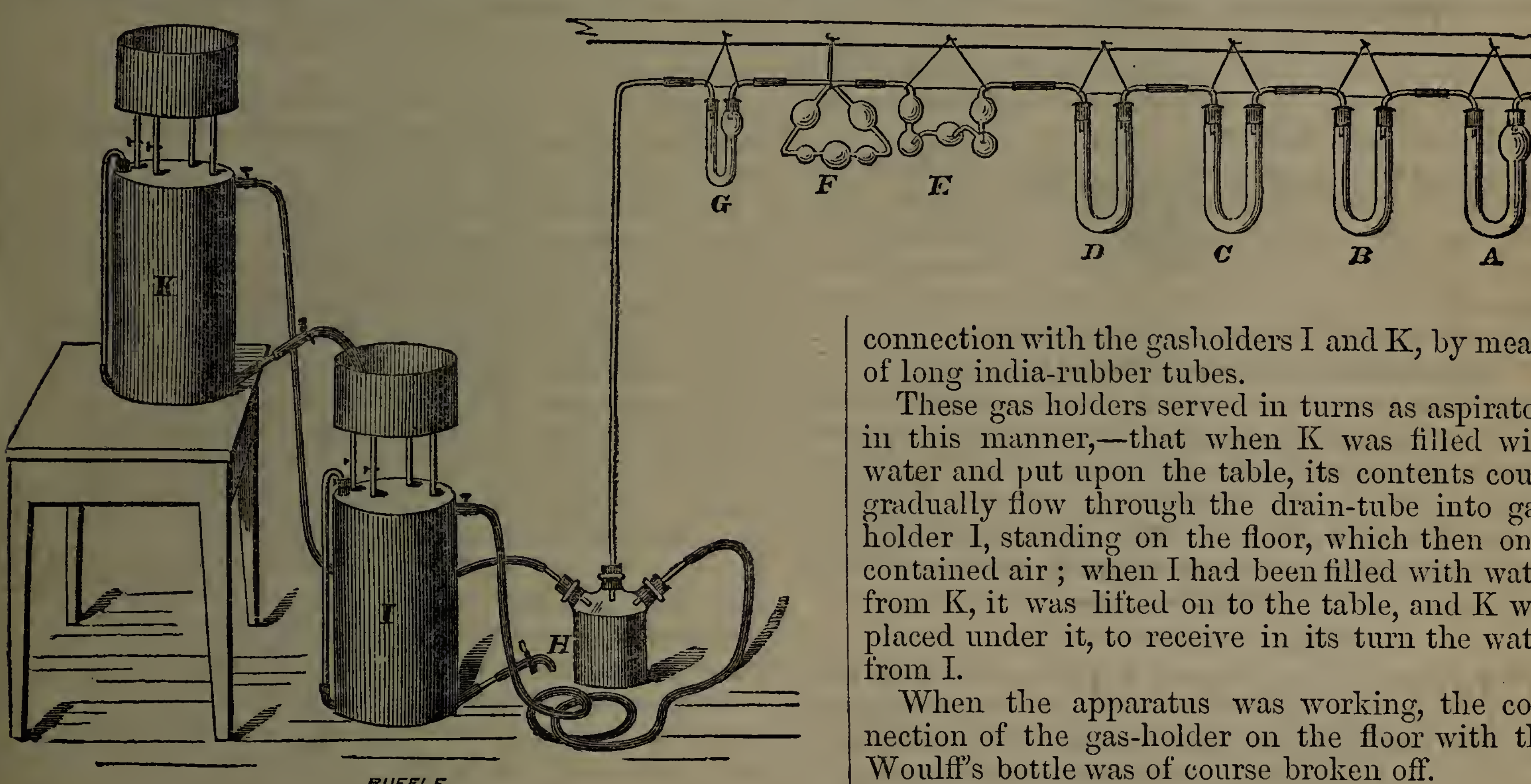
The U-formed tube A, containing only air, the object of which was to gather any possible dust.

The tubes B, C, D, contained cotton, by which the air was filtered, and quite freed from dust, previous to entering *the bulb-shaped tubes E and F*, which contained a solution of nitrate of silver (1 part to 40 parts of water).

The tube G contained only air, and was used in order to receive any solution of silver that might be splashed over by the stream of air from the bulb tubes.

The above-described system of tubes was hung on the wall opposite the windows.

The tube G was united by a long glass tube to the three-necked Woulff's bottle H, that was placed on the floor, and the lateral necks of which were put in connection with the gasholders I and K, by means of long india-rubber tubes.



These gas holders served in turns as aspirators in this manner,—that when K was filled with water and put upon the table, its contents could gradually flow through the drain-tube into gas-holder I, standing on the floor, which then only contained air; when I had been filled with water from K, it was lifted on to the table, and K was placed under it, to receive in its turn the water from I.

When the apparatus was working, the connection of the gas-holder on the floor with the Woulff's bottle was of course broken off.

The gas-holders I and K had each a capacity of 15 litres; the lower opening of each was provided with a perforated cork, into which a bent glass tube with a short india-rubber pipe was inserted, which by a screw stop-cock could be shut and opened. On opening this stop-cock, there ran out from the gas-holder that was filled with 15 litres only about 10 or 11 litres, and a stream of air corresponding with this quantity of water thus passed through the set of tubes.

During the experiment, the doors and windows were shut as much as possible, to make the change of air in the room more difficult.

The passage of air through the set of tubes was continued daily from the 16th of July to the 16th of August, when it was stopped. In one to two hours, 10-11 litres of water had flowed from the gas-holder, and a corresponding quantity of air had been passed at the same time through the set of tubes. Every removal of the gas-holders was noted, and on an average the removal was made 8 to 10 times a day.

At the interruption of the operation on the 16th of August, water had been emptied from the gas-holder 216 times in the above-mentioned manner. If the quantity of water is supposed to be 10 litres every time, 2,160 litres, 2,160,000 cubic centimetres of air had passed during the experiment through the set of tubes. While the experiment lasted, I many times felt on entering the room, after having been in the fresh sea-air, a disagreeable alliaceous smell, certainly not strong, but yet evident.

When the passage of air through the set of tubes had continued about one week, a black sediment in the solution of silver in the tube E was observed; the sediment increased by degrees, and appeared afterwards also in the bulb-tube F.

On the 16th of August the passing of air was discontinued, and the apparatus taken down. The contents of the separate tubes, A to G, were examined after removing to town, and at this investigation the following observations were made :—

Contents in the U-shaped Tube A.

The object of this tube was, as I have said, to gather dust. On examining it scarcely any solid particles could be observed. In the room taken for the experiment, which was a drawing-room, and not generally used by the family, there was but little dust; the papering was, as is before mentioned, *old*, and the colour very well fastened.

To detect the presence of any arsenical colour, the tube was washed out several times with dilute nitric acid, the acid fluid was allowed to evaporate, and a little of it was examined with yellow ferrocyanide of potassium, but no reaction on copper was obtained, and only a little iron could be observed.

The remaining part of the acid fluid was evaporated to dryness, and was heated with sulphuric acid to remove all nitric acid; the residue was poured into a Berzelius-Marsh apparatus, with a heated reduction tube; notwithstanding a continued passing of gas through the constantly glowing tube for an hour and a-half, only an excessively feeble, indistinct pellucid film was obtained.

Cotton from the Tube B.

The cotton taken out was heated with nitric acid, the tube being washed out; the acid was evaporated, and the residue mixed with nitrate and carbonate of sodium, and heated in a porcelain crucible to fusion, which was continued till all organic matter was destroyed. The fused mass was dissolved in water, when a little ferric oxide was left, the solution was super-saturated with sulphuric acid, and afterwards heated to remove all nitric acid.

The acid residue gave in Berzelius-Marsh's apparatus a feeble arsenical film, which began to appear not very plainly after passing the gas for ten minutes through the glowing reduction tube, but became evident after one hour's continued passage of gas and heating.

Cotton from the Tubes C and D.

The contents of these tubes were separately examined in the same manner as the contents of tube B, but neither from C nor D could any arsenical reaction be obtained.

Solution of Silver in the Bulb-tube E.

The black sediment formed during the passage of the air was separated by filtration. A small portion of the filtered liquor was saturated with ammonia, which produced a light-yellow sediment resembling arsenite of silver. The greater part of the filtered liquor was mixed with hydrochloric acid, in order to precipitate the silver, the chloride of which was collected on a filter, and the clear fluid evaporated to dryness; the remainder was treated with sulphuric acid, and heat applied so long as nitrous vapours were exhaled. After dilution with water, the acid liquid was poured into a Berzelius-Marsh apparatus, provided with the usual reduction-tube; after ten or twelve minutes, a feeble brown tint was observed, and after one hour's passing of the gas a pellucid brown film was obtained that, in the contracted part of the reduction-tube, collected into an apparent arsenical crust of such a thickness that it was not transparent.

The black sediment in the solution of silver was easily dissolved by diluted nitric acid, and displayed the characters of metallic silver; on further examination it appeared to contain a little sulphuret of silver.

Solution of Silver in the Bulb-tube F.

The solution in this part of the apparatus had changed in the same manner as in E, though in less degrees; the quantity of the precipitate was smaller, and it yielded a correspondingly smaller amount of arsenical crust.

The tube G contained a little solution of silver that had been carried with the stream of air from the bulb-formed tube F.

I consider that the above-mentioned investigations and observations prove that, from the papering in the room in which the experiment was conducted, a gaseous arsenical evaporation was going on; the change that happened in the solution of silver agrees with that which would be produced by arsenide of hydrogen, namely, a sediment of silver and a formation of dissolved arsenite of silver, and makes it probable that the gaseous compound which was formed was arsenite of hydrogen, which gas also can be produced at an ordinary temperature. Oxide of kakodyl, on the contrary, arises first by heating to redness, and forms, with nitrate of silver, a crystallized compound, and thus causes quite another effect on nitrate of silver than these experiments proved.

Some observations concerning the papering in the room are now to be mentioned. The papering had, as it was said, been put up twenty-five to thirty years ago, and the walls in the room were very dry. The papering had a beautiful, light-green ground, with an ornamental pattern of brownish-yellow.

The brownish-yellow colour was ferruginous—probably some ochre. The green colour resembled Schweinfurt green, and proved to contain a considerable amount of arsenic. A square centimetre of the paper gave, after solution and testing in a Berzelius-Marsh apparatus, with a tube of reduction of seven millimetres opening, an arsenical crust more than six centimetres long, and so thick that the greater part of it was opaque. The above-mentioned green colour proved, upon examination, to contain but a small amount of acetic acid, yet a considerable amount of carbonic acid. When dissolved in ammonia, and mixed with a solution of magnesia containing chloride of ammonium, a precipitate was formed after some minutes, which was found to be arseniate of magnesia and ammonia. The colour of the papering appears thus to have gradually undergone an alteration in composition; one part of arsenious acid has been oxidized to arsenic acid, while another part has been reduced, and has combined with hydrogen. A great part of the acetic acid has been changed to carbonic acid.

Finally, it ought to be mentioned that none of the family experienced any remarkable injury to health while residing in the house, but that I, who had my bedroom beside the room in which the experiments were made, and often during the night had the door open, felt in the morning a heaviness in the head and weariness. How far an attack of rheumatism in the legs, from which I suffered during the month of July, and which still lasted during the first months of 1874, can be ascribed to the green paper of the room, is questionable.

NOTE ON PROCTER'S REACTION OF GALLIC ACID.

BY PROFESSOR FLÜCKIGER.

In this Journal, July 18th, 1874, p. 43, it is stated that a mixture of faintly alkaline arseniate and gallic acid in aqueous solution by absorption of oxygen developes a green colour.

There can be no doubt as to the correctness of the fact. I wish only to point out that the arseniate, that is to say, arsenic acid, has nothing whatever to do with this reaction. The phosphates, borates, silicates, carbonates, etc., may quite as well be used instead of the arseniate. The cause of the green reaction is the presence of a trifling amount of alkali, a fact which has long been well known and expressly recorded, for instance, in Gmelin's 'Organic Chemistry,' among other reactions of gallic acid. The reaction is developed by any alkali, caustic or not, provided it be present in but extremely small quantity. Thus bicarbonate of sodium is a very convenient means of showing the reaction under notice; it displays, it need scarcely be mentioned, but a very moderate alkaline action.

The green reaction, it will be observed, has its merit, as it is not produced either by gallotannic acid or by pyrogallol.

There is another reaction which likewise is sufficient to distinguish gallic acid. If to an aqueous solution of gallic acid some drops of a dilute solution of ferrous sulphate (about one part of vitriol in 100 of water) are added, the mixture remains for some time colourless, provided the gallic acid be free from tannic acid, and the ferrous salt from ferric; the solutions, moreover, ought to be made in the very moment they are to be used. Ferrous gallate is of an intense violet hue; but it is not produced in the above mixture, because the solution of the sulphate has an acid reaction. This is due to sulphuric acid, which can be superseded by acetic acid if we add a little acetate of sodium. Then a trace of acetic acid is set free, and this now is not able to prevent the development of the violet colour of ferrous gallate; an intense violet instantly makes its appearance.

THE MICROSCOPE IN PHARMACY.*

BY HENRY POCKLINGTON.

(Continued from Vol. IV., p. 549).

WOODS.—The examination, microscopically, of woods for diagnostic purposes is not quite the same thing as the examination of stems.

When we deal with stems we have, as I said when speaking of roots, to discuss, seriatim, the relative development of the medullary, wood, and cortical layers and the several tissues composing them, as well as note the morphology of these tissues themselves. But there are many cases where we have to depend entirely upon our knowledge of the minute structure of one of these tissues, for our determination of its origin. This is the case with barks and woods as found in our materia medica, and our difficulties reach their culmination when we have to deal with these woods in the form of a more or less fine powder.

To enable us to deal with these we must very thoroughly familiarize ourselves with (*a*) the nature of wood structure generally, and (*b*) the minute structural anatomy of the woods of the materia medica, and of, at least, those likely to be substituted for them or mixed with them.

We may roughly class the tissues of which wood is composed in three groups: (*a*) vascular, (*b*) prosenchymatous, (*c*) parenchymatous. The two latter may be subdivided into parenchymatous-prosenchyma and into woody-parenchyma, of which the latter is very common and very variable. These three classes and their subdivisions may co-exist in the same wood, or one or more may be absent. Their presence or absence, their relative proportions, and their distribution and character are the points which will aid our diagnosis of any particular wood.

A few words about each of these tissues may perhaps be useful.

The *Vascular* tissues comprise spiral vessels (in the medullary sheath only) and pitted vessels of very various kinds. These latter may have a spiral ternary deposit, as in Elm and Daphne, with or without bordered pits as in Lime, and very characteristically in Tamus, Sassafras and certain Cycads. Sometimes the bordered pits when present are on two or three sides only of the duct, as in Elder, Beech, and Apple. The absence of a vascular system will at once direct the attention of the observer to Conifers. Speaking generally, the character of the vessels and their markings, the size of the pits, their shape and inclination, afford great help in determinating the nature of any wood.

The *Prosenchymatous* tissues proper are characterized by their spindle-shaped cells; where this character is much departed from, the tissue should be called prosenchymatous-parenchyma. The wood-cells may be minutely pitted or, as in Conifers, glandular. In the latter case, attention should be paid to the nature of the so-called glandular marking, whether it is crossed singly, as in Salisburia, or doubly without a spiral, as in Abies, and with a single spiral, as in Taxus, or double spiral, as in Auracaria.

The *Parenchymatous* tissues pretty sharply distinguish themselves by their globular, cubical, or rhombohedral shape and their thin walls. They may be porous, as in Elder, very distinctly pitted, as in the medulla of Cinchona, or have a spiral deposit, as in Orchidaceæ. When the cell-walls are much thickened or the cells are much elongated, and approach in these particulars the nature of wood-cells, with which they may be associated, these tissues should be called prosenchymatous-parenchyma. The co-existence of woody parenchyma with true wood-cells is of great diagnostic value. A good example of this co-existence may be seen in the wood of the Elm, very differently in the Apple, and very slightly in the Beech. In one or two trees the direction of the wood-fibres with regard to the vertical axis of the tree is of importance to be noted. This is the case in Lignum vitæ, where the wood-cells

* I have again to apologize to my readers for delay in the completion of this series of articles. As a large portion of the delay has been due to ill-health, no further apology is, I trust, needful. The whole remainder of the series, with one unimportant exception, is now in MS., and no further delay will occur.

interlace very intimately, producing an unusually tough wood that will not readily split or cleave in any particular direction. The relative thickness of the whole of these tissues is to be noted; but too much stress should not be laid upon it, as this feature is exceedingly variable, and is to a great extent determined by the age of the tree. Still the relative thickness of the tissues is much more constant, specifically, than might be expected.

A few words on the course pursued in the examination, and I pass on. The *nature* of the tissues, *i.e.*, the groups to which they belong, are best studied in longitudinal section.

The wood-cells and one feature of the medullary rays, their outline in cross section, and the markings on the porous vessels, are seen most advantageously in longitudinal sections crossing the rays. The woody parenchymatous cells, with their frequently crystalline contents, on the other hand, are best seen in sections running parallel, as far as may be, with the rays; that is, in radial sections. The relative distribution of the tissue and the character of the wood generally must be studied in cross sections, which must be exceedingly thin. It is desirable to mount all these sections in either glycerine, or glycerine jelly, but one section of each should be carefully stained with magenta and mounted in balsam or dammar. Use may in a few cases, guaiacum for example, be made of a strong solution of caustic potash, in which the section should be boiled to remove colouring matters and clear the tissues. In other cases, where the wood is highly charged with colouring matters, soluble in alcohol or ether, the section should be treated with these agents until the colour is extracted. It is hardly necessary to say that, in the case of such woods, examination should always be made of them in their normal condition in order that the seat of the colouring matter may be ascertained and the vessels or cells containing it carefully noted. It should in these cases be ascertained, if possible, whether the cells containing the colour are associated with the vessels, and whether they are more or less highly specialized, or whether the vessels themselves are the seat of the colouring matter. In the latter case, it should then be made a subject of inquiry whether the colouring matter was produced in them, or, more probably, elaborated elsewhere and located there, and whether *post-mortem* or not. Out of these will arise a further query, which I cannot discuss here at present, whether, in the case of compound colouring matters, these exist in the plant in their compound state or separated and in their own special cells. When this is found to be the case, separate observation should be made, by optical and chemical means, of the several substances in their native cells.* I pass now to the woods of the Pharmacopœia.

(*To be continued.*)

IS OZONE A CONCOMITANT OF THE OXIDATION OF ESSENTIAL OILS?†

BY CHARLES T. KINGZETT, F.C.S.

It is generally stated in books that the oxidation of oil of turpentine is attended with the production of ozone. Thus, in vol. iii. of 'Miller's Chemistry' it is stated, "Oil of turpentine gradually absorbs oxygen from the air, with the formation of a certain proportion of ozone;" and in Gmelin's work (vol. xiv.) it is written, "Oil of turpentine absorbs oxygen gas, acquiring new properties, and being converted into ozonized oil of turpentine."

Further, Lawes, Gilbert, and Pugh have stated their belief that the supposed ozone existing in the vicinity of vegetation is due to the oxidation of hydrocarbons evolved by plants (*Chem. Soc. J.* [2], i., 1863, p. 100).

These statements, variously modified, have been so often repeated, that at last they are almost universally received as matters of facts. But although a vast amount of work has been done on this subject, especially by Schönbein, whose peculiar views on the matter are so well known, yet it cannot be said that the information is absolute. On the other hand, there has ever existed more or less doubt about the formation of ozone by the oxidation of such bodies as oil of turpentine.

It was with the view of acquiring more certain knowledge that the author made a series of experiments, the results of which are recorded in a paper recently read before the Chemical Society.

In commencing his experiments he first of all wished to get some definite notion as to the rate of absorption of oxygen by such bodies as oil of turpentine. For this purpose the liquid to be experimented upon was enclosed in a graduated tube containing air or oxygen, and the volume of the gas read from time to time. It was thus seen that ether, potassium-naphtha, oil of turpentine, and such bodies rapidly absorb oxygen from air or oxygen gas.

A few cubic centimetres of naphtha absorbed 25 c.c. of oxygen in 36 days, *i.e.*, the whole of the oxygen present. In yet another experiment with air, the turpentine oil (not in sunlight) absorbed 10·5 c.c. of gas during 14 days, that being the theoretical amount of oxygen in the air used.

Benzene showed no absorption of oxygen during 40 days. After this, similar experiments were made with the oils of bergamotte, chamomile, caraway, cloves, juniper, lemon, thyme, capivi, cubebs, etc., etc.

The numbers given in the following table are not valuable as showing the absolute relative absorption of oxygen by the various substances, as some were conducted in sunshine whilst others were not.

Body used.	c.c. Oxygen absorbed.	No. of days.	= daily.
			c.c.
Oil of caraway......	18 (from oxygen)	6	3
„ bergamotte ..	12 „	4	3
„ juniper	5 „	2	2·5
„ cubebs	4 „	2	2
„ lemon.........	16 „	13	1·2
„ Naphtha	25 „	33	·7
Oil of turpentine... in sunshine (*a*)	220 „	6	36·6
„ turpentine... in shade (*b*)	20 „	36	·6
„ turpentine.. in shade (*c*)	10 (from air)	14	·75
„ chamomile...	6 (from oxygen)	11	·55
Ether (absolute) (*a*)	6·5 „	34	·19
Ether (absolute) (*b*)	6·5 (from air)	34	·19

These bodies, which had thus absorbed known amounts of oxygen, were agitated after the experiment with a mixed solution of potassium iodide and starch, when they invariably developed the well-known blue colouration more or less quickly. It is remarkable that this colouration does not take place immediately, as one might suppose would be the case if these bodies contained dissolved ozone.

On the other hand, in the case of the bergamotte above given, where 12 c.c. of oxygen had been absorbed, there was absolutely no colouration with the potassium iodide

* There is here a fruitful and, I believe, an untilled field for observers with leisure.

† Abstract of a paper read before the Chemical ociety (*Journ. Chem. Soc.* [2] vol. xii., p. 511).

and starch for some minutes, but it then gradually became of an opaque blue. The same remark applies to the other cases for the most part.

Evidently, therefore, an agent now existed in these oxidized oils, having properties like those possessed by ozone.

This fact was confirmed by taking the various bodies and placing them in tubes, together with a solution of potassium iodide, covering the mouths of the tubes with paper, and exposing to diffused daylight. Ether, naphtha, and turpentine and caraway oils gave almost immediately a yellow line between the two layers, showing either that they precontained the active agent, or quickly produced it. Time was required in all the other cases, in all of which affirmative results were obtained and rendered very evident by the addition of a solution of starch. Confirmation of these results was further obtained by placing the substances in tubes heated to 70° C. by means of a steam-bath, and spreading over the mouth of the tubes paper soaked in the potassic iodide starch mixture. But the best results were obtained by mixing in watch-glasses the substance to be tried and the test-solution.

As the oils of turpentine and caraway were found to give the most decided reactions, most of the subsequent experiments were confined to them. These experiments, which are recorded at length in the original paper, led the author to the conclusion that the active agent produced in the oxidation of these oils, although possessing properties similar in many respects to ozone, is not ozone or peroxide of hydrogen, but an oxidized principle derived from terpene ($C_{10}H_{16}$), namely, a monohydrated oxide of turpentine ($C_{10}H_{16}O{\cdot}H_2O$). The evidence upon which this conclusion is based is thus summarized :—

When oil of turpentine is exposed to air or oxygen, in presence of moisture, it oxidizes, producing an agent which resembles ozone and peroxide of hydrogen, inasmuch as it gives a similar reaction with potassium iodide. It further resembles peroxide of hydrogen, because it gives a violet colouration with chromic acid solution acidulated with sulphuric acid. It cannot, however, be peroxide of hydrogen, because, although it is somewhat soluble in water, the solution retains its properties after long-continued boiling. It again resembles the aforementioned bodies by being totally destroyed by peroxide of manganese, but it also differs from them by having much more stable properties, resisting, to a certain extent, the action of sodium hyposulphite, and temperatures considerably above the boiling-point of water. Although destroyed by peroxide of manganese and other agents, the body again forms on exposure to air and moisture.

Lastly, the active agent so like to ozone is destroyed at the boiling-point of oil of turpentine, viz., 160°, and temperatures at which ozone and peroxide of hydrogen are not destroyed, when chloride of zinc is present. It is also destroyed by other dehydrating agents and by certain deoxidizing agents.

It is increased in amount by heating to 100° in presence of water, but in the oil which distils over at that temperature, there is none of it. Simple exposure to air is, however, alone necessary for its formation, and then it has the same properties as the parent oil.

Oil of turpentine is generally credited with the power of ozonizing the air in its vicinity, as well as with the power of dissolving a certain amount of the ozone to which its oxidation is supposed to give rise. This is because it has long been known that potassic iodide test-paper exposed to its vapour speedily indicates the well-known reaction of ozone ; but this must now be explained by the oil evaporating and oxidizing to this peculiar product, for the oil which has been subjected to the action of peroxide of manganese or chloride of zinc, or any of the other means which have been pointed out as efficient in destroying the active principle, no longer has the power of so influencing the air in its vicinity, until it has been allowed to stand in contact with air (and moisture ?) for some time.

By experiments now in hand, the author hopes to be able to adduce more conclusive evidence as to the composition and constitution of the oxidized product of oil of turpentine, which possesses such interesting properties ; also to show more precisely the circumstances under which it is produced, and to build it up synthetically from terpene or cymene, etc. For the present he can only hint at its nature. His notion, as has already been stated, is, that it is $C_{10}H_{16}O.H_2O$.

1. By the loss of H_2O_2 this becomes $C_{10}H_{16}$. Sulphuric acid causes, by its action upon the oxidized oil, the formation of a body which gives a violet colouration to chromic acid solution.

2. By the loss of $2H_2O$, the body becomes $C_{10}H_{14}$. Chloride of zinc destroys the active agent, and $C_{10}H_{14}$ (cymene) is a product of its action upon $C_{10}H_{16}O$.

3. By the loss of O it becomes $C_{10}H_{16}.H_2O$. Deoxidizing bodies, as pyrogallate of potash, etc., also destroy the active agent. These data combine to show that the constitution of the body is as represented. It is also a fact that $C_{10}H_{16}O.H_2O$ is somewhat soluble in water.

THE PROBLEMS AND FUTURE OF PHARMACY IN GERMANY.*

BY FRED. HOFFMANN, PH.D.

(*Concluded from p.* 70.)

It is not the aim of this essay to parallel the conditions and prospects of American pharmacy with those just described, nor to determine whether and how soon the same questions may come up here, or whether the present state of American pharmacy really justifies the exalted views of the future, as occasionally expressed in valedictories and similar addresses. In its trade relation it has practically the advantage over German pharmacy, inasmuch as it still stands upon the basis of a commercial trade, and cannot therefore be injured in a similar manner by being displaced from a professional basis, secured by a noble career of usefulness and achievements through more than two centuries.

As a natural consequence of the growth and extent of sciences, and the increase and diffusion of learning and a more correct knowledge of nature, which is the tendency of modern times, we must view the fact that an enhanced general, as well as special, education is becoming more necessary in all pursuits. and gives the impulse to innovations and reforms, particularly in those pursuits which are based upon the knowledge of the laws of nature, and upon the application of the principles of physical and sanitary sciences, and that this agitation is felt in medicine and pharmacy, precisely as in other circles.

After the first abortive legislative attempt in several States of the Union in demanding directly, and without previous preparation, a higher qualification, the education of pharmacists, and in consequence thereof a superior status of pharmacy, has made successful progress, and increased facilities for attaining this aim have been inaugurated by the establishment of, and increased attendance at, the various pharmaceutical schools.* In this advance movement, pharmacy stands, however, by no

* If no other, at least one result of high value must be acknowledged to be due to the continued agitation for, and the enactment of, laws regulating the practice of pharmacy, namely, the increased attendance of the pharmaceutical pupils at the courses of the colleges of pharmacy. Although this attendance is not yet dependent upon a preliminary examination and qualification, and though the want of sufficient primary education and knowledge is *à priori* prejudicial to the full value of a course of theoretical study compressed into so short a time, capable and assiduous young men will find at least the path pointed out, and receive the incitement for the further acquisition of knowledge, while American pharmacy will, for the next generation, be supplied with new productive heads and hands for its scientific continuance.

means alone; generalization and unity of sciences on the one hand, and education, scientific knowledge and higher intellectual culture, on the other, are, as already stated, the demands of our time, and this tendency pervades, in our country, all classes of its population and all pursuits, and is practically exemplified in the increase and prosperity of all higher educational institutions,—the medical, polytechnic, commercial and other colleges,—and in the entire literature of the present day.

Pharmacy in the United States will therefore probably meet with fewer difficulties on its high road to improvement, and the less so, as it is in the happy position of profiting by the pharmaceutical experience and acquisitions of older countries, and particularly of Germany, without having to undergo the struggles and errors of its gradual development extending over two centuries. The problems which it will inevitably have to encounter with the progress of time and civilization I have briefly referred to above, and they are more fully stated in Mr. Danckwortt's and Prof. Hlasiwetz's papers; aside from other more technical and less important arguments, they have been felt here likewise for some time, and have been repeatedly and timely expressed,* but appear not to have received due consideration.

The lively interest taken by the American people in progress and the questions of the times, its acceptation for new ideas and their practical application, leave no doubt that the modern popularized teachings of hygiene and of the sanitary and medical sciences which are promulgated by the advanced schools of medicine and by popular literature,† as well as of medical scepticism, will here find a fruitful soil, just as homœopathy has found its adherents not merely among the ign rant, but rather among the wealthier and educated classes of society. The consequences of such a popularization of a more correct knowledge of hygiene and of rational methods of preventing disease, and preserving and restoring health without the former resort to unwise and excessive medication, must be the same here as in Europe, as far as the material emoluments of the pharmaceutical pursuit are concerned, and inasmuch as they will in time greatly diminish the income of the pharmacist, they will also be in direct antagonism with the demands of modern times for higher education, which requires increased expenditure of time, labour, and money. All legislative restrictions and regulations will prove one-sided and without real and permanent value, as long as they aim to raise the claims for a higher qualification and standard only, without affording, on the other hand, some guarantee for a sure and remunerative application of the higher proficiency, and for the conditions necessary for the material prosperity of the practice of pharmacy. Compared to the physician and the tradesman, the pharmacist occupies an exceptional position; the former applies his individual knowledge and skill without investment of capital or risk, and without any restriction; the merchant chooses his wares according to demand and want, and can control his investments quantitatively and qualitatively; he employs labourers or clerks with less knowledge and without responsibility; his wares usually retain their value, and are less prone to deterioration. In this material age and concrete and practical country of ours, there cannot be expected, for any length of time, an acquisition of talent and skill, or a permanent and steady elevation of a calling whose resources appear to be everywhere on the decline,* and which involves an amount of time, resignation, and responsibility as no other pursuit requiring a similar amount of learning, and which, for superior attainments and proficiency, does not offer an adequate equivalent in the shape of pecuniary compensation.

These are some of the problems which American pharmacy will likewise have to encounter sooner or later, and in the discussions of which the recourse to the whole truth will unquestionably prove the best remedy for the evils of imperfectly stated truth. They certainly deserve earnest consideration, and invite our congenial interest in the pending struggle of pharmacy in Germany for its existence and continuance. Whatever may be the future fate of pharmacy, that of Continental Europe has the high merit of having fulfilled its mission of culture, and particularly in developing and applying the natural sciences, and mainly chemistry, and that its achievements are not perishable, but on the contrary will for ever be useful in the further evolution of the healing art and of applied chemistry in general.

THE INSECT ENEMIES OF DRUGS: THE BEST MEANS OF PROTECTING SOUND DRUGS FROM THEIR RAVAGES, AND OF DESTROYING THEM WHEN ALREADY IN DRUGS.†

BY W. SAUNDERS, LONDON, ONTARIO, CANADA.

The insects which take up their abodes in, and consume the various substances kept in a drug store, are more numerous than one might at first suppose, some few of them occurring in abundance almost every year, while others are less frequent or rare; hence the opportunities for investigating their habits are not always alike favourable. It would be a difficult task, were one possessed of much more leisure than has fallen to my lot, to undertake to exhaust this apparently small field of research in a single season. I will, however, state what I have been able to gather relating to two of our more common foes, and report, if permitted, on the rarer ones on future occasions, as opportunities may present themselves.

In years past my own drug stock has suffered far more from destructive insects than it has during the current year. What to attribute this relative scarcity to, I know not; there are so many influences operating from time to time favourably or otherwise on insect life—some of which elude our observation entirely—that one is often quite at a loss to give a reason why an insect should be present in the greatest abundance one year and comparatively rare the next, the circumstances in each case being apparently similar. In any case this scarcity is not to be deplored, not even with an accepted query on the subject in hand, for the destructive powers of some of the species are truly formidable, where their numbers are sufficiently great.

First, because with me most injurious, I would place what has been called by Dr. Fitch, State Entomologist of New York, "The Indian-meal moth," *Tinea zeæ*, so named because it was first found in Indian-meal, although by no means exclusively partial to it. The varied character of the appetite possessed by this creature during the larval

---

* Dan. C. Robbins, annual address, proceedings Alumni Association, N. Y. Coll. Pharm., 1872, p. 34, and *ibid.*, 1873, p. 30. Chas C. Fredigke, in *Chicago Pharmacist*, 1874, p. 36, and *Am. Journ. Pharm.*, 1874, pp. 209 and 265. Dr. Streit. in *Chicago Pharmacist*, 1874, p. 72.

† The *Sanitarian*, the *Herald of Health*, and the *Journal of Health*, are monthlies published in New York. See, also, the annual proceedings of the American Public Health Association; also, Youman's *Popular Science Monthly*, No. 10, p. 422; No. 12, p. 665; No. 22, p. 421, and numerous similar publications.

* The practice of our profession is becoming more arduous, —its scientific relations more complicated, as civilization and science advance, while its legitimate rewards diminish, because the scope of the business contracts, while competition increases, and it is evident that, unless we can arrest or overcome these, we cannot long retain in our ranks a superior or desirable *personnel*. The char cter of any pursuit depends upon the men who fill it, and we cannot have men of culture and attainments unless they are adequately rewarded. (D. C. Robbins, annual address, N. Y. Alumni Assoc., 1872-73.)

† *Proceed. Am. Pharm. Assoc.*

or caterpillar stage of its existence, is something wonderful, very few substances seeming to be distasteful to it. It thrives equally well on aconite root and taraxacum, devours both with avidity, large roots being frequently so completely riddled by the numerous channels made through them that one can crush them between the finger and thumb. In the case of aconite, it would be interesting to know whether the active and poisonous principle of the root is actually appropriated to the nourishment and sustenance of these worms as well as the starchy matter, or whether they possess the power of eliminating from their food noxious or injurious elements, and thus reject the alkaloid in the frass. This point I have not been able to determine. Rhubarb, either in root or powder, is esteemed a dainty morsel by this omnivorous creature, and is eaten as readily as pearl barley or burdock; ergot is also a favourite article of diet, and I have reared it on currie powder, and have even found it feeding on Cayenne pepper. Surely, with such an accommodating appetite, this insect could scarcely ever die for want of suitable food.

When the material fed on is in large pieces, such as roots, this larva forms cylindrical or sometimes somewhat tortuous burrows or excavations through it, which are lined with a silky web, more or less of which protrudes about the orifices, where it is sometimes mixed with rejected fragments of the material and the excrement of the worm. Where the substance is in smaller pieces, such as ergot or pearl barley, or, in case of a crushed root, the larva fastens together with silken threads a sufficient number of particles or pieces to enable it to provide for itself within a secure place of retreat.

When full grown this caterpillar measures about half-an-inch in length, and is nearly cylindrical in form. Its head is of a yellowish-brown colour, with a polished horny appearance, and on the second segment, immediately behind the head, is a yellowish, horny-looking plate, which covers most of the upper part of the segment, and with a surface resembling that of the head, but of a paler hue. There is also a spot on the last segment of a similar character. The colour of the body is dull whitish, with a few minute tubercles or smooth raised dots scattered over its surface, from each of which there arises a fine pale hair, scarcely visible without a magnifier. When disturbed it moves forward, or wriggles itself out backward with almost equal facility.

When fully mature, the larva changes to a chrysalis within the chamber already excavated, where it reposes in a slight silky cocoon, attached to the side of the silk-lined chamber. The cocoon is made of very white silken fibres, and through this slight covering the pupa may be readily seen. The latter is about one-third of an inch long, of a pale dull yellowish colour, ringed with darker brown lines, the large black eyes of the future moth showing through this partially transparent inclosure.

After remaining in this inactive condition for a sufficient length of time, varying with the period of the year and the temperature of the atmosphere, the winged moth bursts its bonds and prepares itself for flight. When fresh from the chrysalis, in common with other moths, its wings are but partially developed, are not more than one-fourth of their normal size, and quite incapable of sustaining in flight the weight of the body to which they are attached, but shortly, as soon as the newly escaped insect can place itself in a favourable position, where the wings can hang downwards, a marvellous process of growth begins, when in a few moments the wings acquire their full dimensions. When we consider that this growth implies, not a mere extension of the membranous structure of the wing only, but the maturity and expansion of every scale upon the wing, the individuals of which appear but as the finest dust to the unaided eye, we may well wonder at the intricate system of circulation and nutrition by which such a marvellous change is so rapidly brought about.

When its wings are expanded this moth measures from one-half to six-tenths of an inch across, and may be readily recognized by its having the basal third of the wings dull white or cream-coloured, while the outer portion is of a dark grey or blackish shade; they have also a somewhat greasy-looking surface, and the scales which cover the wings are easily rubbed off when the moth is handled. There is usually a dull yellowish spot, more or less defined, a little beyond the middle of the wing, and sometimes the hind margin is slightly banded with the same colour. The hind wings are nearly white, with a glossy surface, and margined with a long silky fringe. The body is dark-grey, with sometimes a little yellow behind the head. Beneath, the fore wings are paler than above, with a satin-like lustre, and the hind wings are whitish.

There are some substances which this insect seems to avoid; the following I have never known to be injured, although freely exposed where the insect was abundant: podophyllum, leptandra, menispermum canadense, gentian, gelseminum, hydrangea, geranium maculatum, sanguinaria, senega, and sarsaparilla. The cinchona barks also seem free. Cimicifuga, in the unground state, has escaped injury, but when crushed, or coarsely ground, it is soon taken possession of by this foe.

The meal moth, *Pyralis farinalis:* the larva of this insect very much resembles that last described, but the moth it produces is very different. The common name meal moth has been given to it on account of the injury it does to various farinaceous substances. *Tinea zeæ*, the insect last referred to, is, we believe, a native of this country, but *Pyralis farinalis* is an imported insect, brought over from Europe, where its destructive habits have long been known. I have found this insect very partial to the flaxseed in its unground state. While quite young the larva fastens together a number of the seeds into an irregular mass by means of glutinous silky threads, constructing in the centre a hollow chamber in which it lives, the diameter of which is enlarged as the larva grows. It does not confine itself to flaxseed, but attacks other substances as well, especially those of a farinaceous character, although it is not nearly so general a feeder as *zeæ*.

The caterpillar is of a dull whitish colour, with the head, a plate on the upper part of the second segment, and a spot on the terminal segment pale reddish-brown, with a polished, horny-looking surface. This worm may also frequently be found in old flour barrels. Its history in the chrysalis state is very similar to that of the insect last described.

The perfect moth may frequently be seen on the walls and ceilings of rooms sitting with the hinder segments of its body curved over its back. When its wings are spread it measures about an inch across. The fore wings are light brown, with a large, dark, reddish-brown spot at the base, and another smaller one near the tip of the wing. Two wavy, whitish lines extend across the wings, the inner one bordering the dark patch at the base. The hind wings are paler, with wavy, whitish lines, and clouded with spots and streaks of pale brown. The under side is much paler than the upper.

With regard to remedies, prevention is better than cure; hence by providing proper vessels in which to store the various substances the pharmacist keeps in stock with suitably fitting covers, much damage of this sort may be prevented; but where the insects have already gained foothold, I know of no better method of destroying them than one suggested by Dr. Squibb, which is by the vapour of chloroform. A ready way of applying this is to pour a little of the liquid on a small piece of sponge, and place it in a shallow tin box or other suitable vessel, and close the lid of the package containing the infected drug tightly, so as to prevent free access of air. The vapour of the chloroform, in consequence of its density, falls on the material, and diffuses itself through the entire mass, carrying death wherever it goes. Where the moths are found to be abundant, they may be attracted and poisoned while in the winged state by exposing cloths wet with a mixture of molasses and strong solution of arsenic, to which a few drops of essence of pear have been added.

TINCTURE OF IODINE.*

BY P. CARLES.

It is well known that after being kept a certain time tincture of iodine is modified in its properties, and becomes unsuitable for certain uses, such as for injection in cases of hydrocele, tumours, etc. Guibourt was the first to call attention† to the decomposition which this tincture undergoes, and in 1846 he brought it under the notice of the French Academy of Medicine. He rendered this decomposition palpable by mixing with two equal quantities of water an equal weight of each of two tinctures, of which one was recently prepared and the other was some months old. From the first all the iodine was precipitated, the supernatant liquid being scarcely coloured yellow; whilst the second, in consequence of the greater quantity of iodine which remained in solution, preserved a more intense colour. Guibourt attributed this facility of solution to the intervention of hydriodic acid which had been formed at the expense of the alcohol.

In 1850, M. Gopel presented a memoir upon the same question, and attempted especially to determine in what proportion the iodine diminished in the mixture, or in what proportion hydriodic acid was formed. For this purpose tincture of iodine was treated with reduced copper, which removed the free iodine, without touching that which was in combination, in such a manner that it became easy to estimate the latter under the usual form of iodide of silver. This mode of separation, however, could not be considered as very exact, for the cuprous iodide was slightly soluble and was ultimately estimated as hydriodic acid, thus affecting the exactitude of M. Gopel's results. His conclusions, nevertheless, were, that in the course of time hydriodic acid and hydriodic ether are formed in tincture of iodine.

Finally, in 1859, M. Commaille re-examined the same question and arrived at the conclusion that the alteration in tincture of iodine, far from being rapid, is very limited, and may almost be prevented by the employment of black bottles. M. Commaille the free iodine from that which was in combination by the aid of portions of starch paste, which he successively mixed with tincture until there was no further blue colouration; the hydriodic acid in the residuary liquor was then estimated as iodide of silver. This method of separating the iodine also appears to be inexact, for the large proportion of starch would take up also a portion of the hydriodic acid. Moreover the figures given by these two authors present such a wide divergence that M. Carles has thought it desirable to publish the results of fresh experiments conducted in a different manner.

The following was the method of operating adopted:—The tincture of iodine was diluted with eight times its volume of water, and the mixture filtered in order to remove the greater part of the precipitated iodine. The clear filtrate was agitated with an excess of carbonate of baryta and again filtered. The baryta which had entered into solution in the state of iodide of barium was then estimated as sulphate, which allowed of a calculation being made of the quantity of hydriodic acid, formed at the expense of a given weight of the alcoholic tincture of iodine. In this way the author found that a tincture, after being prepared ten months (from August to May), and exposed in a white flask to diffused light, contained 1·12 part of hydriodic acid (HI) to 100 parts of tincture. M. Gopel had asserted that a portion of this acid exists in the tincture under the form of ether, but M. Carles, like his predecessor, has not been able to isolate it.

The question therefore arose, whether a normal tincture, to which the proportion of acid found had been added, would be susceptible of producing the bad results which are attributed to old and decomposed tincture. Practically, this has not been found to be the case, and M. Carles thinks the defect should rather be attributed to other products of which the nature is not at present known, but which h eproposes to further investigate.

* *Bull. de la Société de Pharmacie de Bordeaux*, xiv, 169.
† *Journal de Pharmacie et de Chimie*, x., 113.

BARYTA, ITS MANIFOLD USES IN THE ARTS.*

BY DR. LEWIS FEUCHTWANGER.

The various salts of baryta have long been employed in pyrotechny; as admixture to white lead; as material almost indispensable to card-makers for a permanent white; in sugar refining; in chemical operations, etc.

In nature we find but few varieties. The sulphate, composed of 66 per cent. baryta and 34 per cent. sulphuric acid, is abundant in England, France, Germany, and the United States, where it most generally is found in connection with beds or veins of metallic ores, as gangue, or veinstone. Sometimes, however, it forms distinct veins, in company with secondary limestone, and very often in fine crystals, along with calcite and celestite. Crystals of large dimensions occur in Westmoreland, Cornwall, Cumberland and Derbyshire, in England. Beautiful specimens of septaria, cut and polished for table and other ornaments, having linings of brown heavy spar, are wrought in Durham, England, in Hungary, at Freiburg in Saxony, Clausthal in the Hartz, in Bohemia, and in Auvergne, France.

The localities in the United States are very numerous. The States of Connecticut and Missouri have long furnished abundant material for the arts. Next come Virginia, New York, New Hampshire, Massachusetts, Pennsylvan ia, Kentucky, and Tennessee. In Canada fine crystals occur, and massive baryta in a 27-foot vein. It is reported from New Mexico also.

The Bologna spar is the ornamental stone, of a brown colour and concentric rings, originally found in a bed of clay near Bologna, where it formerly was considered a great curiosity, on account of its phosphorescence, displayed after heating with charcoal, and it was called the Bologna phosphorus. The common name of sulphate of baryta is heavy spar or barytes; specific gravity 4·5, and hardness 3. It is found in nature in large crystals, weighing 100 lbs. and more, and in slender needle crystals; also in massive aggregations of tabular crystals likewise columnar and radiated, and in globular and nodular concretions; also lamellar and granular, earthy and stalactitic.

The sulphate of baryta often occurs associated with lime and some silica and alum, and is then called calcareobarite; and if it be associated with strontia, it is called baryto-celestine. If the sulphate of baryta gives out a fetid odour on striking or rubbing it, it is called fetid baryta. The name of baryta is derived from the Greek word, βαρὺς, heavy.

Witherite is a carbonate of baryta, having a specific gravity of 4, and a hardness of 3·2, and consists of 78 per cent. of baryta and 22 per cent. of carbonic acid. This is found in considerable quantities in England, at Alston Moor in Northumberland, in Silesia, Hungary, Styria, Sicily, Chili, but not much in the United States. It is extensively employed in manufacture of plate glass and the manufacture of beet-root sugar in France, and for the production of *blanc-fixe*, or permanent white; it is much used of late for paint, particularly in combination with soluble glass and white oxide of zinc.

The metallic base of the baryta salts is called barium, and is obtained from the carbonate of baryta or chloride, of barium, if put in a platinum dish and connected with the positive pole of a strong galvanic battery, in order to decompose it, mercury being placed in a hollow made in the baryta and connected with the negative pole. The result is an amalgam, which may be distilled in a bent tube filled with hydrogen. Barium is a white, malleable and fusible metal, which oxidizes easily in the air and decomposes water at common temperatures. For the purposes of obtaining the pure baryta or barium oxide, the nitrate is calcined at a red heat in a silver or porcelain crucible, or the carbonate is mixed with pulverized

* A paper read before the Polytechnic Club of the American Institute. Reprinted from the *Journal of the Society of Arts* of July 24, 1874.

charcoal in a covered crucible, and exposed for an hour to a strong heat. If oxygen gas is passed over it, it will absorb that gas with avidity and become a peroxide. This is the substance used at the present day for production of the peroxide of hydrogen, which is much recommended as a medical reagent, and employed in the arts for bleaching animal tissue, or converting brown into blonde hair. To prepare it, the peroxide of barium is treated with hydrochloric acid, and the liquid, previously decomposed with sulphate of silver, is carefully evaporated to a syrupy consistency, when it yields a slight chlorous odour. It decomposes easily into water and oxygen, and it is therefore almost impossible to prepare it properly in hot weather. At 212° F. it decomposes with violence.

The oxide of barium, or caustic baryta, unquestionably rivals in its causticity, potash, soda and ammonia, and may be easily employed in the compounds with chromic acid.

The chloride of barium is obtained by fusing the sulphate of baryta, or native heavy spar, with chloride of calcium (the residue from the preparation of ammonia) in a reverberatory furnace, and subsequently extracting with hot water, leaving the sulphate of lime undissolved.

The chlorate of baryta, which is now extensively used for producing a green flame in the manufacture of fireworks, is prepared by dissolving artificial carbonate of baryta in chloric acid solution, when it forms beautiful shining tabular crystals. It is dangerous to keep on hand when mixed with charcoal or sulphur.

Nitrate of baryta, which is likewise used in fireworks, may be easily prepared by dissolving the native carbonate in nitric acid and evaporating the solution, whereby octahedral crystals of the nitrate are deposited.

The native sulphate of baryta is generally used for the adulteration of white lead or paint, to the extent of 25 to 50 per cent. Of this mineral 4,000 tons are produced annually in Connecticut, and 2,000 tons in Missouri, while 10,000 tons are imported in England and Germany. The native mineral, if very white and free from iron coating, is finely ground and floated with water. But most of the native mineral contains fine particles of iron, and hence requires a different treatment, namely, calcination for some hours, in order to oxidize the iron to a higher degree, when hot water and, if necessary, a little sulphuric acid, will take up all the iron, and a beautiful white heavy powder is deposited, which is then dried, either by steam or in the same manner as whiting is dried, in the atmosphere. White oxide of zinc, as well as white lead, may be mixed with sulphate of baryta in linseed oil as a pigment, which is then fit for in and out-door painting, and spreads well.

The artificial sulphate, called white or *blanc-fixe*, which is now largely manufactured in France, England, and the United States, is used in the manufacture of a paper of the purest white, in imitation of linen, utilized for cheap collars, skirts, and cards. It was formerly manufactured from the native carbonate of baryta, but is now prepared from chloride of barium, which is obtained in England as a waste product at a reduced price. This is decomposed with sulphate of ammonia, and pure sulphate of baryta is precipitated. Another process for obtaining the chloride of barium, in order to prepare the permanent white, is by the decomposition of the native sulphate of baryta with chloride of sodium in a strong fire, and the subsequent solution of the fused mass in boiling water. The result is chloride of barium and sulphate of soda or glauber salt. About 5,000 tons of permanent white are annually manufactured in the United States and Europe.

In the chemical laboratory, the barium salts are indispensable for the determination of sulphuric acid, which forms the sulphate as an insoluble precipitate. The carbonate of baryta is a strong poison to animals, and is used for killing rats, etc.

A green paint, composed of manganese and caustic baryta, under the name of manganese green, has been brought to market from abroad, but was soon superseded by the beautiful Guignet green, a composition of aniline and iodine.

The beet sugar-refiners of France have very successfully employed both caustic baryta and the carbonate in their operations. They treat, first, the saccharine juice with lime, and then with carbonic acid, in order to clarify it. Afterwards they add baryta in order to obtain an insoluble precipitate, a saccharate of baryta. After passing sufficient carbonic acid gas under pressure of about half an atmosphere upon this precipitate, a separation takes place, and, without any evaporation, the hot solution is left to crystallize.

In copper metallurgical operations the sulphide of barium has latterly been employed for the purpose of precipitating from an ammoniacal copper solution the copper as a sulphide, which is treated in the usual method for reduction, either by caustic lime or by borax, or by a galvanic current.

The artificial carbonate of baryta, obtained by passing carbonic acid gas through a sulphide of barium, whereby the carbonate of baryta is precipitated, is much used in Europe in glass making for producing an achromatic glass. In 1826, I assisted in Jena my teacher, Koebner, in experiments for this object.

ELIXIR OF PHOSPHORUS.

The following formula for an "elixir of phosphorus" is supplied to the *American Journal of Pharmacy* by Mr. G. J. Luhn, of Charleston, S. Carolina, who states that it has been satisfactorily prescribed by a number of physicians in that city:—

℞	Phosphorus	gr. i.
	Æther sulph. conc.	f℥iiss.
	Alcohol	f℥i.
	Tr. menth. pip.	f℥ss.
	Glycerin. . . q. s. to make	f℥iii.

The phosphorus completely dissolves in the ether in about twenty-four hours, care being taken to introduce no water into the ether with the phosphorus. After the solution of the phosphorus is effected, the alcohol may be added, but the glycerin should be added in small portions, and the mixture shaken after each addition, and allowed to stand until it becomes clear before another portion of the glycerin is introduced.

A great deal of care has to be exercised in the addition of the glycerin; if too much be added at a time it will disengage a quantity of phosphorus, which will fall to the bottom. The essence of peppermint may either be added with the alcohol, or as the last ingredient; the latter is preferable, especially if the preparation is not made with 95 per cent. alcohol.

This preparation contains one-twenty-fourth grain of phosphorus to each fluidrachm, or teaspoonful. It is quite burning to the taste, but can easily be administered in a little simple syrup, when it will not be at all unpleasant to take. It has quite a milky appearance when mixed with syrup, but the author does not think the phosphorus is precipitated, at least not rapidly enough to prevent its being taken.

Mr. Luhn has also often added fluid extract of nux vomica to this preparation in quantities of three drops to each fluidrachm, and in this form it has been styled compound elixir of phosphorus.

SOLUTION OF CITRATE OF MAGNESIUM.*

BY J. C. WHARTON.

In preparing solution of citrate of magnesium, a quick process is sometimes desirable, especially if the customer is to drink it at the store, and happens to be "*in a hurry.*" The formula, as it now stands in the last edition of the United States Pharmacopœia, is not adapted to such a case, and it is to be regretted that the proper authorities did not construct it so as to admit the substitution of

* From the *Tennessee Pharmacal Gazette*, July, 1874.

calcined magnesia for carbonate of magnesium, in the proportion of 80 parts of the former for every 182 parts of the latter, or what is sufficiently near that proportion, 4 parts for every 9 parts or $\frac{4}{9}$ as much calcined as is directed of the carbonate. This would make 88 grains of calcined magnesia, sufficient to replace the 200 grains of carbonate of magnesium directed in the new Pharmacopœia. The advantage derived from the use of calcined magnesia is that a considerable amount of heat is evolved, which aids in making a rapid solution.

Another gain may be made by keeping prepared a syrup of bicarbonate of potassium, containing 20 grains of the salt to a fluidounce of simple syrup, flavoured with two minims of spirit of lemon. Two fluidounces of this syrup are to be used instead of the syrup of citric acid, while the citric acid, which should be contained in that amount of syrup, is to be added to the remainder of the acid in making the solution. This will render unnecessary the syrup of citric acid, but will otherwise make no difference in the preparation, except to facilitate the generation of the carbonic acid gas after the bottle has been securely stopped and well shaken.

To be brief, the following outline of the process is presented, with formulas modified, so as to be substantially the same as authorized by the United States Pharmacopœia :—

First.—Omit syrup of citric acid.

Second.—Prepare syrup of bicarbonate of potassium, as follows :—

Take of—

Simple syrup	2 pints.
Spirit of lemon . . .	64 minims.
Bicarbonate of potassium	640 grs.

Mix and make solution, keep ready for use.

Solution of citrate of magnesium.

Take of—

Calcined magnesia	88 grs.
Citric acid	408 grs.
Syrup of bicarbonate of potassium .	2 fluidounces.
Distilled water, *a sufficient quantity.*	

Mix the magnesia and citric acid in a mortar, and add one and a half fluidounces of water, stir with a pestle, and break up the lumps of acid, if any. After solution is effected, add sufficient water to make up the amount of one bottle nearly full when mixed with the syrup, strain if necessary. In bottling, *pour the syrup in first,* avoiding contact with the mouth and sides of the bottle as much as possible. Then pour upon it the solution as gently as possible at the start, afterwards more rapidly, letting the liquid run down the inside of the bottle so as to avoid agitating the syrup. Then cork and tie down the stopper, and shake the mixture. It will be ready to use immediately.

There will be an excess of acid, but it will make the preparation more palatable. It is probable, however, that 400 grains would be all-sufficient. The syrup should be thick. If a little care be taken, there will be scarcely any escape of carbonic acid gas from the bottle, as the liquid will dissolve it almost as fast as generated. In fact, there will be less than is usually lost when the bicarbonate of potassium is employed in small crystals or in powder. It is possible, however, to use finely powdered bicarbonate of potassium to a good purpose, if a simple, flavoured syrup, *minus* the citric acid, be also used. In this case, put the bicarbonate in the bottle first, then the syrup, and lastly, the solution of citrate of magnesium, cork tightly, as usual, and shake. This will be ready almost as soon as shaken, but the syrup of bicarbonate of potassium renders the process more expeditious, as the weighing out of the bicarbonate is dispensed with, by being included in a measured portion of syrup.

These recommendations are not intended to imply any superiority as to the quality of the solution thus prepared over that made by the present authorized formula, but it is medicinally the same, and may be made in a shorter time.

PRESERVATION OF CATERPILLARS BY INFLATION.

Mr. Samuel Scudder describes, in the *American Naturalist* for June, an admirable method for the preservation of caterpillars, first introduced by Mr. Gossens, of Paris, by which the delicate colours, as well as the hairy or spiny appendages, are better preserved than by any other method. The instruments necessary for the operation, of which drawings are given in the original paper, are a small tin oven, a spirit lamp, a pair of finely-pointed scissors, a pair of forceps, a little fine wire, and a straw, a fine glass tube being sometimes substituted for the last. The caterpillar is first killed by a drop of ether, or a plunge in spirits ; and, if hairy, should be allowed to remain at least half-an-hour in alcohol, and then to rest on bibulous paper for forty-eight hours, to prevent the hairs subsequently dropping off. The vent is then slightly enlarged by a pair of scissors, the caterpillar laid on bibulous paper or soft cotton cloth, and the contents of the body forced out through the enlarged vent by very gentle pressure between the finger and thumb, gradually advancing from the tail to the head ; the intestinal tube being removed by a pair of forceps. Great care must be taken not to injure the skin, or to allow any of the contents of the body to soil its exterior; if cleverly performed, the body is then reduced to a mere pellicle. A syringe is sometimes used for the extraction of the contents. A straw of the proper size is then selected, and the skin of the caterpillar carefully drawn over it without creasing it, for nearly a quarter of an inch, and fixed by passing a delicate pin through the anal plate and the straw. The oven is then heated, and the caterpillar kept extended horizontally on the straw by blowing gently and steadily through it ; and it may, from time to time, be withdrawn for a short time, to improve the shape with the fingers. It should be dried until a rather forcible touch will not cause it to bend ; it may then be removed and is ready for mounting. A piece of wire a little more than twice the length of the caterpillar is cut, bent double, and introduced into the empty skin as far as the forceps will allow ; the skin is then drawn very carefully over the wire, on which a little shellac has been placed, which will smear the inside of the skin and fix it when dry, the free extremities of the bent wire reaching nearly to the head. The doubled end of the wire is then bent lightly round a pin, and the specimen placed where it will dry thoroughly for two or three days before it is removed to the cabinet. This mode of preserving caterpillars is said to be in extensive use on the Continent of Europe.

FIRE AT A WHOLESALE DRUGGISTS'.

On Tuesday last the extensive block of premises belonging to Messrs. Wright, Sellers, and Layman, wholesale druggists, etc., situated in Southwark Street, Blackfriars Road, London, were destroyed by fire. The premises were secured by large iron shutters, and were six floors in height. At four o'clock A.M. a passing police-constable had his attention drawn to a cracking noise proceeding from Messrs. Wright's premises. Upon crossing the road he was met by a body of smoke issuing from the lower part of the building. The powerful steam fire-engine, by Messrs. Merryweather, stationed at Southwark Street, was the first to arrive on the spot, but the flames had now made terrible progress. Immediately after the firemen had begun their labour an explosion took place, blowing down the front of the building and the large iron shutters. Several members of the fire brigade had a narrow escape of being buried beneath the falling *debris.* This explosion was followed by a second one, which hurried the second and third floors, with two of Chubb's heavy iron safes, to the ground, causing great excitement among the vast number of spectators who had assembled to witness the conflagration. By half-past five the place presented a total wreck, and the flames were then threatening the buildings on either side, but the firemen happily succeeded in saving them.

The Pharmaceutical Journal.

SATURDAY, AUGUST 1, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CONFERENCE MEETING.

WITHIN the last few days we have learnt with some surprise that many members of the trade in the metropolitan district were still unaware what were to be the proceedings next week in connection with the Conference meeting. In order to supply the want of information in this respect, we think it desirable to repeat somewhat more fully the general sketch of the programme published in this Journal some weeks since.

In the first place, the business and pleasure work of the meeting will extend over four days, commencing on the 5th and ending on the 8th of August. During the first three days there will be an Exhibition of objects relating to Pharmacy, in the rooms of the Pharmaceutical Society's house at Bloomsbury Square. This Exhibition will be open on those days from ten in the morning until six in the evening, and, if we may judge from previous exhibitions of the kind, it will no doubt be both useful and interesting to many of our visitors.

On the evening of Wednesday next there will be a Conversazione, given by the President, Vice-President, and Council of the Pharmaceutical Society, to which all members of the Conference are invited.

On Thursday the special business of the Conference will commence, as usual, at ten o'clock, with the election of new members, the reading of the Report of the Executive Committee, and the reception of Delegates. Then will follow the Address of the President-Elect, Mr. T. B. GROVES, and after that the reading and discussion of papers will be proceeded with.

In the evening of Thursday, the Annual Dinner of the members of the Conference and their friends will be held either at the Inns of Court Hotel or elsewhere, as may be found desirable. Of this timely information will, of course, be furnished by the Local Secretary to those who have communicated their intention of being present.

On Friday, the reading and discussion of papers will be continued, and the election of officers will terminate the general business of the meeting.

On both these days Luncheon will be provided in the upper rooms of the Society's house, between 12.30 and 2 o'clock, the Local Committee inviting all who attend the meetings to partake of it. In this way, loss of time and trouble will be avoided.

For the purpose of showing at one glance not only the hours at which the above-mentioned engagements, but also those at which the meetings of the Executive Committee are to take place, we have drawn up in a tabular form, the following list, which we hope will prove useful as a remembrancer.

DAY.	HOUR.	BUSINESS.
WEDNESDAY . . .	10 A.M. to 6 P.M.	Exhibition of Objects relating to Pharmacy.
" . . .	4 P.M.	Meeting of Executive Committee.
" . . .	8 P.M.	Conversazione.
THURSDAY	10 A.M. to 4.30 P.M.	Meeting of Conference: Election of Members—Report—Reception of Delegates—President's Address—Reading of Papers and Discussions thereon.
"	10 A.M. to 6 P.M.	Exhibition.
"	12.30 to 2 P.M.	Luncheon, set out in the Upper Rooms.
"	7.30 P.M.	Annual Dinner of the Conference.
FRIDAY	9 A.M.	Meeting of Executive Committee.
"	10 A.M. to 4.30 P.M.	Meeting of Conference: Election of Members—Reception of Delegates—Reading of Papers and Discussions thereon—Election of Officers, etc.
"	10 A.M. to 6 P.M.	Exhibition.
"	12.30 to 2 P.M.	Luncheon, set out in the Upper Rooms.
SATURDAY	———	Excursion down the Valley of the Thames, between Marlow and Maidenhead.

On Saturday there will be an Excursion from London to Cliefden Wood and Maidenhead, to which provincial members of the Conference and foreign delegates are invited by the London members of the trade. A special train will convey the party by the Great Western Railway from Paddington to Great Marlow, where boats will be in readiness for continuing the journey by river through one of the most picturesque parts of the Thames valley, past Cookham Dean and Cookham to Cliefden, where, by the kind permission of the Duke of Westminster, the party can land, to ramble through the woods for a while, until it is time to return to the boats and proceed to Maidenhead Bridge, at which place luncheon will be provided. In the evening a special train will bring the party back to London.

Among the other arrangements that have been made for the convenience of visitors must be mentioned the provision of a room for their special accommodation, at the Inns of Court Hotel, in Holborn, and close to the Society's house. This hotel has been selected as the "head-quarters," where probably most of the provincial members of the Conference will stay, and thus have a greater opportunity of becoming acquainted with each other than if distributed in different parts of London.

Before concluding our account of the various features of attraction of this meeting, we must add the following list of papers to be read. It is perhaps subject to some revision, but will nevertheless show that there will be much interesting matter brought before the meeting.

Barnes, Mr. J. B.—Notes on Extracts.
Barton, Mr. H.—Liquid Extract of Sarsaparilla.
Flückiger, Professor.—The Stearopten of Oil of Nutmeg. A second Paper on another subject.
De Vrij, Dr. J. E.—Chemistry of Cinchona Bark, with reference to its use in Pharmacy. Extract of Pomegranate Root Bark as an Anthelmintic.
Gerrard, Mr. A. W.—The Official Plasters; improved formulæ for their preparation.
Groves, Mr. H.—Medicinal Plants in popular use amongst the Tuscans.
Groves, Mr. T. B., F.C.S.—Further Report on the Aconitine Bases.
Haffenden, Mr. H.—The Confections of Pharmacy.
Heathfield, W. E., F.R.S.E.—Notes on Extracts of Aconite, Belladonna, Hemlock, Henbane, and Colchicum.
Hunt, Arthur.—Notes on Chinese Pharmacy in Hongkong.
Keyworth, Mr. G. A.—The Decomposition of Water.
Muir, Mr. M. M. P., F.C.S.—Potable Water, and its contamination in House Cisterns.
Proctor, Mr. Barnard S.—The Diluted Hydrocyanic Acid of Pharmacy.
Savage, Mr. W. D.—Apprentices, Assistants, and Masters, and their relative duties.
Schacht, Mr. G. F., F.C.S.—Experiments on Juice and Extract of Conium.
Shenstone, Mr. W. A.—Notes on the Diluted Hydrocyanic Acid of Pharmacy.
Smith, Mr. E.—Utilization of Iodoform Residues.
Stoddart, Mr. W. W., F.C.S.—Modification of Liebig's Process for the estimation of Phosphoric Acid. Notes on Sulphate of Copper.
Tichborne, Professor.—The use of Oleic Acid in Pharmacy.
Williams, J.—The Preservation of Diluted Hydrocyanic Acid.
Wright, C. R. A., D.Sc.—On the Essential Oils of Wormwood, Citronella, and Cajeput. New Derivatives from the Opium Alkaloids.

THE REPORT ON THE APOTHECARIES' LICENCES BILL.

The Special Report of the Select Committee on the Apothecaries' Licences Bill, which we publish this week at page 94, will, at any rate, dispose of this matter for the present Session of Parliament. We think, however, that it will be found to bear internal evidence that the investigations of the Committee have failed to elucidate many essential points connected with the contemplated amendment of the law as regards the practice of pharmacy in Ireland. In many respects the recommendations of the Committee appear more like the expression of a foregone conclusion than the result of thorough consideration of all the facts of the case.

There is also an air—we had almost said a peculiarly Irish air—of inconsistency in the recommendations. Thus, for instance, while recognizing the importance of complete reciprocity between Great Britain and Ireland in regard to the practice of pharmacy, the Committee offers the recommendation that a distinct Pharmaceutical Society should be created and maintained for Ireland. To our mind such a proceeding would be totally incompatible with that reciprocity which the Committee declare to be admissible.

The reasons given for recommending the formation of a separate Pharmaceutical Society for Ireland do not bear out the conclusion. The fact that there has been for many years in Ireland a licensing centre for pharmacy is, we conceive, of less importance than the fact that, as regards pharmacy, that institution has become abortive. Indeed, the exclusive privileges enjoyed by the Apothecaries' Company, and the conditions it imposes in granting licences can only be justified on the ground that an apothecary should prescribe as well as dispense. We do not think it is saying too much to describe this as an antiquated view, and one inconsistent with present tendencies.

The argument that a local centre would be more conducive to the scientific and professional development of pharmacy in Ireland than extending the operation of the Pharmaceutical Society of Great Britain would be, seems utterly fallacious when it is remembered that the like extension of that Society to Scotland actually provided, in that case, not only the local centre, which is rightly considered to be necessary, but also a large portion of the funds requisite for maintaining it.

We do not perceive from what source funds in Ireland, adequate for such a purpose, are to be derived, and if the suggestion to have recourse to grants from the public fund were carried out it would probably give rise to many questions that would seriously interfere with the establishment of reciprocity throughout the three kingdoms. Doubtless, however, this subject will receive the careful consideration of our Council, and for the present, therefore, we refrain from further discussion of it.

YORKSHIRE COLLEGE OF SCIENCE.

At a General Meeting of the Council of the Yorkshire College of Science, held on Friday, July 24, Dr. T. E. Thorpe, F.R.S.E. was elected Professor of Chemistry.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July, 1874.

Present on the 8th, 9th, and 10th—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Taylor, and Umney.

On the 14th and 15th—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

On the 16th—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Gale, Hills, Linford, Martindale, Schweitzer, Taylor, and Umney.

On the 17th—Messrs. Allchin, Barnes, Benger, Carteighe, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Taylor, and Umney.

On the 20th—Messrs. Allchin, Barnes, Benger, Bottle, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, Taylor and Umney.

On the 21st—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

On the 22nd—Messrs. Allchin, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

On the 23rd—Messrs. Allchin, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Taylor, and Umney.

On the 24th—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Taylor, and Umney.

Dr. Greenhow was present on the 8th, 15th, 22nd, and 24th, on behalf of the Privy Council.

MAJOR EXAMINATION.

Twenty candidates presented themselves for this examination. *Five* failed. The following *fifteen* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

	*Fairman, George Peters	London.
	*Whyte, Alexander	London.
	Symons, William Henry	Barnstaple.
	Hunt, Freeman William	London.
	Smith, Thomas James	Spalding.
	Collier, Henry	Chatteris.
	Compton, Arthur	Reigate.
	Cotterell, William Burbidge	Dover.
	Green, Thomas	Belfast.
	Thirlby, William Arthur	Ashby-de-la-Zouch.
	Aylesbury, William Thomas	Brighton.
	Hamond, Joseph	Peterborough.
	Norman, Joseph Slaughter	Royston.
	Thring, Edmund John Henry	Trowbridge.
	Kirkby, Robert	Ulverston.

MINOR EXAMINATION.

Three hundred and three candidates presented themselves for this examination. *Two hundred and thirteen* failed. The following *ninety* passed, and were declared qualified to be registered as Chemists and Druggists:—

	*Jones, Jabez Abraham	Birmingham.
	*Fowler, Thomas	Torrington.
	Ashbourne, Charles	Birmingham.
	Long, Theophilus H. Beavan	Brighton.
	Atmore, Edward Alfred	King's Lynn.
	Warriner, Charles William	Nottingham.
	Axford, John William	Coventry.
	Townend, Thomas Francis	Durham.
	Purvis, Thomas Alexander	Gosport.
Equal.	Brown, George German	Dresden.
	Hemingway, Edward	London.
	Lloyd, Rees	Dowlais.
Equal.	Bunn, Charles Grinling	Colchester.
	Miles, Charles John	Bristol.
	Wedge, George Deller	Alresford.
	Brend, Kenneth Benjamin	Swansea.
	Holmes, Alfred John	Preston.
Equal.	Catford, Obadiah William	Chard.
	Hayhoe, William	Diss.
	Pattrick, George	Long Sutton.
	Street, John Westrope	Melton-Mowbray.
Equal.	Coleman, Edward James	Cardiff.
	Garratt, Arthur	Guildford.
	Woolston, Thomas Henry	Faversham.
	Bamfield, John	Bristol.
Equal.	Owen, Phillip Nicholas	Carmarthen.
	Price, John	Swansea.
Equal.	Clifford, Richard Noon	Melton Mowbray.
	Mill, John Brown	Coventry.
Equal.	Cooke, Edmund Herbert	Northampton.
	Head, John	Waterfoot.
	Hues, William Richard	Everton.
Equal.	Beardsley, James	Nottingham.
	Pumphrey, John Henry	Evesham.
	Wilson, Griffith Phillips	Merthyr.
	Josling, Alfred	Chelmsford.
	Wilks, Robert	Skipton.
Equal.	Bailey, Richard John	Spalding.
	Tomlinson, Eldred Edward	Whitehaven.
Equal.	Ashmore, George Johnson	Lindsworth.
	Hodgkinson, Peter James	Congleton.
	Holmes, George	Sheffield.
	Perry, Edward Charles	Wareham.
	Pain, Edwin	Dover.
Equal.	Knight, William Tomlinson	Nottingham.
	Sampson, George	Chesterfield.
Equal.	Jerrett, Edward	Salisbury.
	Passmore, Charles Frederick	Kilburn.
	Bray, Ernest Edward	London.
Equal.	De Carle, Horace Edward	Norwich.
	Loadman, James	Liverpool.
	Stephenson, Robert	Bradford.
	Halse, Thomas	Tiverton.
Equal.	Duncalf, James Mills	Congleton.
	Owen, Rowland	Holyhead.
	Pritchard, Samuel Evan	Bangor.
	Tigar, Harwick Brigham	Beverley.
Equal.	Breese, Thomas	Norwich.
	Davis, Henry John	Newbury.
	Hall, Peter	Sunderland.
	Harston, John Frederick	Lincoln.
	Sneath, Thomas Dixon	Newark.
	Bathe, Frederick James	Chippenham.
	Wells, John	Sleaford.
	Morson, Thomas Pierre	London.
	Ewell, Richard Michael	Sandwich.
Equal.	Cuttle, Arthur Edward	Scarborough.
	Dear, Theophilus	Hornsey Rise.
	Garth, John	Preston.
	Jeffery, Henry Thomas	Tring.
Equal.	Hitchcock, James	Whittington Moor.
	Wigginton, Alfred	Islington.
	Davies, Arthur	Swansea.
	Legg, Henry Arthur	Kingsland.
Equal.	Hogg, Edward Grindle	Ealing.
	Padwick, William Guy	London.
	Waddington, Herbert	Thornton.
Equal.	Endle, Frederick	Barnstaple.
	Glyde, Henry Alfred	Bedford.
	Smithurst, John	Nottingham.
	Stedman, Harry Bernard	Bayswater.
Equal.	Gimson, Joseph	Leicester.
	Lloyd, David	Merthyr.
	Marrion, William	Oakengates.
	Read, John Henry	London.
	Ronchetti, Thomas Angelo	Stockton.
	Rowland, Edward Edisbury	Liverpool.
	Solomon, Charles Edwin	Penryn.
	Walton, David	Manchester.
	Kimber, Benjamin Tindall	Southampton.

The above names are arranged in order of merit.

* Passed with Honours.

PRELIMINARY EXAMINATION.

Certificates as undermentioned were received in lieu of the Society's Examination.

Certificates of the College of Preceptors.

Ashton, Henry ....Lynn.
Gantlett, Henry ....Wolverhampton.

Parliamentary and Law Proceedings.

SPECIAL REPORT OF THE SELECT COMMITTEE ON THE APOTHECARIES' LICENCES BILL.

Your Committee having examined witnesses on the general questions raised by the provisions in the Bill submitted to them, have agreed to the following report :—

That a great deficiency is admitted to exist in Ireland of shops for the sale of medicines and compounding of prescriptions, by which serious inconvenience is entailed on the public.

That this deficiency arises from the exclusive privileges enjoyed by the Apothecaries' Company, and from the high and consequently expensive standard of qualification which it has thought it necessary to maintain, in accordance with the view that an apothecary should prescribe as well as dispense medicines.

It was suggested to remedy this deficiency by extending to Ireland the operation of the Pharmaceutical Society of Great Britain as it has been extended to Scotland ; but your Committee recommend, in preference, the formation of a separate Pharmaceutical Society for Ireland, especially on the following grounds :—

a. That in Ireland there has been for many years a licensing centre for pharmacy. There was no similar institution in Scotland, at the date of the extension of the English Pharmaceutical Society to that country.

b. That a local centre will be more conducive to the scientific and professional development of pharmacy in Ireland, this effect having been found to result in the analogous cases of the medical and surgical schools.

c. That the evidence we have heard leads us to believe that there exist in Ireland ample materials for the creation and maintenance of a Pharmaceutical Society.

Your Committee, feeling how important it is that complete reciprocity should exist between the Pharmaceutical Societies of Great Britain and Ireland, recommend that the examinations and qualifications in each of the three kingdoms be identical ; the fees to be paid for examination, licence, and registration, be equal ; and that registered licentiates of each kingdom shall have equal rights and privileges in the three kingdoms respectively.

Your Committee further recommend the adoption of a common register for both Societies, and that both be subject to Government supervision.

Your Committee suggest the following as a scheme for creating a Pharmaceutical Society in Ireland, viz., that the Society be formed by naming, in the first place, a certain number of fit and proper persons to be foundation members ; with power to make bye-laws, lay down a scheme of examination, and appoint a Board of Examiners, subject to the approval of the Lord Lieutenant in Council.

That a first Board of Examiners be appointed, with representatives from certain scientific bodies, which have expressed their willingness to co-operate.

Your Committee are of opinion that the new Society should be independent of the control of any existing body.

That after a date to be hereinafter named, no person whose name is not on the register of the Pharmaceutical Society of Great Britain and Ireland (with the exception of the licentiates of the Apothecaries' Hall of Ireland) should be permitted to sell any of the articles scheduled or to be scheduled as poisons under the Sale of Poisons Act, Ireland, 1870 ; or to compound prescriptions containing any such articles.

That the restrictions and penalties on the sale or compounding of medicines or poisons contained in the Act 33 Geo. 3, c. 34, be abolished.

That the interests of existing traders affected by the foregoing resolutions as to the sale of poisons, should be protected.

It has been suggested to your Committee that the introduction into Ireland of men qualified by a shorter and less expensive process to practise as pharmacists would unjustly affect the interests of the licentiate apothecaries, who at present possess the exclusive right of so practising, and have obtained it by a longer and more expensive process.

It would appear, however, that the more expensive qualification also confers a more extended power of practice, with which it is not proposed to interfere ; and your Committee is of opinion that no such case of hardship would arise as to call for legislative interference.

Your Committee, in conclusion, report that it is not expedient to proceed further with the Bill referred to them ; but that, in their opinion, the Executive Government should at the earliest opportunity introduce into Parliament a measure framed in accordance with the resolutions in this report.

HOUSE OF COMMONS.

CO-OPERATIVE SUPPLY ASSOCIATIONS.

On Tuesday night, Sir Thomas Chambers called the attention of the House of Commons to the inexpediency of associations for trading purposes being established and conducted by *employés* of the Government, under the name of co-operative supply associations. He said he had no objection to the system of co-operation for the purpose of enabling a number of persons to facilitate the supply of their own wants, as distinguished from carrying on trade to supply the wants of those who did not form a portion of the body corporate. But it was felt by many persons that under the name of co-operative stores and civil service supply associations there had been a regular system of trading, and they wished the attention of the house to be called to the fact that under the name, guise, and pretext of co-operative associations, certain civil servants of the Crown had been carrying on a very large system of trading, which could not be distinguished from ordinary trading. These associations were not carried on on the principle on which co-operative associations were carried on. He held in his hand a document which had recently been issued, headed "Civil Service Supply Association, Limited," which showed the state of its affairs on the 28th February last. It stated that the total purchases of that establishment alone, during the half-year ending on the 28th February, amounted to £773,364 1*s.* 8½*d.*, and the total amount received from sales was £819,428 1*s.* 1*d.* The net profits for the half-year were over £9000, which, added to accumulated profits account of that institute, amounted to £90,000. He believed that the returns of all these societies together were upwards of £2,000,000, and that their profits were very large. The profits made by these associations were made in the way in which ordinary tradesmen or companies made their profits—not simply by selling at a price to cover the cost and distribution, but on the principle of selling some articles at a loss and others at a large profit. The association to which he referred consisted of 4500 members and 15,000 ticket-holders, who had the privilege of purchasing ; and at the last meeting a motion was to be made that the 15,000 ticket-holders should be increased to 30,000. They, therefore, were not co-operative but trading societies, set up in competition with retail tradesmen by the civil servants of the Crown, and ought properly to be called limited trading companies. The hon. member then drew attention to the prospectus of a society set up to displace the original civil service co-operative stores; which, after stating that the profits of the old society had been £90,000, went on to say that accumulation of profits so large was a direct infringement of the main principle of co-operation, which was that after paying all expenses and allowing a fair dividend for the capital employed, all the profits belonged to the purchasers. It stated that four-fifths of the original members (viz., 17,000) were ticket-holders, and proposed that they as well as shareholders should be entitled to the benefits of the new organisation; so that the large profits realised should be devoted to the customers, and not exclusively to the shareholders. The regulations, after all, were not co-operation but trade, and he could not see why her Majesty's civil servants should be allowed to set up this gigantic trading association against the efforts of individual shopkeepers. He had received a private letter from Dublin, date June 8, giving him a few notes respecting the doings of the only society of the kind in Ireland. It was established in 1862, and it well illustrated the temptations into which such societies not unnaturally fell. The first prospectus stated that civil servants, having only fixed and generally small salaries, found it difficult to meet the enhanced prices of every article of consumption in their families, and that therefore the articles of the association would be supplied at such a reduced rate as would only leave a narrow margin to cover the expenses. If that had been adhered to there would be nothing to complain of, but in less than a year the fundamental principle of the association was broken, through, and the temptation to make it a trading association was found to be irresistible. It appeared from the complaints of those who set them up that these associations had gone far beyond the original intention. That intention was no doubt justifiable, because it included the poorer civil servants; but now the poorer were excluded and the wealthier alone benefited. Again, it proposed to deal with the necessaries of life; but in the more modern forms every conceivable luxury was supplied from the stores. The Haymarket society, for instance, included amongst the customers it was founded to benefit, as stated in its prospectus, not only civil servants but peers, members of parliament, officers of naval and military rank, and clergymen. Indeed, to use the words of one of their own writers, the whole affair was now a gigantic sham, and there was nothing to distinguish them from ordinary trading societies. To the work of carrying on these societies a large number of gentlemen in the civil service devoted their time, which was contrary to the Queen's regulations. Public time was not unfrequently devoted by these gentlemen to the management of these societies, which, as he had stated, had transactions covering an outlay of £2,000,000 a year. Complaints had reached him of the way in which the canteen at Woolwich was conducted, and he had been informed that the canteen servants in uniform called on private person for orders and for the delivery of goods. There was only one other point on which he would trouble the house. The societies now not only supplied all the luxuries of life, but they made up physicians' prescriptions (a laugh), thereby acting in direct contravention of the laws relating to apothecaries. The house would, he thought, be of opinion that he had made out his case; but all he wanted was an assurance from the Government that all this was not done with the sanction and approval of the Government.

Mr. Forysth expressed his general concurrence in the views of his hon. and learned colleague. He wished the house to clearly understand that those who objected to these co-operative stores did so not because they denied the right of the civil servants to combine to buy things wholesale and sell them retail among themselves, but because civil servants had become shopkeepers on a gigantic scale, and were selling not only among themselves but also to the outside public. It was perfectly well known that these stores were not confined to the civil servants, but that they were conducted as commercial speculations. He himself knew of a case where £80,000 had been divided among the outside public. What the tradesmen said was, that these civil servants were the paid servants of the Crown, that the shopkeepers contributed towards those salaries, and that it was somewhat unfair that they should be allowed to compete with the regular shopkeepers. Another objection raised by the tradesmen was that the civil servants were supposed to devote their whole time and attention to the service of the State, and that it was an injustice to the public to allow them to become clerks, managers, and directors of these associations, where they employed time which, properly speaking, belonged to the state.

Mr. Macdonald said that this was, he believed, the first effort which had been made to put a stop to the thrift and providence of a large body of the people of London, and he did hope that the house would not countenance the attempt. It was contended that these civil service stores were not carried on on the co-operative system. He ventured to say that all which had been said against the civil service stores applied with equal force to all such stores throughout the country. At Rochdale, for instance, which was the home of the co-operative system, the principle had been acted upon from the commencement of allowing the general public to purchase in the stores. Nay, the promoters had even gone the length of giving a bonus to the public to induce them to purchase. That system had, in fact, been adopted throughout the entire country. When the civil service stores were complained of it ought to be borne in mind that, besides saving money, they were established to supply good, pure, and wholesome articles. There had been a system of adulteration and public poisoning going on for a long time, which the founders of the stores determined to put down, and it was being done effectually. If the regular dealers would supply good articles, and would be content with smaller profits, they would soon reclaim back their customers.

The Chancellor of the Exchequer said the hon. and learned member had made a very temperate statement, and had so commended the question to the attention of the house. But it ought to be borne in mind that the question was naturally one of very great difficulty, and one that was by no means free of embarrassment. For instance, in regard to one of the last points which the hon. and learned gentleman has mentioned—that relating to the sale of drugs—he (the Chancellor) might be permitted to make a suggestion which applied to the rest of the hon. and learned gentleman's argument. Undoubtedly, if the effect of selling drugs at stores was such as in any way to endanger the public interests in regard to matters which were of great importance, it must be observed that even were the Government to take strong measures, and were to put down these stores, there could be little doubt that the system which had been initiated, and which had proved such a financial success, would be at once taken up and worked by others. In that case the difficulties of which the hon. and learned gentleman had given them an illustration in the case of drugs would present themselves under another and a similar system of association. Therefore such difficulties, if at all, must be dealt with by some general system of legislation designed to prevent such abuses. They could not be dealt with simply by the interference of Government in the way of putting down these particular associations. Attention would be given to the subject, but if any legislation was felt to be necessary it would have to be proceeded with cautiously. He would say at once that the attention of the Government would be given to any matters of that sort in order to decide whether or not any remedies were required. But with regard to the general question of the carrying on of this system by the civil servants of the Crown, and as to whether the Government ought to interfere to prevent, limit, or regulate in any way that system, the house would perceive that two questions here arose of very considerable importance. The first was whether the tradesmen of the metropolis had a right to complain of the competition to which they were subjected by this system. He thought that the history of the co-operative movement seemed to prove that they had not. A number of the civil servants employed in the Post Office and elsewhere thought that they could provide themselves with certain articles at a cheaper and better rate than that at which they got them from their tradesmen. When they dealt with their tradesmen they found out that they were subject to many disadvantages. They were charged the highest price for articles, and the latter were found not to be of the best quality. Those high prices were charged in order that the bad debts might be covered which were contracted by the tradesmen under the credit system. They thought they would be protected from these evils by introducing among themselves a system of co-operation, founded upon the ready-money principle. No doubt it was a very great advantage to a large body of public servants that they should be able to supply themselves upon moderate terms, and upon a system which would prevent them running into debt. But when they established this system they were met by a counter movement on the part of certain of the retail traders, who endeavoured to crush the movement by inducing the manufacturers and wholesale dealers to refuse to trade with the gentlemen who had started the stores. The consequence was that the latter were compelled, acting upon the principle of self-defence, to extend their system and bring in a number of outside customers. The hon. and learned gentleman said these stores had become trading societies. That was a matter with which they had very little to do. He, for one, did not see where the line was to be drawn, or how they were to say that co-operation, within certain limits, was reasonable, but beyond those limits was unreasonable. But then there was another side of the question, and one which raised considerations of extreme difficulty. That was not so much the political or the economical question as the question of the administration of the public service. Here also arose a very difficult point for consideration, and that was how far public servants ought to be allowed by Government to embark in business of a remunerative character outside and beyond their own duties. He confessed that was a matter which had often caused him considerable anxiety, and it was one upon which he had not even yet come to a clear and definite conclusion. No doubt it could be contended that you engaged the services of those gentlemen, that you paid them for their time, that their time ought to be given up to you, and that it was an abuse to allow them to employ their time carrying on business on their own account. Well, if they laid down that doctrine they must apply it not only to civil servants who traded, but to civil servants who embarked in any other kind of extra employment. Much undoubtedly could be said on that point also. Between these views of the question it was very difficult to decide. He was anxious not to come to any definitive conclusion at present, the more especially as the whole question of the reorganisation of the civil service was under review. A commission was sitting which might soon be able to report, and which report might likely contain some very valuable suggestions. All, therefore, he would now say was that he admitted there was a great deal in the argument which had been brought forward by the hon. and learned member. On the other hand it was manifestly an advantage to the whole country that the civil servants should be able to supply themselves with cheap and pure articles. He would promise that the attention of the Government should be devoted to the subject.

Poisoning by Oxalic Acid.

Mr. Bedford held an inquest, on Monday, at Westminster Hotel, on the body of a man named John Stevens, aged 67. It appeared that at 7.30 on Saturday morning last the deceased walked into the hall of Westminster Hospital, and addressing the night porter, said he had taken poison, because he wanted to die, for he was a wicked man. He appeared to be quite sober and sensible. The porter at once called Mr. Parkhouse, the house-physician, who attended immediately, and to whom the deceased said he had taken a quantity of oxalic acid, handing him at the same time a paper packet which had contained oxalic acid and was marked "poison" on the outside, adding that he had taken the poison in its solid state in Peter Street, close by the hospital. The usual remedies were at once applied, but did not appear to have any effect, the deceased became pulseless and sank in a state of collapse, dying in less than an hour after coming to the hospital. Mr. Parkhouse said he had made a *post-mortem* examination of the body, which was well nourished. The gullet and stomach of the deceased was highly inflamed and corroded from the action of an irritant poison. The symptoms were such as would be produced by oxalic acid. He had no doubt the deceased died from this cause. The clothes worn by the deceased at the time of his death have been searched, but nothing was found to give any clue to his friends. The jury returned a verdict in accordance with the medical evidence.

Attempting Poisoning by Vermin Killer.

At the Summer Assizes, at Lancaster, on Saturday last, Charles Stansfield, plumber, was charged, before Mr. Justice Archibald, with astempting to administer poison at Fleetwood, on the 15th of March last, to his wife, Mary Stansfield, with intent to murder her.

Mr. Addison conducted the prosecution; the prisoner defended himself at great length.

It appeared that the prisoner and his wife were living with her parents, and that his wife had charged him with going with some other woman. On the 9th of March he purchased a packet of vermin powder, telling the shopkeeper his mother-in-law wanted it to kill rats with. He also told a friend that he would probably never see him again, and bade him good-bye. On the evening of Sunday, the 15th, the prisoner brought in a quart of beer for supper. His wife got out two teacups and he then filled both cups, one for each. While she was drinking he said, "Take a good drink as I do." He then asked her to go for some coals, but she refused until she had had her supper. He then asked her to do something else, and eventually at his request she went for some cake in the pantry. She took the candle with her, leaving him in the dark, and as she went she heard a rustling of paper. On her return she noticed he had her cup in his right hand and the jug in his left. He put down the cup where it stood before, and she then noticed some green powder on the top of the beer. She asked what he had put in the beer, and he replied, "Nothing." He then took the cup and emptied the beer into the ashes. She noticed some powder on the table and on a knife, and asked what it was. He said it was nothing, and wiped it away. She then charged him with trying to poison her, and called out for her mother, who came downstairs. However, the prisoner and his wife went to bed together, and it was not till next day, when the sediment in the cup had been analysed and found to be strychnine, that her father turned him out of the house. The prisoner, on being charged by the police, said he had put no poison into the cup. It was only jalap, and he gave it her because he knew she was bound in her body, and he thought it would do her good. Afterwards he said he was so much troubled about the young woman his wife was jealous of, that he meant to put an end to himself, and the poison was meant for himself and not for her, and he was in the act of drinking it when his wife found him with her cup in his hand. The prisoner had prepared a long list of questions for cross-examination, and also an ingenious speech which he read at great length, but the jury found him *Guilty*, and sentence was deferred.—*Times.*

Reviews.

A MANUAL OF BOTANY, ANATOMICAL AND PHYSIOLOGICAL, FOR THE USE OF STUDENTS. By ROBERT BROWN, M.A., etc., Lecturer on Botany. Edinburgh: William Blackwood and Sons. 1874.

Of the writing of botanical text-books there appears to be no end; and it will be acknowledged that the reasons ought to be very cogent which bring forward one more competitor into the field. Whether in the present case the *raison d'être* is sufficiently obvious is a question on which opinions will probably differ. The plan pursued by the author of the present volume is, in one respect, a novel one, in support of which much may be said. The ground occupied by the science is now so vast, the number of separate facts to be described so enormous, that the attempt to compress even the outlines of the whole into a single volume of moderate size and within reach of the ordinary student in the matter of price, often signally fails. Mr. Brown accordingly treats on the present occasion only of the anatomy and physiology of flowering plants, leaving to another volume the systematic and geographical department, in which will also be included the anatomy and physiology of cryptogams.

Turning first of all to the later portion of the volume, we find many of the subjects treated of more copiously than in other works of a similar character. The phenomena of fertilization, vegetable irritability, etc., are described in detail; and all the most recent publications appear to have been carefully consulted so as to give a *resumé* of the state of our knowledge to the present time. The copious references to the original sources of information will be very useful to the student who wishes to pursue special branches. Of the earlier portion we cannot speak with the same unqualified praise, the author having apparently drawn his statements from a great variety of sources, often evidently without testing their accuracy, and sometimes apparently without even understanding their meaning. The work is disfigured by too many typographical errors; and we must take serious exception to such descriptions as that of stomata as "anomalous cells," and of the "intercellular substance" as if it were something of altogether different origin to the cell-wall itself,—defects which thrust themselves upon us in the first two pages. The chapter on the ultimate constituents of plants contains a large amount of information that will be useful to the student; though even here we find statements which have apparently been inserted without sufficient care; as, for instance, that sodium is "invariably found in all plants," which is not in accordance with the most trustworthy observations; and the somewhat astonishing assertion that carbon "forms, on an average, about one-half of our edible vegetables"!—a statement which would somewhat perplex the student who is told, two pages further on, that 90 per cent. of cabbage, 75 per cent. of potato-tubers, and 91 per cent. of turnips, consist of water. Altogether we do not see that Mr. Brown's Manual is likely to supplant those already in existence.

MANUAL OF BRITISH BOTANY; containing the Flowering Plants and Ferns, arranged according to Natural Orders. By C. C. BABINGTON, M.A., F.R.S., etc. Seventh Edition, corrected throughout. London: J. Van Voorst, 1874.

We have here to welcome the re-appearance of an old friend. Among all its competitors, "Babington" has probably kept its place as the most trusted and widely-used field-companion of the botanist, the work from which the largest number of students have derived their knowledge of the characters of British plants. The portable size, especially of the thin paper edition, and the convenient practice of putting in italics the few words which describe the character by which the species is most readily distinguished from the other species of the genus, have no doubt contributed to this result. Criticism on so well known a work there is hardly room for. Great pains seem to have been taken in keeping it up to our constantly advancing knowledge of British botany, in the addition of newly discovered species and varieties. Several of the larger and more difficult genera, such as *Rosa*, *Rubus*, and *Salix*, have been carefully revised, and the position has been altered of a few genera and species. If it is worth while to allude at all to so trivial a point, it seems a pity that some uniformity cannot be adopted in the use of the terms "rare," "common," and so forth. To take the first page at which we happen to open the book. The locality of *Ajuga reptans* is given as "wet places," and of *A. Chamæpitys* as "sandy and chalky fields;" there being no indication to the young plant-hunter that the former is a plant which he will find almost universally distributed, while he may botanize for years and years without coming across the pretty and rare "ground pine." Precisely the same description is indeed given of the habitat of so widely distributed a plant as *Lamium amplexicaule*, which is, however, by no means confined to "sandy and chalky fields." Again, why is *Senebiera Coronopus* called "common," when the same term is not applied to *Lamium album* or *purpureum?* It would greatly assist the collector if numbers were affixed to the description of each plant to indicate its comparative rarity, such as those employed in the London Catalogue. He will there find the distribution of *Lamium purpureum* indicated by 100, *Ajuga reptans* 90, *L. amplexicaule* 80, *L. album* and *Senebiera Coronopus* 70, *Marrubium Vulgare*, (styled "rare" in Babington,) 40 (?), whilst *Ajuga Chamæpitys* is as low as 10. Why, again, is the honour of indigenousness denied, edition after edition, to *Teucrium Botrys*, which is admitted to be native by every one who has seen it growing in its habitat near Box Hill, and the geographical distribution of which would entitle one to expect that it should be found in Britain? These, however, are microscopic criticisms on a most admirable and useful work.

BOOKS RECEIVED.

DU LAIT ET DE L'ALLAITEMENT. Par CHARLES MARCHAND, Pharmacien de 1er classe, etc. Paris: J. B. Baillière et Fils. 1874. From the Publishers.

A TREATISE ON PHARMACY, designed as a Text Book for the Student and as a Guide for the Physician and Pharmacist, etc. By EDWARD PARRISH. Fourth Edition, enlarged and revised by THOMAS S. WIEGAND. With 280 Illustrations. London: Baillière, Tindall and Cox. 1874. From the Publishers.

Obituary.

THOMAS STANDRING.

We regret to have to announce the death of Mr. Thomas Standring, Pharmaceutical Chemist, late of Piccadilly, Manchester, who was one of the earliest members of the Pharmaceutical Society, and during many years promoted its interests as a member of Council.

The late Mr. Standring served his apprenticeship with Mr. Halkyard, an apothecary in Piccadilly, Manchester, to whose business he succeeded; but about forty-two years ago he purchased the business of Mr. Goulter, No. 1, in the same street, to which he removed and he carried it on successfully until within the last seven or eight years, when he ceased to take any active part, and left the management in the hands of his son, Mr. John Standring, who had been partner with him for some time.

Mr. Standring was one of the visiting apothecaries to the Royal Infirmary for nearly forty years, and the flag of that institution was hoisted half-mast when his death was announced. He always took an active and leading part in any matters connected with the interests of the trade, and was generally chosen president or chairman of the various associations which were formed from time to time amongst the chemists and druggists of Manchester; those only who were intimately associated with him on such occasions knew the amount of time and trouble he devoted to the work, and the liberality and kindly feeling he displayed.

Mr. Standring had been subject for some years to a bronchial affection, and had latterly resided at Southport, for the benefit of the milder climate and the sea-air. He had been staying at Buxton for a few weeks, and appeared much better in health than usual, until Saturday night, the 18th ult., when he was seized with an attack of vomiting, which, becoming serious, his medical attendant was sent for. But medicine was of no avail; a stoppage of the bowels had taken place, which could not be overcome, and he died on the 21st ult., at the age of 72, in the presence of several members of his family, free from pain, and in full possession of his faculties to the last. He was buried at Monton, near Eccles, on Saturday last.

Mr. Standring was first elected to the Council in 1847, and retained his seat for two years. In 1858 he was again elected, and served for three years consecutively, In 1862 he commenced a fresh term of office, which lasted until May, 1869.

Notice has also been received of the death of the following:—

On the 18th July, 1874, Mr. William George Davies, Pharmaceutical Chemist, of Commercial Road, London. Mr. Davies had been a member of the Pharmaceutical Society since 1860.

On the 1st July, 1874, Mr. Thomas Illingworth Holgate, Chemist and Druggist, of Bradford.

Notes and Queries.

GLYCEROLE OF ASSAFŒTIDA.—In order to avoid the tedious and disagreeable operation of rubbing together the assafœtida and water for the mistura assafœtidæ of the U. S. Pharmacopœia, Mr. J. W. Wood suggests (*Amer. Journ. Pharm.*, July, p. 309) forming a solution, or at least suspending the gum resin in a certain proportion of pure glycerine, which mixture could be diluted and used as required. The formula he proposes is as follows:—

Picked Assafœtida	℥ij
Pure Glycerine	℥ij

Cut the assaœftida into small pieces, and together with the glycerine subject it to a moderate heat in a capsule, constantly stirring and triturating with a pestle. In a short time the solution will be effected, and the result will be a liquid, not too thick for easy manipulation, each troy drachm of which will represent fifteen grains of the gum resin.

To prepare, say, four ounces of mistura assafœtida, add to four drachms (troy) of this glycerole sufficient water to make up the measure, shake them together, and the result, Mr. Wood states, is a handsome preparation much less susceptible to change than the official mixture. It is necessary in preparing the glycerole to guard against employing too great a degree of heat, so that the volatile oil may not be dissipated.

A similar method to the foregoing might be employed in the preparation of mistura ammoniaci.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ADULTERATION ACT, 1872.—REPORT OF THE SELECT COMMITTEE.

Sir,—As the result of a preliminary meeting of public analysts, held yesterday, we are directed to announce that a general meeting of the public analysts of the United Kingdom will be held on Friday, August 7th, at the Cannon Street Hotel, at 4 p.m., with a view to the formation of a society for mutual assistance and co-operation. The chair will be taken by Professor Redwood.

Circulars notifying this meeting are sent this day to all public analysts whose addresses are known, but if any are accidentally omitted, the announcement of the meeting in your columns will supply the omission, and we shall be happy to furnish all particulars to any gentleman who will communicate with us.

CHARLES HEISCH, } Hon. Secs.,
G. W. WIGNER, } *pro tem.*

79, *Great Tower Street, London,*
July 29th, 1874.

EXCESSIVE LABOUR IN PHARMACY.

Sir,—I have observed with pleasure that this subject is again being discussed in the Journal, as I was very much surprised and disappointed at the action taken by the Council in resolving to oppose Sir J. Lubbock's Bill, more especially as some of them stated they were in favour of fewer hours, which statement seemed to me altogether antagonistic to their action in opposing the Bill, which would have given them such.

I can understand those who approve of excessive hours of business doing so, but that the Members of the Council and yourself, who are in favour of fewer hours, should oppose the Bill, which would make earlier closing universal, and thereby prevent any special hardship, is to me inexplicable.

Without imputing anything like interested motives, it must be borne in mind that neither of you feel the pressure of the excessive labour, the Council being composed of gentlemen who are able to employ several assistants to do their business, and consequently cannot feel that amount of sympathy and interest in this matter that those do who have to bear its burden and pressure.

If it be right and advantageous alike to employer and employee that shops should be closed earlier, why oppose it? I very much fear that unless such a measure is adopted by the Legislature, early closing will never become universal, as there are in almost every town some members of the trade, both crotchety and selfish, who would oppose anything tending to shorten the hours of business.

In several cases which have come under my own observation, I have noted that even where agreements have been entered into to close earlier, as it has been optional, the selfishness of one or two has broken through the engagement.

For about six months the shops in Looe were closed on Thursdays at five o'clock, and it caused no loss to ourselves or inconvenience to the public, but was highly approved of by both; indeed, it seemed to ourselves like the beginning of a new life. Unfortunately, one of the drapers refused to continue, and consequently it was discontinued, although the members of our own trade were willing and anxious to do so; but, one being an outfitter as well, feared it would interfere with his business.

If Sir J. Lubbock's Bill had become law the selfishness of our neighbour would not have hindered and prevented the pleasure of the rest of us; not being so, however, it happened with us, as in the days of the wise man, that "one sinner destroyed much good."

While strongly urging endeavours to be made to induce a voluntary earlier closing, still more strongly would I urge the Council to reconsider the matter, and support Sir J. Lubbock's Bill, feeling assured that nothing less will meet this matter in its entirety. I would also urge all who are interested to write to their Members of Parliament, when the Bill is again introduced, asking them to support it.

The Council have not been very reluctant to apply for Parliamentary powers in other matters, and if it was right then, why object to Parliamentary interference when it will be attended with very great advantage to large numbers.

Of course, as you say, it will cause some amount of inconvenience; so has former legislation to a great many. Some of us, however, are so accustomed to inconvenience, that it does not trouble us very much, and it is to be hoped that we have learnt of two evils to choose the least, more especially as the inconvenience would only be of a temporary nature. The public would soon become accustomed to the earlier closing and make their arrangements accordingly.

To say a word as to the necessity and advantage of early closing seems to me unnecessary, as I have found in the course of my experience, both in London and provincial towns, very great regret expressed at the excessive and unnecessary hours of business, and the fact that it is already adopted in some towns shows it to be practicable.

I have been surprised to see the statements made respecting the salaries obtained by chemists' assistants. £50 or £60 per annum, indoors, is not a large amount, it is true, but if any man who understands his business works for less, he is, I think, acting very foolishly.

Twelve years since, when not 23 years of age, my salary in London was more than that indoors, and assistants are not so plentiful now as they were then. The comparison between the position of a joiner and chemist's assistant seems to me most anomalous, inasmuch as a joiner has not much opportunity of raising himself to a higher position, whereas any chemist's assistant can do so if he chooses to take the trouble.

JAMES S. HICKS.

Looe, July 27, 1874.

Sir,—It is very consolatory to me to observe that I am not the only pharmaceutist crying aloud over his grievances. From the correspondence which has recently appeared it may be inferred that what I complained of in my first two letters was not a particular, but a general grievance, and our troubles seeming now to have reached their highest point, our united efforts and a determined will are all that are required to remove them.

The Editor seems to espouse Mr. Cardell's suggestion, "To act according to what the majority of chemists wish should be done in the matter," and hints that, instead of supporting Sir J. Lubbock's Bill, we should put our shoulders to the wheel and get the waggon out of the rut ourselves—advice which cannot be put into practice, since past experience has proved it.

My senior partner tells me that, forty years since, it was agreed by the chemists here to close earlier, as well as to raise the prices of drugs. One chemist acted as a spy upon the others, and sent a messenger round the town, to notice which of them kept open longer, or sold their goods at a lower price than they had agreed to. There was no fidelity amongst our brethren then, and the whole scheme soon fell to the ground. The same remark may be repeated now, and I might give several instances to maintain it. One part of Mr. Cardell's plan is therefore impracticable. "As it was in the beginning, is now," etc.

There are three means by which we might do all we require. They are :—

The Pharmaceutical Society.
The formation of a trade's-union.
Sir J. Lubbock's Bill.

And why should we not expect our Council to take active steps to raise our position, and grant us our freedom? I went to the door of our Alma Mater and knocked. I was distressed, hard-worked, underpaid, and asked for help. Notice the answer she gave me—"This is a matter not purely pharmaceutical; I cannot receive you." Soon afterwards, however, I visited her again, more distressed than ever, and we all now see her answer—"The exertion of personal influence and example." Possible to the majority of us, but only in small things, and therefore driving us to extremities, to form a trade's-union, to rekindle the spark of secession, or perhaps do something as bad.

And have we no right to ask her attention to our wants! She is our legitimate parent, and ought to hear, as well as to appease, our wailings.

But it may be that a trade's-union would do more in every way than the Society has yet done for us. It would bring us prominently before the world as a class of workers entitled to respect and remuneration. We might expect then eight hours instead of twelve or fourteen, our ordinary day of labour, also "a fair day's wage for a fair day's work," which is certainly what we have not yet arrived at. The "rattening," however, the only drawback, would be unbecoming of good men.

Without putting ourselves to the trouble of canvassing in towns, in order to make an arrangement which past experience has taught us will be ephemeral, let us all agree to invite Sir J. Lubbock's Bill, which will make us all equal. I hold fast to the belief that nothing else will protect us from excessive labour. A clause to be inserted, whereby medicines only should be supplied after what any reasonable person would consider a fair day's labour for men engaged in a very responsible and learned profession.

I have no doubt Sir J. Lubbock has had his attention drawn to our complaints. How his heart will pulsate, and what stimulus will he receive merely at the prospect of casting his Bill to those who are actually yearning for it!

A COUNTRY MAJOR ASSOCIATE.

Sir,—I have been in the drug trade since 1840 (as assistant and master), and although not prepared to say that things are perfectly satisfactory as regards either the hours or the pay, perhaps you will allow me to answer from pretty extensive experience the questions of Mr. Cardell. What are the prospects in your trade? To a youth with a cultivated taste, desirous of acquiring knowledge, and willing to practise the necessary amount of self-denial, learning, position, respectability, and for the amount of capital employed, as good a return as almost any other occupation.

What are the drawbacks? The following among others :—That although it be honestly and faithfully pointed out to a youth on his offering himself for apprenticeship the absolute necessity for thoughtful and studious habits, and though every effort be made by the employer to render facilities for study and improvement, still by far the greater number refuse to avail themselves of the advantages offered, and having served an apprenticeship of four or five years with the minimum of study and the maximum of neglect, they are obliged either to take an inferior situation or to get into a good shop as improver, at a low salary, and even then are often dear enough.

And, further, numbers of them having but little capital, and less ambition, if they can but manage to squeeze through an examination; they fill the outskirts of our towns and cities, ruining prices, and keeping up late hours.

For this class the drug trade holds out but little encouragement, but for a young man who is determined to do his best, the "good time" spoken of may be hopefully looked for. Putting aside the exceptional cases and extravagant statements that appear in your last impression, any person who will look at things fairly must admit that great improvements have taken place. A few weeks ago I happened to be in a large city on the Sunday, and although wanting an article rather urgently, went through street after street before I found a shop with the door open. Ten or twelve years ago the door-shutter would have been down in almost every case.

In the town where I reside are forty chemists: ten years ago almost every one was open all day Sunday; now there is only one. The week-day hours are also shorter, and greater time allowed for study. For study, my young men have from two to three hours every evening: and for recreation, etc., the whole of the Sunday, one afternoon and two evenings every week.

In time we may see greater advances still; but I am afraid it will be a long while before either masters or assistants will be able to calculate a great pay, and little or no work.

As "*Vir pro bono publico*" says, the assistant (if good for anything) has the best chance, he can select his place, make his own terms, and leave when he likes.

There has been this grumbling about salaries for years. Surely many of these underpaid ones must have become masters themselves. Why have they not acted upon their convictions, and paid better?

There are many matters in the trade that require improvement, but they are mostly of a local character, and can never be met by any general rules or regulations.

There must be mutual forbearance and consideration between employers and employed. Nothing can be done without this. As to driving us to close our shops at seven o'clock regardless of all consequences, that is what many of us could not do. If we are to put up our shutters every evening at seven, and let our hands leave whilst we stay at home to meet every demand and supply every emergency, the drug trade would indeed be a greater slavery than it has ever yet been in its worst times. What sort of respect or feeling could an employer have for those who would treat him in such a churlish spirit? This is not a contest between capital and labour, and to find those who ought to be gentlemen talking of striking, is offensive to one's better feelings.

Let the trade, in each city and town, casting aside all petty jealousies, combine together and labour for the common good, in regulating prices, shortening the hours of business (as much as practicable), and in giving all reasonable time for study and recreation. Much more than has yet been done may be accomplished, and the advantage of this system will be, that instead of ill-feeling being excited, good feeling and respect will be promoted amongst all. If your complainers will leave extravagance and bombast for a while, and unitedly conferring in each town and city upon these evils, will call upon the trade generally, and temperately and calmly state their grievances, and how they propose to remedy them, they will, I believe, meet with a patient hearing. Most of us hate unnecessarily long hours as much as they possibly can do, but these things cannot all be set right by a few strokes of the pen written without much thought and less consideration, and mostly by those who have little merit to boast.

ONE WHO HAS KNOWN THE DRUG TRADE MORE THAN THIRTY YEARS.

Sir,—If I am not treading ground that has already been gone over, I shall thank you to give me space for what I consider to be our real drawback, both in relation to status and remuneration; and while there is some pharmaceutical legislation in process of enactment for the sister isle, might we not, as a body, petition Parliament for the repeal of the Amendment, 1869, of the 1868 Pharmacy Act? I see comparatively little good resulting from the 1868 Pharmacy Act, while medical men have still the right to compound their own drugs. I never saw yet that chemists or the public had to fear the neighbouring grocer retailing a few "simples." It is the men who practise physic and pharmacy who are the real clog to our advancement. Repeal the 1869 Amendment and we will want neither candidates for our examinations, nor a fair guerdon for our responsible services.

Neston. N. P. LEWIS, M.P.S.

EVENING CLASSES FOR PHARMACEUTICAL STUDENTS.

Sir,—Having but recently come up from the country, where comparatively few opportunities are afforded young men, I expected to find in London evening classes or lectures, where those engaged during the day could meet for the purpose of instruction; but in this I, like others, have been disappointed. However, as this is a want that can be supplied, perhaps you will kindly allow me a short space in your columns, wherein I may express my views, hoping that others more capable of taking the lead may be stimulated into action.

All who have pharmaceutical progress at heart cannot but have due regard for the School of Pharmacy at Bloomsbury Square, and every one able to do so should avail himself of the advantages offered there, but still it cannot be denied that the majority of us young men are so situated as to be unable to derive any direct benefit from that institution.

To meet this deficiency I would suggest to the Council the desirability of instituting evening classes, at the Square, say, meeting twice a week, once for chemistry, and once for materia medica, not for the purpose of cram, but to instruct those desirous of obtaining sound knowledge.

There is every reason to believe that the plan would prove a success, provided it be well organized, and not overweighted, as we have an abundant supply of gentlemen quite capable of undertaking the work of conducting these classes.

I cannot but feel that any good scheme calculated to improve the present state of things should command our best support.

E. EVANS.

60, *St. George's Road, S.W.*

"OIL OF CINNAMON OR CASSIA."

Sir,—May I ask Dr Porter Smith whether the statement that the oil which he thus designates* is obtained from the "leaves and twigs of the cassia-tree," is the result of his own observation?

Also in what work or trade-list any mention can be found of the *Oleum Malabathri* of commerce?

DANIEL HANBURY.

"*Alpha.*"—By adding to an aqueous solution of nitrate or chloride of cobalt sufficient sesqui-carbonate of ammonia to dissolve the precipitate at first formed.

W. Pail horp.—The information is contained in most modern works on arithmetic.

W. T. Elliott.—The elixir mentioned is a proprietary preparation concerning which we are unable to supply you with any information.

A. K.—We do not think that, with the present demand for capable assistants, there would be much difficulty in one obtaining an engagement upon more favourable terms than those mentioned in your communication.

R. B. S.—It is not advisable, in studying any subject, to confine your reading to any one author. With this proviso the book you say you are using is a good one for the purpose.

"*Nestor.*"—(1) Antiseptic properties have been attributed to hydrate of chloral, but we do not know that it has been suggested as a preservative for butcher's meat. (2) We are not qualified to say. (3) A Bill to modify some of the restrictions under which the examinations of the Apothecaries' Company are conducted. (4) "Care should be taken of health."

"*Associate.*"—In section 1 of the Bye-laws, clause 18, it is provided, that Associates being in business on their own account, and desirous of continuing Associates, "shall give notice to the secretary on that behalf, and shall contribute to the funds of the Society the same subscriptions as members, and in default thereof shall cease to be Associates."

M. Thompson.—A post-card, to which one of your labels is affixed (thus incurring charge for deficient postage), has been received, but we are unable to guess to what it refers.

H. O. Brown.—The Latin subject for the Preliminary Examination in October next will be Latin Grammar, and the translation into English of a paragraph from the first book of Cæsar, or a passage from each of the following works: 'Pereira's Selecta è Præscriptis,' and the last edition (Latin) of the London Pharmacopœia. After the 31st December, 1874, the medical Latin will be discontinued.

"*Aq.*"—Probably, as you suggest, the sandstone contains deposits of gypsum.

"*Dandie Dinmont.*"—We are unable to comply with your request to reproduce the regulations as to Dispensers in Her Majesty's Naval Hospitals (printed in vol. iii p. 364); but it may answer your purpose to state that application for the office must be made, in writing, to the Director-General of the Medical Department of the Navy; that the applicant must not be less than 20 nor more than 25 years of age; and that he must possess the Major or Minor qualification of the Pharmaceutical Society. There is no stipulation as to marriage; and pay and allowances depend upon length of service and rank. The only way of obtaining employment as a dispenser in the army appears to be by enlisting in the Army Hospital Corps as a soldier; upon attaining the rank of sergeant, if qualified, and the post were vacant, you would be eligible to be employed as a compounder of medicine.

J. Williams.—We are unable to give you the opinion asked for, but would reccommend you to consult a dealer in druggists' sundries.

S. B.—See the articles on the drying of drugs in Proctor's 'Lectures on Practical Pharmacy,' or Parrish's 'Practical Pharmacy.'

"*Buck.*"—(1) *Hypericum androsæmium.* (2) *Allium oleraceum.* (3) *Rheum partense* var *nodosum.* (4) *Serrafalcus mollis.*

COMMUNICATIONS, LETTERS, etc., have been received from Mr. G. Durrant, Mr. A. W. Bennett, Mr. H. O. Brown, Mr W. Wickham, Mr. D. MacRitchie, "Aureoline," D. J., A. K.

---

* PHARM. JOURN., July 25, p. 61.

BRITISH PHARMACEUTICAL CONFERENCE DINNER.

The annual dinner was held at the Terminus Hotel, Cannon Street, on Thursday, August 6th, 1874, T. B. Groves, Esq., of Weymouth, president, in the chair.

Covers were laid for 150 of the members, who sat down to a most pleasant repast, served in the most admirable manner. During dinner the band of the Coldstream Guards played a selection of music, and the evening was enlivened by the singing of several glees and songs, under the direction of Mr. Winn.

After dinner the President rose, and proposed the usual loyal toasts of "The Queen," "The Prince and Princess of Wales, and the rest of the Royal Family," observing that, although they were sometimes called formal toasts, he entirely disagreed with that expression, for, with regard to himself, as also with regard to the members, nothing could be less formal. He was sure they would drink with the greatest enthusiasm, and with a hearty love, to the health of the lady who presides as head over our civil and religious institutions, and to whom we owe so many of the blessings we enjoy. The toast of "The Prince and Princess of Wales, and the rest of the Royal Family" was next in popularity to that of "The Queen," and there was no royal family in Europe, or in the world, who were so deservedly esteemed and beloved.

Professor Tichborne, of Dublin (who on rising was greeted with loud cheers), said that, as one of the oldest members of the British Pharmaceutical Conference, he claimed the privilege of proposing a toast which he was sure would be well received in that room, for he looked upon it as the most important toast of the evening, after that of the Queen. It was, "Prosperity to the Pharmaceutical Society of Great Britain," and, as a member of the British Pharmaceutical Conference, he felt that he was privileged to speak in a double capacity, as it were. They must bear in mind that in drinking the health of the British Pharmaceutical Society, they were actually drinking their own health, because the Conference was the offspring and child of the Society. If the Conference had not been nursed and cared for in the way it had, it could not have risen to its present high and happy position. Therefore, when he looked around him and saw the great success of that meeting, he felt it was not only a compliment to the British Pharmaceutical Conference, but indirectly a compliment to the British Pharmaceutical Society. The British Pharmaceutical Conference was, as he had observed, the offspring of the British Pharmaceutical Society, and as they had got into the nursery, they might carry it a little further, and consider the Pharmaceutical Society as a growing institution. It was a young institution itself, but it was one of the most prosperous institutions of the kingdom. He sincerely hoped and trusted that it would progress still more, and not get indolent from the apathy which might possibly be created by its great success, but that it would always carefully foster and tend the education of pharmacists. He hoped in the future to see the Society grow greater, and that the future generation—for they must recollect that not till the present generation had passed away would they get the generation that truly represented the work of the Pharmaceutical Society of Great Britain—would place themselves not only on a par, but in advance of all the countries of the world, France and everywhere else, and that they would be looked up to, as *par excellence* the Society which had encouraged and fostered pharmacy. He would not inflict upon them a long speech, for he was not given to long speeches, unless he had something very definite to talk about, and although the toast was one which would be a luxuriant subject to dwell on, he felt he need only commend it to them, coupling with it the name of T. H. Hills, Esq., the president, to ensure its most hearty acceptance.

The toast was drunk with honours.

T. H. Hills, Esq., the president (who was greeted with hearty cheers) thanked the members for the very kind manner they had received the toast of Professor Tichborne, and the professor for the way in which he had proposed it. He thanked them very much when they said he was a jolly good fellow. He felt he did not deserve it, but that he ought to do so after the kind and flattering reception they had given him. He would not appropriate their kind expressions to himself, though they had expressed them, he supposed, because he had taken great interest in the Pharmaceutical Society of Great Britain. He believed they did like men who were taking a deep interest in an association which was striving and doing all it possibly could for the advancement and education and prosperity of the chemists and druggists of England; and if there was anything he might lay claim to, it was that he did all in his power to advance and further the interests of those who were connected with the Pharmaceutical Society. Having said that, he would add he felt it was a very great honour for him to be placed in the position of vice-president; he felt very proud of it. Their meeting, he was sure, would do them a great deal of good and advance the best interests of the Society, for they had received their friends, and tried to make them as much at home as they could. They had welcomed them with their hearts and arms, and he must confess that it made him feel proud that he belonged to such a Society, when he heard the papers that were read both at the Society's meetings and at the Conference to-day. He supposed those who were members of the Conference were also Members of the Society, and he would say if they were not they ought to be. He was glad to be able to address them in that double capacity, and would remind them all that there was still a great deal to be done. He was, he believed, the first Associate of the Society, and he felt proud in saying it, and he had watched the Society from its commencement. He heard of what was going on at the Crown and Anchor, at the meeting there, when they were likely to be extinguished, and he had seen the Society grow to the exalted position it now occupies. That being the case, he felt most pleased that the Conference had met in London, and he was delighted to meet with Professor Tichborne from Dublin, because he would see what was done, and would be able to report when he went back in such a way that he trusted it would end in their becoming one Society for the United Kingdom.

Mr. Young, of Edinburgh, said that he was surprised on coming into the room to be told there was a toast which he was to propose, and although he had used all the arguments he could to persuade Mr. Carteighe that he was not the man to do it, and that there were others far more able, yet his arguments had all been answered, and he had to propose what, in his opinion, was really the toast of the evening. He should have liked an hour's consideration before speaking on it. He had listened to the speech of Professor Tichborne, and he was very pleased to hear him say that the toast he had to propose was, in reality, that of themselves. If that was so with the toast of Professor Tichborne, it was still more so the case with his, which was that of "Prosperity to the British Pharmaceutical Conference." When the Conference was first started he feared it might in some measure be antagonistic to the Pharmaceutical Society. However, time had gone on, and all his fears and doubts had been very much overcome by the way in which the Executive had conducted its affairs, and he was sure when they looked at the names of those whom the Conference had chosen during the period it had been in existence, from the name of Henry Deane, its first president, and others who had presided over them, down to the present time, they would agree with him, that if the Con[illegible] bearers such gentlem[illegible] would have every reason to be proud of it as the offspring of the British Pharmaceutical Society. He hoped it would go on and prosper. He wished to couple with the toast the name of T. B. Groves, Esq., its president, to whose address (though there were some things in it from which he might be disposed perhaps to dissent), he had listened with very great pleasure. He would say of Mr. Groves that, though he had never seen him until that evening, he had often read his papers with very great pleasure. He well remembered, twelve years ago, when Mr. Charles Harvey, of London, a friend of his, mentioned that he knew a gentleman of the name of Groves, who was a most extraordinary man, and who was working at all times in the laboratory, and he really did not wonder at those expressions of Mr. Harvey, when he saw the papers of Mr. Groves. He had therefore great pleasure in proposing the toast of "Prosperity to the British Pharmaceutical Conference," coupling with it the name of T. B. Groves, Esq., the president.

The toast was drunk with great enthusiasm.

The President (who in rising was received with loud and long-continued applause) said: Gentlemen, I am afraid your hearty applause has taken all the conceit out of me. A very wise man has observed that some men are called to honour, some achieve honour, and some have honour thrust upon them. I am quite sure that I have honour thrust upon me. When my name was proposed as president for this year, I can assure you I was never more astonished. I was astounded in fact. What induced my friends to put me in this position to be president here in London, when I live so far away in the country, I cannot imagine. I am rather inclined to think that this fact has something to do with it, that my friend the President of the British Pharmaceutical Society is named Hills, and I am named Groves, and as hills and groves are frequently found together, I suppose that may have given rise to the suggestion that I should occupy the chair. (Loud laughter.) I will not deny that I have always been a staunch supporter of the Conference. I was present at its birth in Newcastle, and have occupied a post on its management ever since, and if it is a reward to me, I will not accept it so much for what I have done, as to encourage the younger members in their future career. Let them work, whether their results be good or bad; in the end they must succeed. I will not say that I have done much in the way of success, but, nevertheless, I have worked, and I hoped. There are many in this room to-night who will aspire to the honour of being president, and who will go the right way to obtain it if they work. The Conference, as you all know, was never to be antagonistic to the British Pharmaceutical Society; on the contrary, it was formed with the view, I might say, of being a roving member of that Society. The Society, holding all its meetings in London, had often in the country been regarded more as a London institution; but the Conference has carried the reputation of the Society all over the kingdom, and the result has been of great profit to both of us. I hope, gentlemen, you will go on for the next ten years' as comfortably and successfully and prosperously as you have in the past. We have achieved much, and I hope in the future we shall achieve still more. There never has been any question about the success of our social gatherings, and I think this one beats all. I have often had misgivings as to the success of our Conference from a scientific point of view, but I think this year we may also congratulate ourselves on its success in that respect, and I view the future of our Conference with very great hopes indeed. As your president I am very grateful for the honour you have done me. You certainly have valued my efforts far too highly. I hope we shall go on prospering, and that the young men in this room will aspire to fill my place. (Loud cheers.)

Professor Attfield, in proposing the toast of "The Visitors," and coupling with it the name of Dr. Frazer, of Dublin, said that from year to year they alternately played the part of hosts and guests, of visitors and visited; and very pleasing these alternate relations were. The Conference was peculiarly fortunate at its meetings every year in having visitors from all quarters of the globe. They had had gentlemen from nearly all the States of America, from the South of Africa, from nearly every part of Europe, and from every part of the British dominions. He would ask the visitors when they went home to tell their friends that the British Pharmaceutical Conference was single in its aim, which was that of the prosecution of original research. Twelve years ago, before it came into existence, original research in this country was prosecuted and was encouraged by the Pharmaceutical Society of Great Britain, by means of its evening meetings, and its Journal, which, at that time was published monthly. But now the Journal was weekly, and it therefore took away fifty-two original papers, yet, in spite of that, the Conference presented to the world a clear addition of some thirty to forty original researches. He would ask them to tell their friends, no matter what language they spoke, that those in England, whether as members of the British Pharmaceutical Society, or as Members of the British Pharmaceutical Conference, at all events, 2300 gentlemen read the researches made in Germany, in France, in Italy, and in all quarters of the civilized globe, as they were presented in a collected form in the Year-book of Pharmacy. (Cheers.)

Dr. Frazer, of Dublin, thanked the meeting most sincerely, in the name of the visitors, for the kind, harmonious, and cordial reception they had received, and he must say he had never met with more harmony in any meeting than he had met there. He did most sincerely wish to see an extension across the water of the bounds of both Institutions, and if that were the case, he was sure they would receive a cordial Irish welcome. For himself, he could speak in nothing but the sincerest terms of gratitude for the kindness he had received from every one with whom he had come into contact, and he did hope, not only for the sake of science, but for the sake of that common brotherhood in science which had always existed, that the Irish Channel would not be the boundary henceforth, either of the British Pharmaceutical Conference, or of the British Pharmaceutical Society. (Applause.)

Mr. Giles apologized for venturing to propose a toast but he was sure every one from the country, assembled as they were, enjoying the pleasures of a most agreeable repast, would feel they were indebted to their friends in London for organizing and providing that most elegant and successful entertainment. He thought they ought not to part without expressing their congratulations at its success and their sense of the obligation they felt. He would, therefore, take the liberty of proposing the health of the London members of the Conference, coupling with it the name of Mr. Carteighe.

Mr. Carteighe (who was greeted with loud cheers) returned thanks, observing that it was too early for himself and his friends to be thanked, while there yet remained so much before them, and when, as yet, they had done nothing in the shape of work to justify such an honour. He hoped that the excursion which they proposed taking on Saturday would be a great success, for he felt there was as much utility in an excursion as in the reading of papers or anything else. He did believe in the necessity of bringing men of kindred thoughts in contact. Their previous excursions had been of immense good. The value of these meetings was greatly enhanced by the opportunity they afforded of coming in contact with men who had the same objects, and who were thus able to assist in the advancement of art and science by associating personally one with another, and talking over their different views. And while he held that excursions were very pleasurable, he was certain they were also very useful aids, indeed, to pharmacy by that means. (Loud cheers.)

The Pharmaceutical Journal.

SATURDAY, AUGUST 8, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE CONFERENCE MEETING.

THE business of the first—and probably for a long time the only—visit of the British Pharmaceutical Conference to London has terminated, and about the time of the publication of these pages many of the members will be preparing to start on the excursion by which the London pharmacists crown their efforts to rivet the bonds of friendship which have been established and strengthened between them and their provincial brethren. Whether for the number and quality of the papers, or the interesting discussions that have followed the reading of them, the meeting of 1874 has been a success, the only drawback having been that the number of members attending it have hardly equalled the hospitable hopes of the Local Committee. The interest with which the proceedings of the Conference are watched by pharmacists outside Great Britain was demonstrated by the presence of Dr. DE VRIJ, from the Hague, Colonel FORNIE and Mr. DOBBIN from the United States, M. ADRIAN and M. GALLOIS from Paris, and Dr. FRAZER and Professor TICHBORNE from Dublin.

The Conversazione was attended by about three hundred and fifty gentlemen, who found ample occupation in examining the chemical, pharmaceutical, microscopical, botanical, and other articles in the exhibition, or in witnessing the demonstration by Mr. DAVIES of Mr. CROOKES'S experiments to show the attractive and repellent properties of light and radiant heat.

On Thursday the General Meeting of the Conference auspiciously commenced by the announcement that five hundred members had been elected by the Executive Committee the previous day. The PRESIDENT'S address, which is printed *in extenso* in another page, was confined to topics of a political nature, and will doubtless obtain the careful consideration of all pharmacists, as containing the opinions of so experienced a leader of their body.

The first paper was read by Dr. DE VRIJ, and described a new method of estimating the pharmaceutic value of cinchona barks, by which not only the alkaloids, but also other active substances, particularly the cinchotannic acid, may be readily determined by the pharmacist himself. At the invitation of the PRESIDENT, Mr. BROUGHTON contributed some important observations as to the state in which the alkaloids exist in the barks (viz., one-fifth quinate, four-fifths tannate), furnishing a key to the principle best applicable for their extraction. He also mentioned the practice in India, of employing the combined alkaloids. In the discussion which followed, Mr. UMNEY, and Mr. GILES criticized severely the liquid extract of cinchona of the B. P., the former recommending percolation with proof spirit (product to contain 1 in 1).

PROF. FLÜCKIGER contributed two papers : in one he reported that he had determined the deposit from essential oil of nutmegs, known generally as myristicon, to be really myristic acid; in the other he described the chemistry of elemi.

Dr. DE VRIJ then gave the result of his experience of the anthelmintic virtues of pomegranate root-bark.

It was appropriate that it should have fallen to the lot of the PRESIDENT to present the first of the reports of investigations, towards the expenses of which grants have been made by the Conference from the funds entrusted to it by Mr. THOMAS HYDE HILLS. The subject was a continuation of his researches upon the aconite bases. Mr. GROVES having prepared specimens of the alkaloids, the determination of their chemical constitution was undertaken by Dr. C. R. A. WRIGHT, who arrived at the conclusion that aconitine, pseudaconitine, and another body which Mr. GROVES'S at first thought to be Mr. BROUGHTON'S atisine, are polymerides. Mr. BROUGHTON has, however, since stated that he is certain that the body to which he has given the name of atisine is not of the same centesimal composition as aconitine, so that Mr. GROVE'S alkaloid may prove to be a fresh discovery.

This report was followed by another that had been entrusted to Mr. A. W. GERRARD, on the official plasters, which was an able criticism of the present formula, and contained several suggestions for their improvement ; Mr. GERRARD was also able to contribute to the information of many present by a dexterous demonstration of the art of plaster spreading.

The use of oleic acid in pharmacy was the subject of a valuable paper by Professor TICHBORNE, in which he advocated the substitution of oleic acid for soap in the preparation of the liniments of the Pharmacopœia, and he illustrated his argument by the preparation of Linimentum Ammoniæ, Lin. Potassii Iodidi c. Sapone, Lin. Saponis, and Lin. Terebinthinæ. Objection was raised as to the difficulty of obtaining a sufficiently pure oleic acid, but Mr. TICHBORNE said that it could be obtained with facility, and even if this be not at present the case, there can be little doubt that a supply would follow the demand.

Mr. STODDART then described a modification of LIEBIG'S process for the estimation of phosphoric acid, and afterwards practically exhibited the method of estimating the quality of milk recently suggested by Mr. HORSLEY, of Cheltenham, which consists in treating the milk in long tubes with ether and water, by which means the casein, salts and butter fat are separated in distinct layers. This process he also proposed to extend to the analysis of butter, showing by experiment, that lard, for instance, in the cold, was not wholly soluble in ether, and therefore separated from the normal butter fat. The perfection of this test was, however, questioned, especially by Dr. Redwood, who, admitting that the test might detect a clumsy adulteration with lard or suet, was of opinion that there was no proof that it would expose a skilful admixture of fats more nearly approaching butter in its physical character.

This concluded the business of the first day's meeting. In the evening the members dined together at the Cannon Street Hotel; but for an account of the proceedings there we must refer our readers to p. 101.

On Friday the first paper read was a "Note on Cortex Rhamni Frangulæ," by Mr. H. C. Baildon. In continuation of his own and other previous remarks on this bark, Mr. Baildon urges the importance of selecting *good samples, i.e.*, corresponding to such a description as that of the German Pharmacopœia, and for administration he recommends concentrated decoction (or liquid extract); also a concentrated tincture. The paper led to the expression of a considerable amount of personal testimony to the value of black alder bark as an aperient.

Mr. Louis Siebold mentioned the important fact that the concentrated Liq. Ammon. Acetatis exerts a very evident solvent power on any lead which may be present in the glass vessel containing it, and suggested the propriety of keeping such solution in bottles of Bohemian glass.

In a "Note on Scammony," by Mr. T. Greenish, the use of the microscope was recommended in preference to iodine for examining starch present in scammony, to ascertain whether it was derived accidentally from the scammony root, or from wheat, etc.; the shapes of the granules, and especially of the hilum, being quite characteristic. He has found samples of *lump* virgin scammony invariably free from all starches, whilst every sample *in powder* as uniformly contained scammony starch, and some of them wheat starch in addition, which he attributes to the powder being prepared from the smaller fragments contained in cases of mixed qualities of the drug.

Hydrocyanic acid furnished the topic of not less than four papers. Mr. Barnard S. Proctor recorded the results of some experiments having for their object the discovery of a process for extemporaneous preparations of official acid, and also of a solvent that would diminish the variation in strength dependent on evaporation. Of three solvents,—water, alcohol, and ether,—the latter he found to maintain most nearly its percentage of hydrocyanic acid. Two substitutes for the B. P. hydrocyanic acid were discussed by Mr. W. A. Shenstone, namely, the double cyanide of zinc and potassium proposed by Mr. Towerzey, and the hydrocyanic acid ($\frac{1}{10}$ of B. P. strength), proposed by Dr. Tilden. Experiments by Mr. Shenstone indicate that acid of 0.2 per cent. suffers trifling (if any) loss from either volatilization or decomposition. Mr. Shenstone also found solutions of the double cyanide perfectly stable. He did not, however, approve of its substitution for the B. P. preparation, but he thought the 0·2 per cent. acid would be legitimate. Mr. J. Williams stated that he had found that 20 per cent. of glycerine preserves acid up to the strength of about 5 per cent. This application of glycerine was suggested by the knowledge of its effectiveness in the case of solution of sulphuretted hydrogen.

Mr. L. Siebold had found that a dilute acid 0.1 per cent. ♏xx = ♏j B.P. does not deteriorate much in one month in an 8-oz. bottle in daily use; in unopened bottles it will keep at least three months. He also gave a useful caution to inexperienced chemists when estimating the strength of hydrocyanic acid by Liebig's (nitrate silver) method, that alkalinity to test paper is not necessarily an indication that sufficient alkali has been added.

A contribution to the growing literature respecting the administration of phosphorus was made by Mr. Williams, who prefers for that purpose a solution in alcohol and glycerine, and is of opinion that many of the preparations used and supposed to contain a certain amount of phosphorus, would, if carefully examined, prove to contain it in a more or less oxidized condition.

We must content ourselves with a bare enumeration of the other papers. Mr. Barton expressed a preference for the direct treatment of sarsaparilla root with spirit in larger proportion, in the preparation of of extract. Mr. Haffenden contributed a paper on the confections of pharmacy; Mr. Muir on Potable Water, and its Contamination in House Cisterns, and Mr. Daniels on the Syrups of the Phosphates. Mr. H. Groves, of Florence, sent some interesting information respecting the medicinal plants in use among the Tuscans, and Mr. Hunt added to our knowledge of the pharmacy of the Flowery Land. Professor C. R. A. Wright sent two papers; one on the Essential Oils of Wormwood, Citronella, and Cajeput," and the other a continuation of his researches on the opium alkaloids. Mr. E. Smith suggested a method for the recovery of iodine from the waste in the preparation of iodoform. Mr. W. E. Heathfield sent some notes on the extracts of aconite, belladonna, hemlock, henbane, and colchicum, and Mr. Schacht took the opportunity of explaining the scope of some experiments he is making to ascertain the relative proportions of conia present in the succus and extract of conium. The last paper read was by the President, and described his experience in the preparation of trimethylamine from the skate.

Nothing now remained to be done but to pass the usual votes of thanks, to elect the officers, and decide the place of meeting for the ensuing year. It was resolved to meet at Bristol, and again under the presidency of Mr. T. B. Groves.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, August 5th, 1874.

MR. T. HYDE HILLS, PRESIDENT, IN THE CHAIR.

MR. A. BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Frazer, Hampson, Mackay, Owen, Radley, Rimmington, Robbins, Savage, Schacht, Shaw, Sandford, Stoddart, and Williams.

The minutes of the previous meeting were read and confirmed.

THE PHARMACOPŒIA COMMITTEE.

Mr. ATHERTON inquired if there had been any reply received from the General Medical Council, in regard to the resolution passed at the last Council meeting, on the subject of pharmacists being consulted in the preparation of any future Pharmacopœia.

The SECRETARY read a letter from the Secretary to the Medical Council, simply stating that the resolution had been laid before the Council.

Mr. HAMPSON said the letter was certainly curt, though they could not deny that it was civil. He would simply venture to express a hope that the Parliamentary Committee would be alive to the importance of this question, and that, if any opportunity presented itself, such as any amendment of the Medical Act, it should be taken advantage of to bring the subject under the notice of the Legislature.

THE LATE MR. STANDRING.

The PRESIDENT desired, before the regular business commenced, to express his sense of the loss which the Society had sustained in the death of Mr. Standring, an old member of the Council, and a gentleman who had taken the greatest interest in the proceedings of the Society from its commencement.

Mr. SANDFORD desired to call attention to a matter arising out of the proceedings at the last meeting. It would be remembered that when the Council was discussing the propriety of admitting ladies to the laboratory, he expressed an opinion that Professor Attfield had a little exceeded his province in apportioning them a retiring room. Professor Attfield, instead of applying to the Council to correct anything which he considered conveyed an erroneous impression — which he (Mr. Sandford) thought was the proper course for an official of the Society to take if he felt himself aggrieved—had written a letter to the Journal, repudiating the charge of exceeding his duty, and in so doing he had put a false colour on the matter, by saying—"It was not I who suggested that the housekeeper's cloak-room might serve as a cloak-room for the ladies;" thus making it appear that there was a room available for the purpose, and that the Council were desirous of creating unnecessary difficulties. But the facts were simply these: there was no housekeeper's cloak-room, the room so designated being the bedroom of the porter and his wife; and as he supposed a man had access to his own bedroom at any time, it appeared to him that to allow ladies to make use of it as a cloak-room could scarcely be called providing them with decent accommodation. He thought it only right to make this explanation, lest any erroneous impression should be created.

The PRESIDENT thought it would be satisfactory to all members of the Council that this explanation should have been made.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society.

Aylesbury, William Thomas.
Collier, Henry.
Compton, Arthur.
Cotterell, William Burbidge.
Fairman, George Peters.
Green, Thomas.
Hamond, Joseph.
Hunt, Freeman William.
Kirkby, Robert.
Norman, Joseph Slaughter.
Selkirk, James.
Smith, Thomas James.
Symons, William Henry.
Thirlby, William Arthur.
Thring, Edmund John Henry.
Whyte, Alexander.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected Members of the Society:—

Collier, Henry ....Clapham Common.
Compton, Arthur ....New Beckenham.
Fairman, George Peters ....Sunderland.
Green, Thomas ....Belfast.
Hamond, Joseph ....London.
Hunt, Freeman William ....Aldeburgh.
Kirkby, Robert ....Ambleside.
Symons, William Henry ....Barnstaple.
Thirlby, William Arthur.........Packington.
Thring, Edmund John Henry ..Trowbridge.
Whyte, Alexander ....London.

Chemists and Druggists.

The following registered Chemists and Druggists were elected Members of the Society:—

Davies, Charles.........................London.
Maish, Edward ....Bristol.
Moore, Edward.........................Cheltenham.
Park, William ....Broughty Ferry.
Penney, William S. ....Llandudno.

ASSOCIATES.

The following, having passed the Minor Examination, and being in business, were elected "Associates in Business" of the Society.

Howorth, George Buxton ....Egremont.
Mill, John Brown...................Holsworthy.

The following, having passed the Minor Examination, were elected "Associates" of the Society.

Arnold, Harry Shaw................Cwm-Avon.
Ashmore, George Johnson ......Lindsworth.
Axford, John William ....Coventry.
Baildon, Henry Bellyse ....Edinburgh.
Bailey, John Richard ....Spalding.
Bamfield, John ....Bristol.
Bathe, Frederick James ....Chippenham.
Bray, Ernest Edward ....London.
Brend, Kenneth Benjamin ......Swansea.
Brown, George German ....Dresden.
Catford, Obadiah William ......Chard.
Clifford, Richard Noon ....Melton Mowbray.
Cripps, Ernest Henry ....Devizes.
Dear, Theophilus ....Hornsey Rise.
Duncalf, James Mills ....Congleton.
Dyson, Alfred ....Brighouse.
Endle, Frederick .. ..Barnstaple.
Ewell, Richard Michael ....Sandwich.
Fryer, Arthur..........................Ayston.

Garratt, Arthur ....Guildford.
Garth, John ....Preston.
Gimson, Joseph ....Leicester.
Hall, Peter ....Sunderland.
Halse, Thomas ....Tiverton.
Hands, Henry Joseph ....Chipping Campden.
Hayhoe, William ....Diss.
Hillier, Henry ....Newport.
Hitchcock, James ....Whittington Moor.
Hogg, Edward Grindle............Ealing.
Holmes, Alfred John ....Preston.
Jenkyn, Thomas, Jun. ....Penzance.
Jones, Jabez Abraham............Birmingham.
Josling, Alfred ....Chelmsford.
Legg, Henry Arthur.................Kingsland.
Lloyd, Rees ....Dowlais.
Long, Theophilus Henry Beavan. Brighton.
Miles, Charles John ....Bristol.
Morson, Thomas Pierre ....London.
Padwick, William Guy ....London.
Passmore, Charles Frederick ...Kilburn.
Price, John........................Swansea.
Pumphrey, John Henry ....Evesham.
Purvis, Thomas Alexander ......Gosport.
Read, John Henry..................London.
Russel, Thomas Gregory ....Cambridge.
Solomon, Charles Edwin ....Penryn.
Sneath, Thomas Dixon............Newark.
Stephenson, Robert ....Bradford.
Street, John Westrope............Melton Mowbray.
Tigar, Hardwick Brigham ......Beverley.
Tomlinson, Eldred Edward......Whitehaven.
Townend, Thomas Francis ..... Durham.
Wedge, George Deller............Alresford.
Wilks, Robert ....Skipton.
Woolston, Thomas Henry ......Faversham.
Wright, Robert........................South Shields.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination, were elected apprentices or students of the Society :—

Ackerman, Henry.................Chipping Sodbury.
Allen, John ....Manchester.
Beech, Joseph, Jun.................Birmingham.
Bilson, Frederic Eastall ....Newark.
Blaymire, Thomas Croskell.......Kendal.
Bovill, Edmund........................Whitby.
Buchan, Jno. Greig ....London.
Burman, George Alfred ....Towcester.
Caven, William Alexander ....Dalbeattie.
Clough, Alfred ....Northwich.
Crompton, Alfred, Jun. ....Bury.
Crompton, Henry ....Bury.
Culley, Charles ....Leicester.
Davies, Hugh ....Liverpool.
Eccles, Robert Burton ....Brigg.
Fazan, Charles Herbert ....Colchester.
Green, George ....Horncastle.
Harrison, Frederick ....Brighton.
Hutton, Harry .... Warwick.
Johnson, Walter Edmund ......London.
Kendrick, Alfred ....Limehouse.
McAlley, Robert, Jun...............Edinburgh.
Porteous, Arthur Alexander ...Kirkwall.
Purves, Peter........................Edinburgh.
Potts, Walter ....Oldham.
Richards, Philip ....Bury St Edmunds.
Roberts, George William.........Manchester.
Rogers, Charles........................Nottingham.
Rose, Charles........................Birmingham.
Scott, Jeffers Wilson ....Douglas.
Shaw, John William ....Guisborough.
Smith, Andrew Lees ....Selkirk.
Stewart, Donald ....Forres.
Townend, Thomas Francis ......Durham.
Varney, Henry George ....Oxford.
Walker, James ....Auchmull.
Ward, Thomas William ....Towcester.
White, Charles ....Southborough.

The name of John Newton Watts, of 217, Edgware Road, was restored to the Register of Chemists and Druggists.

Several individuals who had neglected to pay their subscriptions in proper time, were ordered to be restored to their former status on payment of the subscription for the current year, and a fine equal to half the amount.

FINANCE.

The report of this Committee, recommending the payment of sundry accounts, was read and confirmed.

BENEVOLENT FUND.

The report and recommendations of this Committee were received and adopted.

A grant of £10 was made to a former member, at Brighton, in distressed circumstances.

A grant of £10 to the widow of a pharmaceutical chemist in Scotland.

A grant of £15 to a chemist, at Sheffield, in distress from ill-health.

A grant of £10 to the daughter of a deceased chemist and druggist.

LIBRARY, MUSEUM, AND LABORATORY COMMITTEE.

The minutes of this Committee were read. They stated that, according to the report of the librarian, the average attendance in the library had been, during the day, 21·875; evening, 5·6. Circulation of books, in town, 142; country, 34. The average attendance in the museum had been, daily 20; evening, 5. Professor Attfield had reported that there had been 90 entries in the laboratory since the commencement of the session. Number of pupils working at the date of report, 35.

The following books were recommended to be purchased for the library :—

Virgil.
French Grammar.
German Grammar.
Thomson's Conspectus, by Birkett.
Bloxam's Laboratory Teaching.

The Committee also recommended that the library be closed in the evening during the recess.

The report and recommendations of the Committee were received and adopted, and the Museum was ordered to be closed during August and September.

HOUSE.

The report of the House-Committee was received and adopted.

PARLIAMENTARY.

This Committee reported that they had held meetings to consider the Apothecaries' Licences Bill, and that two of their members had given evidence before the Select Committee of the House of Commons. The Juries Bill had been withdrawn.

The SECRETARY stated that the minutes of the evidence taken before the Select Committee on the Apothecaries' Licences Bill had been published that morning. The report had been issued before, and it had been published in the Journal.

The report was adopted, and it was resolved that each Member of the Council be supplied with a copy of the minutes of evidence above referred to.

GENERAL PURPOSES.

The only matters which had come before this Committee, were the reports of the Professors as to the sessional prizes, etc. Professor Redwood reported that he considered the new arrangement with respect to the lectures satisfactory in every respect, except in regard to the remuneration afforded to the Professors, and he believed his colleague, Professor Bentley, agreed with him. There had been 41 entries for the first course, and 40 for the second. At the end of the season there had been two examinations, one for students who had attended the whole course of ten months, who were eligible to compete for the silver medal and certificates; and the other for those who, having only attended one course of lectures, were only eligible to compete for the bronze medal. For the former examination there had been 13 competitors, for the latter 5.

Professor Bentley reported very favourably as to the regular and punctual attendance and good conduct generally of the students attending his classes; and stated that he had every reason to be gratified, except as to the numbers.

Professor Attfield reported that there had been 23 entries in his class during the ten months, the average period of work being 3¾ months. There had been 9 competitors at the prize examination, of whom the most successful had attained the highest number of marks possible.

Professor Bentley also reported that there had been only one collection of plants sent in, to which he recommended that a bronze medal be awarded. It consisted of 370 specimens.

Mr. STODDART said he thought Professor Bentley was rather hard on the competitors for the Herbarium; he did not seem to think that 300 was a great number of plants, but the fact was, for a young man who was employed all day to collect so many, and to change them every day, and properly prepare them, was no slight task. He knew of one case a short time ago when the silver medal was given to a gentleman who had his whole time at his disposal, and who had *carte blanche* to go all over the kingdom collecting specimens; the consequence was, that many young men in business felt it was totally useless to attempt competing under such circumstances.

Mr. SAVAGE fully endorsed Mr. Stoddart's observations. He thought there was too high a standard set up in this respect, and that it would have to be lowered. One of his own young men was very anxious to enter for this prize, and put his name down, but after he had been at it a month or two, he found it absorbed the whole of his time to the neglect of other studies, so that it was very questionable whether he would carry out his design.

Mr. SCHACHT said the remarks which had been made were very appropriate, but he had no doubt, on a conference with Professor Bentley, matters might be arranged more satisfactorily. He wished, however, to make a remark on the general question of the professors' reports, which he had not listened to with perfect satisfaction. He was not prepared to suggest any course of action at present, but he must say he was not satisfied with the result of the working of the lecture portion of the school. They had been often told, and very properly, that the institution was not a local one; that it was designed for pharmacists all over England; but viewing it in that light, he was a little disappointed to find that, so far as one could make out, there had been only ten competitors for the prizes offered in Botany, and thirteen or fifteen in the other subjects, while there were about forty students attending the different courses of instruction. Many local associations could present almost as good results as that. He was not quite sure whether the working of the new scheme was yet fully developed or not; perhaps it was too soon to judge, but he did not like these reports to pass without a single word of comment, and he thought it would be well if one of the Committees could make something like a better analysis of the new scheme, and of the comparative results obtained under it, than had at present been put forward. At present he did not quite understand on what grounds Professor Redwood commenced his report in such satisfactory terms, for though he was sorry to hear that the classes had not been so remunerative to the professors as they could wish, still another result not less important was that the attendance had not been so great as was anticipated. He could not but compare the number of students with the number presenting themselves for examination, which was 303 during last month. That represented a large number of persons anxious to obtain recognition as pharmacists, and it seemed rather a meagre result that only forty of them could be found desirous to obtain the instruction there offered, and to compete for the high and distinguished rewards offered by the Society to successful students.

Mr. MACKAY said that, like Mr. Schacht, he was rather disappointed, not altogether with the results of the attendance, but that they had not a proper and fair analysis of how the various classes had worked since the recent change in the arrangements. Professor Attfield seemed to think that, as far as he was concerned, no material change had taken place, but in the other classes there had been a slight increase, for although Mr. Schacht spoke of the attendance being 40, as far as he could gather from Professor Bentley, there had been something like 70 attending during the session, whilst in the previous year he believed the number was 60. The total number of attendances on Professor Redwood's lectures also was 81, but they had no comparative statement to show the numbers attending in the previous year. He thought, however, some such statement should be prepared, though whatever the result of the analysis might be, it would be too soon to judge yet of the real results.

Mr. ATHERTON said he had been told, on very good authority, that the two courses of lectures on chemistry and pharmacy were almost word for word identical, and if that were the case one could hardly be surprised at the results not being satisfactory.

Mr. MACKAY said it could hardly be satisfactory unless the courses of lectures on chemistry were so dissimilar that a student going through the whole course, from October to July, could derive benefit from the whole of the lectures.

Mr. WILLIAMS reminded Mr. Atherton that it was understood the two courses of lectures were to be identical—the same information was to be gone over twice.

Mr. SCHACHT said it was distinctly asserted, he believed, that the illustrations were to be fresh, though the general principles of the course must be gone over again.

Mr. HAMPSON said he did not think it desirable, at present, to introduce any special inquiry into the working of the system which had scarcely had time to get into operation.

The PRESIDENT said he understood it was stated at the Committee, by Professor Bentley, that the session had been very unremunerative to him—that he had received £75 less than last year.

Mr. WILLIAMS said it was £220 less that Professor Bentley had received.

Mr. BETTY thought, if that were so, they were bound at once to institute an inquiry. They could not blink the fact that it was commonly reported that the two courses of lectures were precisely the same, and that this was causing great dissatisfaction with the new system. He thought they had better appoint a Committee to look into the matter, and see how it was acting, and how it was likely to operate in the ensuing year. If they allowed things to go on as at present with this sort of inuendo hanging over, it would be very likely to damage the school irretrievably.

The PRESIDENT said he had inquired of Professor Bentley if it were really the case that he was out of pocket by the new arrangements, and he informed him it was so. He had then asked Professor Redwood, who told him he was £100 worse off by the change.

Mr. SCHACHT having asked what was the amount of fees received by the Professors, Mr. Mackay said that was one of the points which they required further information upon. They did not know how many fees had been received, or what were the results.

Mr. Betty said he would move that Professors Redwood and Bentley be invited to meet a sub-Committee to confer with them on the working of the new regulations lately made by the Council.

In reply to Mr. Schacht,

The Secretary said there were five candidates for the Bell Scholarships.

Mr. Sandford thought there had been a little misapprehension as to the two courses of lectures. He read an extract from the new regulations, stating that the instruction given in the first five months was to be *repeated* in the second course, though it also stated that "some of the facts will not be the same in each of the courses."

Mr. Hampson had heard it reported that not only were the lectures identical in the second courses, but also the illustrations and experiments; so that any students who had taken notes of the first course found the second absolutely useless. But if the whole subject was going to be inquired into, he hoped a notice of motion would be given, so that it might be fully considered.

Mr. Shaw said his recollection of what took place at the interview with the Professors preparatory to the promulgation of the new scheme was that they stated that the course of instruction they had been accustomed to give in ten months might be compressed into five, so that the lectures in the two courses would be substantially identical.

Mr. Williams said he had opposed as strongly as he could this division into two courses, on the ground that they would be practically identical. At the same time he understood that the Professors had promised that they would, to some extent, vary the experiments. The theory was that what was formerly taught in ten months could be taught in five; but for his own part he did not think ten months any too long a time in which to learn chemistry and pharmacy.

Mr. Frazer said it would be no doubt very easy for the Professors to give two distinct courses of lectures, especially as they had been accustomed to spread their course of instruction over ten months.

Mr. Williams remarked that the Professors desired to give a complete course of instruction in five months, and expressed their opinion that they could satisfactorily do so.

Mr. Frazer said there was, evidently, some ground for inquiry, since it was stated that the remuneration of the Professors, which had never been excessive, had considerably fallen off, but as they were at present in a transition state, with a new system of examination about to be introduced, he did not think they were yet in a position to look narrowly into the matter, and recommended waiting for another year.

Mr. Mackay said he had as yet heard nothing to change his opinion, that a Committee ought to make some inquiry into this matter.

Mr. Baynes could confirm what had been said by Mr. Shaw, that the ten months' course had been compressed practically into five. He thought their experience was not sufficient as yet to enable them to pronounce a positive opinion as to the failure or success of the scheme, though it was not too soon to make inquiries.

Mr. Schacht said he would second the motion proposed by Mr. Betty.

Mr. Williams asked what it was that was proposed to be done? Was the Committee to be authorized to recommend that the whole system should again be altered and changed?

Mr. Mackay apprehended the arrangements would not be disturbed for another year, whatever the alterations might be.

Mr. Schacht said he had not heard any one say he considered the condition of the school satisfactory on the whole, and therefore he thought there was ground for inquiry.

Mr. Hampson hoped the Committee would go thoroughly into the whole matter. The school was not as successful as could be wished, and he hoped the Committee would, if appointed, go thoroughly into the matter, and inquire into the causes of the failure.

After some further conversation, the following resolution was carried unanimously:—

"That a Committee, consisting of Messrs. Hampson, Greenish, Schacht, Betty, and Sandford, be appointed, to inquire into, and report on, the educational arrangements of the School at Bloomsbury Square."

Prize Awards.

The following awards were made on the reports and recommendations of the Professors, and of the Board of Examiners:—

Jacob Bell Memorial Scholarships.

William Henry Vernon.

George Green.

Pereira Medal.

Arthur Pearson Luff.

Prize of Books.

Arthur Pearson Luff.

Chemistry and Pharmacy.

[Ten months' course.]

Silver Medal......................William Henry Symons.

Certificates of Honour......... William Ayton Gostling. / Harry Alma Thomas. / Alexander Whyte.

Certificates of Merit .... Arthur Pearson Luff. / Henry George Greenish. / William Arthur Thirlby.

[Five months' course.]

Bronze Medal ....William Henry Symons.

Botany and Materia Medica.

[Ten months' course.]

Silver Medal ....Arthur Pearson Luff.

Certificates of Honour .... William Arthur Thirlby. / Alexander Whyte.

Certificates of Merit .... William Ayton Gostling. / William Henry Symons. / Henry George Stacey.

[Five months' course.]

Bronze Medal ....Alexander Whyte.

Practical Chemistry.

Silver Medal ....Arthur Pearson Luff.

Bronze Medals .... William Ayton Gostling. / Allan Fox Sainsbury.

Certificates of Merit .... Arthur Joseph Carter. / William Arthur Thirlby.

Botanical Prize.

Bronze Medal......................Thomas Wm. Nettleship

Reports on the Examinations of the Pharmaceutical Society held in London during the Year 1873.

The Secretary read the following reports, which had been sent by the Privy Council for the information of the Society:—

During the year 1873, the Board of Examiners of the Pharmaceutical Society held four meetings for the Preliminary examination of candidates in Latin, English, and arithmetic, and thirty-six meetings for the Technical examinations.

At the *Preliminary* examinations, 1292 candidates presented themselves, of whom 670 passed, and 622, or about 48 per cent., were rejected.

There is a larger proportion of failures than I have had to report in any previous year, and the increase, I have no doubt, is to be attributed in great measure to the change in the regulations with respect to marks, to which I referred in my report for the year 1872. I there stated, with respect to the Preliminary examination, that it had been found that more than usual competency in English and arithmetic had enabled candidates to pass the examination, who had only obtained one-fourth of the number of marks in Latin. Under the regulations then in force, the number of marks allotted to each of the three subjects comprised in the examination being 100, and the passing number for the whole examination being 150, whilst the minimum passing number in each subject was only 25, it followed that a candidate who should have obtained 125 marks in English and arithmetic would pass the examination, although he should be so weak in Latin as only to obtain 25 marks, or one-fourth of the number allotted to that subject.

The same objection applied to the regulations with respect to marks at the technical examinations, in which also a candidate who had obtained only one-fourth of the marks in one or more of the subjects might nevertheless pass the examination if he had obtained the requisite number of marks on the aggregate of all the subjects.

With the view of ensuring a more equal degree of competency in all the subjects comprised in the several examinations, it was last year resolved by the Board of Examiners to raise the proportion of marks necessary for passing in each subject from one-fourth to four-tenths of the total number of marks allotted to that subject separately, without making any change in the number of marks required for passing the examination as a whole.

This regulation has been in force throughout the year 1873, and has undoubtedly tended in the Preliminary examination to secure a higher degree of competency in Latin, whilst it has probably also led to the rejection of some candidates who, under the previous system of adjudication, would, notwithstanding their weakness in Latin, have passed the examination as a whole by the means of their strength in other subjects.

Another cause of the unusually large proportion of rejections during the past year has probably been the premature examination of candidates anxious to obtain a qualification before October 1874, when new regulations will come into force, with respect to the examination for the Minor qualification.

As regards the rejected candidates, it is satisfactory to know that for the most part they present themselves again at a subsequent period, and that a considerable proportion of them eventually pass the examinations, some of them even with credit.

At the Technical examination, 73 candidates presented themselves to obtain the *Major* qualification, of whom 49 passed and 24, or nearly 33 per cent., were rejected.

This proportion of failures is one-fourth smaller than it was in 1872, although still somewhat larger than in previous years. The large increase in the proportion of failures which took place in 1872 was coincident with the substitution of a practical examination in chemical analysis, in place of the written examination previously given. Since then it has become well understood that this more practical test of competency is now required, and the candidates, having prepared themselves for it, the proportion of failures has fallen again from 43 per cent. in 1872, to 33 per cent. in 1873.

I have been present on several occasions at this practical examination, and am able to state that it is searching and perfectly fair, and that many of the candidates go to work in a skilful and thoroughly business-like manner. The matters submitted to them for analysis are such salts as sulphate of quinia, acetate of morphia, sulphate of strychnia, oxalate of potash, and the like. Each article to be analysed is distinguished by a number, and candidates are required to determine the base and the acid, and to explain in writing the processes they have made use of in their analysis. Each candidate is placed by himself at a counter, upon which are arranged all the articles required for testing, and he is expected to analyse at least three substances during the three hours allotted for this part of the examination. In order to prevent the possibility of collusion between the candidates, a large number of substances are prepared beforehand, and no two of the candidates have any of the same substances submitted to them for analysis.

For the *Minor* qualification there have been 745 candidates, of whom 410 passed, and 335, or nearly 45 per cent., failed.

This proportion of failures does not differ materially from that of 1872, but it has been considerably higher in both these years than it was before. It must, however, be borne in mind that the same causes to which I have already adverted as increasing the proportion of failures in the Preliminary examination, have been in operation also with respect to the Minor examination, viz., the raising of the passing number of marks for each separate subject of examination, and the desire of candidates to obtain a qualification before October, 1874. The supposition that this latter cause has led many candidates to present themselves prematurely seems borne out by the fact that the number of candidates for the Minor examination has risen, during the year 1873, to a total of 273 above that of 1872; a rate of increase greatly in excess of that which has obtained in previous years.

Only 95 candidates have presented themselves for the *Modified* examination, of whom 60 passed, and 35, or nearly 37 per cent., were rejected.

I am of opinion that the several alterations adopted by the Board of Examiners during the last two or three years, viz., those of rendering the Major examination more practical, of raising the passing number of marks in each individual subject of examination, and of requiring rejected candidates who present themselves for re-examination to pass in all the subjects, even though they may have previously obtained the passing number of marks in some of the subjects—have worked satisfactorily as regards the candidates themselves, and advantageously for the public service.

As I explained in my last report, amended regulations providing for the more practical examination of candidates for the Minor qualification will come into operation in October next. When these shall be fully enforced, the examinations of the Pharmaceutical Society will have been made as complete as appears for the present to be attainable; and I am of opinion that it was only just that the regulations should not have been made too strict in the first instance, and that the Board of Examiners have shown good judgment and discretion in the important but gradual improvements which they have effected in the scope and conduct of the examinations.

(Signed) E. Headlam Greenhow.

14*a*, *Manchester Square*,
March 28*th*, 1874.

Report of Government Visitors.

Dr. Maclagan's Report on Examinations by the North British Branch of the Pharmaceutical Society of Great Britain.

Since the date of my report of 27th March, 1873, I have been present during the greater part of the sederunt, on the following days of examination in Edinburgh:—

1873, 16th April.
„ 25th and 26th June.
„ 14th, 15th, and 16th October.
1874, 13th and 15th January.

The general conclusion to which my supervision of the examinations has led me is, that the examiners continue to discharge their duties satisfactorily, showing their full qualification for the office, and maintaining a due regard at once to the interests of the public and of the candidates. The amount of rejections at all the examinations is great, but is not, in my opinion, due to unnecessary severity on the part of the examiners. It seems not improbable that the knowledge that hereafter all candidates will require to be of the age of 21 before receiving their diplomas, has led a number of young men, without adequate preparation, to try to pass the examinations before the new regulation comes into operation.

On the several examinations I have to offer the following remarks:—

Preliminary Examinations.—At these examinations the total number of candidates during the past year was 148, of whom 87 satisfied the examiners, and 61 failed. The proportion of failures—41·2 per cent., does not differ much from that of last year—44·3 per cent. I repeat the opinion expressed in my last report that these examinations are not too severe; on the contrary, I hold that if any change, which, however, I do not in the meantime advise—were to be made in them, it ought to be in the way of exacting more rather than less. Last year the average number of marks obtained by successful candidates seemed to be so very nearly equal in all the three subjects required (Latin, arithmetic, and English) that there was no one of them that could be pointed to as constituting a leading deficiency in candidates. The result of the year now under consideration is somewhat different. The most numerous failures have been in the subject of arithmetic, and in all candidates, successful or not, the marks obtained in this department have been below those obtained in the other two. Taking the Preliminary examination of 7th July as a fair average sample, the total marks obtained by all the candidates, whether they passed or not, were:—

Latin	69·5 per cent.
English	64·6 „
Arithmetic	38·5 „

I do not venture to generalize from these results, which may possibly be exceptional, but I record them as a contribution to the statistics of these Preliminary examinations, from which, when we have more data, we may be able to draw practical conclusions. It is enough in the meantime to call attention to the present deficiency in arithmetic, with a view to urging its importance upon future candidates. Not merely for the cultivation of the science of chemistry, but for the ordinary work of the dispenser, accuracy and promptitude in arithmetic are essential.

Technical Examinations.—At these examinations 152 candidates presented themselves, and the results were as follow:—

	Passed.	Failed.	Total.	Percentage of Rejections.
Major . . .	6	4	10	40
Minor . . .	65	51	116	43·96
Modified . .	19	7	26	26·92

It is hardly necessary to make any remarks upon the Modified examinations, because the class of persons who present themselves for them is limited in number, and will soon become exhausted. These Modified examinations are upon all hands admitted to be unsatisfactory. The Major and Minor examinations, on the other hand, are, to my mind, satisfactory. They have, in some respects, been improved since I had the opportunity of observing them, but they are, I think, capable of further improvement. In the spring of 1873, it appeared to me that the examinations in Botany were so far imperfect that the candidates had presented to them only herbarium specimens of plants, which enabled them to do little more than recognize species, and did not afford any opportunity of ascertaining the candidate's knowledge of vegetable organography and general classification. I have been, through the kindness of Professor Balfour, enabled since then to obtain for the examiners regular supplies of fresh plants from the Royal Botanic Gardens, and the result has been that in the examinations in June and ever since, there has been a marked improvement in the botanical examinations, which are now to be regarded as very satisfactory. Another improvement has, at my suggestion, been introduced into the examinations, to which I attach some importance—I mean, the use of the microscope. It is hardly possible thoroughly to test a candidate's knowledge of botany without an appeal to the microscope, but this is still more important in reference to adulterations of drugs, many of which are detectable by its use, where chemistry totally fails to discover such frauds. At the October examination, therefore, the microscope was brought into use, and on this occasion I conducted this part of the examination myself, taking occasion to inform candidates that, as no notice had been given that they would be tested by the use of the microscope, it was desired in the meantime only to ascertain how far pharmaceutical students were acquainted with its use, and that their performances were not to count either for or against them as regarded the result of their examinations. I had an opportunity in this way of trying 1 Major and 16 Minor candidates. The candidate for the Major diploma was found fairish, but by no means so good as many of the Minors. Of these, 5 had worked more or less with the microscope, and all of them made good appearances—two in particular, one of whom had a microscope of his own, the other being the brother of a student of medicine, who is well known to me as a good microscopist. The 11 other Minors had had little or no opportunity of using the microscope—some had indeed never looked through a microscope at all.

The average result may be said to have been satisfactory, some of them readily recognizing vegetable structures from the drawings in their text-books. One candidate only could make absolutely nothing of it. It thus appears that there would be no hardship in insisting upon a knowledge of microscopic appearances as part of the qualifications of a pharmaceutist of either grade. The very fact that microscopic appearances are appealed to in many instances in the Pharmacopœia, is, I think, sufficient justification of this.

As regards the examination in Chemistry, there is a call for some improvement, which is in course of being responded to. I am still disposed to regard as highly satisfactory the written papers on this subject required from Major candidates, as bringing out thoroughly their knowledge of chemical theory, and I am not disposed to recommend the abolition of this.

There has hitherto been no opportunity in Edinburgh of testing candidates practically in chemical work, as is done very satisfactorily in the examinations in London.

Arrangements are now, however, being made by the North British Branch, to acquire new rooms, one of which is to be a laboratory, in which the candidates will be made to perform actual analyses. These practical chemical trials have, even in London, hitherto been restricted to Major candidates; I am, however, very decidedly of opinion that in the case of Minors, an actual demonstration of some of the simpler chemical reactions would not only be found a more satisfactory test than the mere asking of questions regarding them, but would be more acceptable to the candidates themselves. It appears to me, therefore, that this should be done at once, in the case of Minors, whilst, as in London, all Majors should be required to make one or two more elaborate analyses.

Hitherto in Edinburgh, from the want of a proper laboratory, this has been restricted to one or two processes of volumetric analysis.

In the month of March, 1874, I went, at the request of

Mr. Simon, to London, to be present at the pharmaceutical examinations there. Two members of the Edinburgh Board of Examiners, Messrs. Tait and Gilmour, accompanied me. The immediate object of our visit was, by personal intercourse, to come to a definite conclusion as to certain differences of opinion which had existed between the London and Edinburgh Boards, as to the rigid adherence to the value of answers in determining the passing or rejection of candidates who had done well in some of the subjects of examination, but had in one of them made appearances not quite up to the required standard. In addition to the opportunity of actually witnessing the examinations in London, we had the advantage of full and free discussion of the whole subject of the examinations between the members of the London and Edinburgh Boards. To go into the details of this would add unnecessarily to the length of this report. It is enough to say that to me, and I think I may say to the gentlemen who were with me, this conference was very satisfactory, and that the result will be a more complete uniformity in the decisions of the two Boards, so that no candidate will have any inducement to suppose that he will be more likely, if not adequately informed, to pass in one part of the kingdom than another. Though it does not fall within my duty, I may, I hope, be permitted to record my satisfaction with the style and character of the examinations in Bloomsbury Square.

(Signed) DOUGLAS MACLAGAN.

Mr. HAMPSON, with reference to the use of the microscope by Dr. Maclagan, at Edinburgh, thought that that gentleman had rather stepped out of his proper position in attempting to examine candidates or test the quality of their knowledge, and he thought it was to be regretted that young men who only had a limited time given them for answering the questions should have any quantity of that time taken up in testing their knowledge of the microscope.

Mr. MACKAY said it was an idea of Professor Maclagan that chemists should use the microscope for the purpose of their avocations, and he must distinctly state that, before Prof. Maclagan asked any candidate to go to the microscope, he cautioned him that whether he knew anything about it or not it would not in any way add to or detract from his position in the examination. He was quite certain that those who went to it, were rather pleased than otherwise.

Mr. RIMMINGTON said he understood that the microscope had been introduced into the examinations in Bloomsbury Square.

The VICE-PRESIDENT said one had been introduced simply as an experiment, as had been explained had been done at Edinburgh; but it formed no part of the examination.

Mr. HAMPSON thought it was not advisable to take up any young man's time with a matter which did not form part of the subject of the examination. He must also protest against the action of the representative of the Privy Council, in introducing the microscope, and testing the candidate's knowledge of it in the examination-room.

Mr. WILLIAMS thought it quite right that they should stand up for the great principle that the gentlemen appointed by the Privy Council were not Examiners, and had no right to act as such. The Council appointed the Examiners, and he quite agreed that it was a wrong thing for the Government visitor to attempt even to examine in any matter, although it was not an essential part of the examination.

Mr. MACKAY said that Drs. Maclagan and Greenhow took no part in the examination. They acted as visitors only. The Board did not object to the microscope being shown as described, but he could positively affirm that it occasioned no waste of time, nor did it interfere with the course of the examination.

LADY STUDENTS.

Mr. HAMPSON said he would withdraw for the present the motion of which he had given notice, "That at the ensuing session the laboratory be open to lady students."

The SECRETARY read a letter from four female students, asking permission to attend the course of instruction in the laboratory.

The PRESIDENT said he had had the honour of seeing a deputation on the subject on Saturday, but he had declined giving them any positive answer.

The Secretary was instructed to acknowledge the receipt of the letter.

REPORT OF THE BOARD OF EXAMINERS.

July, 1874.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
July 7th and 8th Major ...	10	8	2
„ 13th and 14th „ ...	10	7	3
	20	15	5
„ 8th Minor	16	5	11
„ 9th „	28	9	19
„ 10th „	28	6	22
„ 14th „	17	2	15
„ 15th „	27	10	17
„ 16th „	27	4	23
„ 17th „	28	7	21
„ 20th „	28	12	16
„ 21st „	28	11	17
„ 22nd „	25	8	17
„ 23rd „	25	7	18
„ 24th „	26	9	17
	303	90	213
July 1st Preliminary	312	150	162
	635	255	380

Certificates received in lieu of the Preliminary Examination:—

College of Preceptors 2

SCOTLAND.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major...	2	1	1
Modified	6	4	2
Minor...	40	19	21
Preliminary	43	28	15
	91	52	39

Certificate received in lieu of the Preliminary Examination:—

University of Cambridge 1

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The eleventh annual meeting of the British Pharmaceutical Conference was commenced on Wednesday last, August 5th, in the house of the Pharmaceutical Society of Great Britain, 17, Bloomsbury Square, London, under the presidency of Mr. T. B. Groves, F.C.S.

Meeting of the Executive Committee.

On that day the proceedings were commenced by a meeting of the Executive Committee. Present—T. B. Groves, President (in the chair); Messrs. Bentley, Stoddart, Brady, Hills, Reynolds, Williams, Schacht, Attfield, Benger, Davies, Carteighe, Clayton, Martindale, Rimmington, and Umney.

The minutes of the previous meeting were read and confirmed.

A letter from the Editor was read, announcing that the MS. of the 'Year Book' would not be ready till the end of September.

Professor Attfield reported as follows respecting Secretarial work done since the previous meeting of the Committee:—

Subscriptions.—At date of last meeting (Jan. 22) 600 subscriptions remained unpaid, although two applications (in July and December) had previously been issued. During the succeeding month (to February 21st) 111 came to hand. On February 21st a third application was sent out for the remaining 489. This brought 139. On May 7th, when distributing the list of subjects for research, application was made for the 350 subscriptions then owing. In response, only 25 were received. The 325 members whose subscriptions were in arrear might thus be classified:—

Owe for more than two years	115
Owe for two years	99
Owe for one year	111
	325

The members who owed for more than two years (115) had been asked for the subscription some sixteen or twenty times, and a special letter had recently been sent to each, stating that, unless the amount was received within ten days, his name would be removed from the list of members. The 99 in arrear for two years would be similarly treated next year, unless they responded to further appeals. There remained a few more than 100 who owed for one year, but 100 might be taken as the maximum number of members withdrawing on account of the increase in the amount of subscription from 5s. to 7s. 6d., made in the year which had just ended (June 30).

On May 7 the list of subjects suggested for research was sent to every member.

In May, also, local secretaries were appointed in all towns where one did not previously reside, and all local secretaries were advised respecting defaulters, and a few subscriptions thus obtained.

Professor Attfield further reported that, at various times during the year, he had asked some seventy or eighty gentlemen to contribute results of researches to the annual meeting now about to be held, and he was happy to say that nearly thirty papers, all of pharmaceutical interest, had in consequence been promised.

At the close of the year Professor Attfield, finding that he had nearly one hundred pounds in hand, had ventured to spend most of it in asking chemists and druggists, not already members, to join the Conference. Throughout July he had issued the invitations, and more than 500 gentlemen had offered their names for nomination. Already £200 had thus been contributed to the funds o the Conference, and more candidates were daily applying for enrolment.

Various accounts had been paid since last meeting, as would be seen when the financial statements were read.

The Secretaries were duly instructed to remove the names of 115 defaulters from the lists of members.

Professor Attfield drew the attention of the Committee to five papers, which he thought might, perhaps, be considered unsuitable for the Conference. Abstracts of those papers having been given to the Committee, Professor Attfield was instructed to thank the authors for the contributions, and state that they were scarcely fitted as communications to the Pharmaceutical Conference.

The whole of the candidates mentioned were elected unanimously.

Mr. Brady proposed the name of Mr. William Saunders, of London, Ontario, as an honorary member. It was agreed that the President should bring the name of Mr. Saunders before the annual meeting.

Professor Attfield submitted a "programme of proceedings" at the sittings of the members on the following two days. With a few additions, the programme was agreed to.

Mr. Benger read a draft report of the Executive Committee, which was accepted.

Mr. Schacht, Treasurer, read a financial statement which had been prepared by the Secretaries, and signed by the Auditors.

The Treasurer also submitted the financial condition of the Bell and Hill's Fund.

Mr. Stoddart and Mr. Schacht stated that they were authorized by the pharmacists of Bristol to invite the Conference to Bristol in 1875.

Conversazione.

On Wednesday evening many members of the Conference, upon the invitation of the President, Vice-President, and Council of the Pharmaceutical Society of Great Britain, attended a Conversazione held in the Society's Rooms. An Exhibition of objects of interest in relation to pharmacy, of which some details are given in another column, was offered for the inspection of visitors.

Thursday, August 6th.

On Thursday, the Conference met for the reading and discussion of Papers at 10 a.m. The first business was the

Reception of Delegates.

The Secretary (Professor Attfield) having announced that, as a result of invitations he had issued, 500 new members had been elected, and that a fresh list of proposed members would be submitted on the following morning,—

Mr. F. B. Benger read the following list of delegates attending the Conference:—

Hull Chemists' Association.—Mr. Baynes,

Colchester Association of Chemists and Druggists.—Mr. J. B. B. Shenstone.

Leeds Chemists' Association.—Mr. George Ward and Mr. P. Jefferson.

Nottingham and Notts Chemists' Association.—Mr. J. H. Atherton.

Liverpool Chemists' Association.—Mr. Robert Sumner, Mr. John Shaw, and Mr. A. H. Mason.

Manchester Chemists and Druggists' Association.—Mr. Louis Siebold, Mr. F. Baden Benger, Mr. Wilkinson, and Mr. H. Woolley.

Midland Counties Chemists' Association.—Mr. Wm. Southall and Mr. H. W. Jones.

Dundee Chemists' Association.—Mr. Wm. Laird.

Brighton Association of Pharmacy.—Mr. Savage and Mr. Barton.

Bristol Pharmaceutical Association.—Mr. G. F. Schacht, Mr. W. W. Stoddart, and Mr. R. W. Giles.

Bradford Chemists' Association.—Mr. F. Bell and Mr. F. M. Rimmington.

Glasgow Chemists' Association.—Mr. Stanford, Mr. Frazer, and Mr. Fairlie.

Scarborough Chemists' Association.—Mr. J. Whitfield.

North British Branch of the Pharmaceutical Society.—Mr. Mackay, Mr. Baildon, and Mr. Young.

Professor Attfield said there were also present, as visitors from America, Mr. Edward T. Dobbins, member of the American Pharmaceutical Association; and

Colonel J. W. Forney, who desired to address a few words to the meeting.

Colonel Forney said—I feel deeply honoured, as the Commissioner of the United States Government, to appear before you in this somewhat informal way—not as a member of your body, but as representative of my country—with a communication to lay before you, and all bodies of a similar character, a few facts with reference to a great movement which has been set on foot by the American Government and people. I am a journalist in the City of Philadelphia, coming here rather as a rest from hard work than to undertake any such duty, but my people having understood that I intended to remain here for some time, have authorized me to communicate with the people of Great Britain, and with certain powers on the Continent, with reference to what is to us, and we hope will be to you, a most significant manifestation. On the 4th July, 1876, the American Government will be one hundred years old, and we propose to commemorate that event by an Exhibition to afford such proofs of our material and mental progress as will, we trust, be not unacceptable to the people of other nations. I feel somewhat appalled, at my position as a citizen of a young country, in venturing to lay before the representatives of this great English people, the reasons why we invite you to come to Philadelphia on the 4th July, 1876, and I should certainly feel appalled by the contrast between our young growth and your riper development, if I did not feel, after all, that we were the offspring of your laws, your literature, your religion, and your general example. In coming therefore to speak to you, I feel in some sort that I am speaking to my own people, by the same language, a language which in course of time must conquer all others. Philadelphia was laid out by an Englishman, William Penn, who lies buried, I believe, in Buckinghamshire, and whose grave it is my intention to visit, so that I may there draw some inspiration from the memory of the founder of Pennsylvania. That city, founded in 1668, has to-day a population of nearly one million. Her institutions of learning are perhaps not unknown to you. Her Academy of Fine Art, her Philosophical Institution, her Franklin Institution, and her various monuments for the promotion of science, particularly with reference to that branch which you represent to-day—chemistry—are not unknown either here, or in other parts of the world. The Government of the United States passed an Act of Congress on the 4th June last to encourage this celebration of the close of the century of American civilization. The State of Pennsylvania has raised over one million pounds sterling for the promotion of this great object. We do not come here to ask your pecuniary aid, but simply that you will send us such specimens of science and art as will be an invocation and encouragement to our own people; in return for which the Government of the United States has passed a law putting all objects or specimens that may be loaned to the Exposition on the free list, so that if your goods are sent by our American line of steamers, their safety will be insured. It is the intention of the thirty-seven States of the Union to contribute to this Exposition, and I think, therefore, you will see that we intend and desire, by asking your contributions, to present to you something that will not be unworthy of your own inspection. With these remarks I beg to thank you, in the name of my country, for the generous welcome you have given me.

The President said the proposed Exhibition was a long distance off at present, but he had no doubt that, in some way or other, English pharmacy would be represented there.

Mr. F. B. Benger next read the following report of the Executive Committee:—

Report of the Executive Committee.

Your Committee have little of importance to report since the last annual gathering. The work of the Conference having been chiefly of the ordinary routine character—a kind of work necessarily increasing in connection with so large an Association—it has devolved mainly on the Secretaries.

At a meeting of your Executive held on January 22nd, considerable discussion took place as to the most convenient date on which to hold the annual meeting for 1874. On previous occasions the Conference has assembled at the time and place of meeting of the British Association, and your Committee has therefore hitherto been relieved of the responsibility of deciding in the matter. It was finally resolved that the meeting should take place in London, on August the 5th and 6th, the house of the Pharmaceutical Society having been kindly placed at the service of the Conference. The Committee was further informed by Mr. Hills, President of the Society, that the Council over which he presided was most anxious to afford every facility for promoting the success of the Conference. It was also resolved in connection with the meeting once more to hold an exhibition of Pharmaceutical novelties and articles of interest, as it was felt that the objects of the Conference would be greatly promoted by such a course.

Appointment of Editor.—At the same meeting of your Committee, applications from eight candidates were read, and also letters relating to the editorship, and the merits of the candidates from various members of the Committee unable to be present. After a full discussion and careful deliberation, the election fell on Mr. Louis Siebold, Lecturer at the School of Pharmacy of the Manchester Chemists' Association.

Bell and Hill's Research and Library Fund.—A motion was carried authorizing the Treasurer to sell one bond of £50, and to expend the proceeds in aid of research or otherwise, according to the instructions of the Committee.

It was then resolved that £5 be placed at the disposal of Mr. Gerrard, to defray the cost of materials to be employed in a research on the official and other plasters; £10 had been forwarded to Mr. Groves to defray expenses incurred in further study of aconitines; and £10 to Dr. C. R. A. Wright to assist him in his researches. Reports by two of these gentlemen will be read at the present meeting. Ten pounds worth of books, bound in calf, and stamped with the Bell & Hill's device, were forwarded to Bradford, and duly acknowledged by Mr. Rimmington on behalf of the Chemists' Association of that town.

Assistant Secretary.—Mr. Robert Higgins Davies, F.C.S., has been appointed to this office.

The Year Book of Pharmacy.—The late date of the last Annual Meeting, and the sudden departure of the Editor for India, caused ten days' delay in the publication of the 'Year Book.' The volume, however, was issued on the 6th of January, and at once distributed to every member who had paid his annual subscription.

Exchanges for the Year Book.—Efforts have been made by the junior secretary during the year to establish exchanges with editors of scientific journals at home and abroad. The result has been, that some of the leading journals, treating of pharmaceutical matters, in England, France, Germany, and America, are now received regularly by the editor of the Year Book in exchange for our annual volume.

Circular respecting Unusual Doses.—Professor Attfield communicated with the officers of the Conference and with Mr. Hampson on this subject, and the resolutions of the Conference, preceded by an introductory letter, were printed in the form of a circular, nearly five hundred copies of which were posted to the leading physicians of England, Scotland, and Ireland. Although no answer to the circular was requested, several letters commendatory of the course adopted by the Conference were received. The medical and pharmaceutical press generally also gave favourable notices of the matter. Further, written copies of the circular letter, signed by the President of the Conference, were sent to the Presidents of the General Medical Council and Colleges of Physicians of London, Edinburgh, and Ireland, accompanied in each case by a short private note from the President of the Conference. From the English college a letter was received promising that the subject should be brought before the college at the earliest convenient opportunity.

At a meeting of the Committee held last evening, Professor Attfield reported that 200 subscriptions had been paid since the last meeting of the Executive. The names of 115 members whose subscriptions remained unpaid for three or four years, and to whom repeated applications had been made, were ordered to be struck off the list. He had recently sent an invitation to membership to every chemist on the register not already a member of the Conference. In reply to this, 500 new members had already sent in their nomination papers, and these gentlemen were duly elected.

Your Committee cannot close their report without an expression of deep regret at the loss sustained by the Conference in the death of Henry Deane, its first President, and the joint author with H. B. Brady, F.R.S., of the following papers, published in our transactions:—(1) Microscopic Research in relation to Pharmacy, 1864; (2) Microscopic Analysis, applied to Pharmacy, 1865; (3) Examination of Extract of Flesh, 1866.

Mr. SCHACHT (Treasurer) presented the financial statement as follows:—

The Treasurer in account with the British Pharmaceutical Conference.

Dr.

		£	s.	d.
To Sale of "Year Books" by Secretary		10	2	0
" " " Publishers		20	0	0
" Advertisements in 1872 "Year Books"		16	7	6
" " 1873 "		102	14	6
" Subscriptions from Members		591	14	4
		£740	18	4

Cr.

		£	s.	d.
By Balance due to Treasurer, July 1st, 1873		4	6	4
" Expenses connected with "Year Book":				
" Butler and Tanner for printing, banding, and binding	£330 15 11			
" Salary to Editor	100 0 0			
" By Messrs. Churchill, 5 per cent. commission on advertisements	29 15 6			
" Advertising "Year Book"	2 16 0			
" Foreign Journals—Nutt	7 15 0			
		471	2	5
By General Printing—				
Butler and Tanner	£18 4 6			
Stevens and Richardson	8 10 0			
Parkins and Gotto	4 14 10			
Byles, Bradford	1 17 0			
		33	6	4
" Directing Circulars and Envelopes		3	17	0
" Assistant Secretary's salary and expenses at Bradford		30	0	0
" Postage		9	19	10½
" Sundries, including making of four large Cupboards, Telegrams, &c.		18	2	9
" Postages of Invitation to Membership	£49 18 4			
" Printing Circulars, &c., of do.	24 15 0			
" Wrappers	5 3 0			
" Addressing Envelopes	4 8 6			
		84	14	10
" Balance in hand		3	8	9
		£740	1	4

Bell and Hill's Fund.

Dr.

	£	s.	d.
To cash in hand, June 30, 1873	20	5	8
" Dividends on Russian Bonds, October and March	8	11	10
" Cash from sale of one Russian Bond	48	15	0
	£77	12	6

Cr.

	£	s.	d.
By amount voted to T. B. Groves, Esq.	10	0	0
" Grant of Books to Bradford	10	10	0
" Amount voted to C. R. A. Wright, Esq., D.Sc.	10	0	0
" Amount voted to A. W. Gerrard, Esq.	5	0	0
Balance	42	2	6
	£77	12	6

Examined and found correct,

MICHAEL ROGERSON,
ALFRED ALLCHIN, } *Auditors.*

Mr. GILES (Clifton) moved the adoption of the report and financial statements.

Mr. HAMPSON seconded the motion, which was carried unanimously.

THE MEETING IN 1875.

Mr. SCHACHT, as chairman for the time being of the Bristol Pharmaceutical Association, begged leave to state that if the Conference should decide on coming to Bristol next year, as was anticipated, the chemists and druggists of the neighbourhood would be extremely gratified, and would do their utmost to make the gathering successful in all respects.

Mr. STODDART begged to second and cordially endorse the invitation.

The PRESIDENT having thanked both gentlemen and the pharmacists for the invitation, proceeded to read the following Inaugural Address:—

ADDRESS OF THE PRESIDENT TO THE MEMBERS OF THE BRITISH PHARMACEUTICAL CONFERENCE.

It will be known to most of those whom I have the honour of addressing that the original scheme of the British Pharmaceutical Conference did not embrace the contingency of a session held in the metropolis. It was intended to be a peripatetic Society, accompanying the wanderings of its elder and more powerful sister, the British Association for the Advancement of Science, of which organization, indeed, some aspiring souls hoped to make it a section or sub-section.

Until this year we have found no difficulty in adhering to our programme, and, however distant our place of meeting, have found a sufficient number of devoted pharmacists to wend their way thither. and there uphold, to the best of their power, the credit of British pharmacy, endeavouring to convince an unbelieving public that a chemist and druggist's occupation involves something more than the mixing of drugs at the order of a medical superior, and urging, both by precept and example, upon the local chemists, the necessity of union, of cultivation of that professional feeling that should animate every member of a scientific and honourable calling, and suggesting, where it was needed, the formation of local associations, the institution of libraries, in the formation of which it was enabled, by the generosity of one of its leading members, to give effective aid, in the shape of money grants, and generally endeavouring to carry out, to the best of its ability, the programme originally sketched by the founders of the Conference.

The result of ten years of such work has already been reviewed in the last annual address of the retiring President, and it is pleasant to think that, in the opinion of so competent a judge, our efforts have been crowned by a large measure of success.

It would need no gift of prophecy to foretel that so long as the same spirit animates the Conference that has inspired it hitherto, so long will it continue to flourish, so long will it powerfully second the efforts of the Pharmaceutical Society in raising the condition of British pharmacy, and improving the status of the British pharmacist.

It will be necessary now to advert to the reasons that have induced the Conference to deviate from its usual course, and, instead of accompanying the Association to Belfast, to decide on holding its session in London. But first let me acknowledge, without further delay, the courtesy that prompted the Council of the Pharmaceutical Society, in offering, through its President, for the use of the Conference, this lecture-hall for our meetings, and generally the use of its rooms, unrivalled in their special adaptation to our purposes, and further, the promise to afford every facility for the success of our meeting, a success which I, holding so responsible a position, am delighted to consider as now absolutely certain.

It seems that, early last year, inquiries were set on foot to ascertain what the feelings of the bodies representing in Ireland the pharmaceutists and chemists and druggists of this country, were, as to the feasibility of holding a successful meeting in Belfast, during the visit of the British Association. The answers received were unanimous in their deprecation of any such meeting being attempted during the continuance of the differences between the Irish apothecaries and the chemists and druggists of Ireland. Subsequently, on May the 29th, a deputation from the former body was received by the Council of the Conference, and the result arrived at, after long deliberation, was this: that, considering present circumstances, it would not be advisable to hold the 1874 meeting of the Conference in Belfast.

The reasons urged by the deputation, who were very polite in their expressions of admiration for the excellent work performed by members of our organization, showed that the Irish apothecaries were smarting under a sense of injury in consequence of the threatened encroachments of the chemists and druggists on their long-enjoyed privileges, and that, in fact, they declined to meet them as brethren, or countenance in any way their pretensions.

The Apothecaries' Hall of Ireland was instituted by Act of Parliament, 31 George III. cap. 34, which provides for the examination of candidates for the title of apothecary. To this body of examinees is exclusively confided the right to dispense the prescriptions of the medical profession. The original intention of the Legislature, it would seem, was to provide an adequate supply of apothecaries pure and simple, but somehow the curriculum demanded embraced the essentials of a medical education—included, in fact, medicine, surgery, midwifery, and anatomy, all of which subjects the candidate was compelled to pass in, even if he were desirous of limiting his practice to pharmacy only. The practical result was this, that as a medical qualification the diploma of the Hall was not much valued, and the course of study necessary for obtaining it entailing considerably more expense of time and money than a mere pharmacist would be justified in incurring, the labours of the examiners under the Act became lighter and lighter, until the fees for diplomas, at ten shillings each, averaged £10 only per annum. The public inconvenience caused by this limitation of the supply of dispensers, coupled with the feeling of injustice under which the chemists and druggists, many of whom were men of good position and education, laboured, gave rise to an agitation for an alteration of the law in the direction of the Pharmacy Acts, the operation of which had been of such advantage in the case of Great Britain.

The monopoly was not merely injurious, whole districts being deprived, by its influence, of competent dispensers, but absurd. It was competent for one apothecary to open any number of dispensaries, which he might or might not superintend personally, and regarding compounders he was under no restriction as to their selection. It was, and is, possible for the assistant at the druggist's of to-day to step across the road to-morrow to the apothecary's, and there accept an engagement in the higher branch of the business.

It is, therefore, I think, much to the credit of the apothecaries that in their Bill they have voluntarily proposed to trammel themselves with provisoes that limit the employees of the pharmaceutical chemist and apothecary to persons who have proved their capability before an Examining Board. A fair amount of time would of course have to be given those now engaged in the business to prepare for meeting the examiners, then there would be an exodus of the idle and incompetent, and matters would speedily arrange themselves in settled and permanent fashion. There need, I think, be no fear of opening and reopening of doors by which the idle are encouraged to postpone the evil day when they would have to withdraw somewhat from frivolous pursuits and take to hated study. A time having been fixed, it would, it is to be hoped, be strictly adhered to.

Many pharmaceutists on this side of St. George's Channel would rejoice if similar provisions could be ingrafted on our Pharmacy Act at some not distant day; but for the arrival of that day we must not be too impatient.

The Irish pharmacy question, being still *sub judice*, I would venture to insist on the great importance of compelling every student, apprentice, and assistant to pass an appropriate examination, and to suggest that, in the event of two grades of pharmacists being instituted, each grade should have its own distinctive title, and not be permitted to use any other, so that the public might be able, without difficulty, to recognize the distinction.

I am of opinion that great and, I fear, permanent injury has been done to pharmaceutical education in England by the omission of some such precaution. The public has been perfectly bewildered by the variety of titles assumed by holders of the lesser qualification, and remains to this day, and probably will remain till the end of the century, entirely ignorant of the distinction between things that differ so much as the Minor and Major qualifications. And it is not necessary to adopt Carlyle's estimation of "the public"—"some thirty millions, mostly fools," to account for such a state of things. What is the result? Young men, not unaware of this, concluding that the "title" is of no pecuniary value, and urged by no higher considerations, decline to undergo the expense and trouble of obtaining it. One cannot expect otherwise. It is as true now as ever it was that the belly is the real

"Magister artis, ingeniique largitor,"

deducting perhaps one per mille, the rest of mankind are ruled in the main by considerations of profit. Martyrs were never an abundant commodity; they are, I fear, becoming rarer every year.

I am led to these remarks by comparison of the Registers of 1873 and 1874, where I find that in 1873 the examined pharmaceutists were 8·93 per cent. of the total number, 12,750, whilst in 1874 they were but 8·92 per cent. of 13,216; the actual numbers in 1873 being 1138; in 1874, 1179; the increase—41 examined pharmaceutists, corresponds to a total increase of registered chemists and druggists of all kinds of 466. On the other hand, the chemists and druggists who have passed the Minor only have increased their percentage in the same interval from 7·87 per cent. to 10·59 per cent. I am aware that nothing is more deceptive than figures, unless it be facts, and therefore will abstain from forcing a construction of these figures upon this meeting. I fear, however, it must be confessed that the candidates for the Major examination bear no tolerable proportion to those for the Minor.

The evil might be partially met by the adoption by general consent of *one appellation only*, by all Major associates. Let me suggest Pharmacist (Major). It will, I hope, be understood that my object is not the glorification of the individual, but the conferring upon the title so much of distinctiveness that it might in a reasonable time become sufficiently appreciated by the public to be considered worth some effort and expense on the part of the rising generation.

I fear, however, the rising generation will find some difficulty in acquiring the instruction necessary for obtaining the distinction. Although the School of Pharmacy of the Pharmaceutical Society of Great Britain is but thirty-two years old, one already feels inclined to look back upon its earlier years as upon a golden age that has, alas! passed away. One looks with regret at the statement in the Calendar that in 1843 its lecturing professors numbered four, each one the most distinguished in his department of that day—George Fownes, F.R.S., Chemistry; Theophilus Redwood, Ph.D., Practical Pharmacy; Anthony Todd Thompson, M.D., F.L.S., Botany; Jonathan Pereira, M.D., F.R.S., Materia Medica. It is true the quality of our lecturers has not deteriorated, but their number has been halved, and, worse again, the length of each course has also been halved, in order, it would seem, to meet the demand for "rapid preparation," not to use a shorter and far uglier expression. But where is this to end? Is the School of Pharmacy of the Pharmaceutical Society of Great Britain to descend into the arena and compete with proprietary schools of pharmacy? The old objection of the impropriety of an examining body being also an educating body has of late years been frequently raised, and as often refuted, but I am not sure that now it could be done so easily. It seems to me that the difficulty will soon have to be faced, and the connection now existing between the two bodies severed. Disappointed candidates, it is well known, have ascribed their want of success to the partiality of the examiners for the students of their own schools, and now very recently a professional "crammer" has gone far beyond that, and not scrupled to print and distribute in a circular, addressed generally to students, that he will deliver a course of thirty lectures, etc. "The lectures will review each subject thoroughly, and point out the various tricks and artifices employed to pluck candidates."

The examiners were, of course, aware of the existence of this circular, and feeling themselves strong enough in the good opinion of the world to disregard it, have so done. In that, perhaps, they have done wisely. George Herbert has written—

> "Think not thy fame at every twitch will break,
> By great deeds show that thou canst little do;
> And do them not: that shall thy wisdom be."

But that feeling can be carried too far, and I am not sure that it has not now reached its limit. Should the Society be contemplating any such severance as I have indicated, it would seem only fair to the present staff of professors that it should not be long delayed, lest the ground be already covered, and they left out in the cold.

What seems to be really wanted is a chartered and endowed College of Pharmacy, that should confine its labours to the providing a high-class scientific education for intending Pharmacists. I believe that no such scheme would pay as a private speculation, and that one such, placed in the metropolis, would suffice for the whole of Great Britain. For the endowment of professorial chairs, one might look hopefully, perhaps, towards the Pharmaceutical Society and the wealthier members of our profession.

The School of Pharmacy of Paris, with its staff of twelve professors, and a three years' course, has, at the present time, 500 students attending it. In addition to these must be reckoned those attending the provincial Superior Schools of Pharmacy.

The recent change in the mode of conducting the Preliminary examination will, I think, meet with general approval as a step in the right direction. I think, however, that public opinion will eventually declare in favour of our delegating that office to one or more purely scholastic boards. That is already my opinion.

The reports of the examiners have of late revealed a most lamentable proportion of failures, especially in the Minor. The result is mainly due probably to the prospective increase in the stringency of that examination in October next. Young men, conscious of weakness, are rushing in, hoping by some fluke to pass the ordeal. One is compelled to wonder how or why such men enter the trade, and to speculate on their career as assistants.

The future of British pharmacy, with the present state of which the great mass of pharmacists are so profoundly dissatisfied, will depend in great measure on the class and condition of the young men introduced into the trade as apprentices and students. It has unfortunately been for many years the custom to regard an apprentice as a cheap labourer, and boys, if capable of plenty of work, no matter how ignorant or how rough in manner, were considered eligible for the post. Having no fear of examination before their eyes, they acquired what is called a practical knowledge of the business, and in due time commenced on their own account to keep open shop, as their employers had done before them. In that way, the country has been filled with chemists, with little scientific knowledge and less professional feeling, who, if they succeed in making a decent living, are therewith content, regarding the excelsior aspirations of their brethren as great rubbish. The great, but I hope not increasing, difficulty of finding competent assistants, obliges one to deal tenderly with young men of this class. Proprietors of mixed businesses are, I believe, the chief sufferers from this scarcity, and I fear that their troubles are likely to become more severe than otherwise. Every one sees and knows what the end will be. Young men of education, and presumably of refinement, will decline to do porter's work, and a separation of duties, and possibly of establishments, will be the result.

Every lover of advanced pharmacy will, I am sure, declare this to be a consummation devoutly to be wished.

The necessity, now I suppose generally understood, for a youth to pass certain examinations before entering business, has influenced and will continue to influence for the better the *personnel* of the trade. For an employer to take a premium from the parents of a youth, who he has reason to believe will never be able to enter the trade as a master, would be worse than robbery—not only is the money wasted, but what is of far greater value the youth's time; and it is satisfactory to think that such cases are now of very rare occurrence. Still, many years will, I fear, elapse before we shall be able to tap the right spring, and introduce into our ranks any great number of youths of gentle origin. Parents and guardians who have well-conditioned boys to place out in life are accustomed to well consider the matter before deciding.

The youth has perhaps seen at a popular lecture some brilliant experiments in chemistry, and forthwith decides that he will be a chemist. But his less impressible guardian before consenting counts well the cost of such a step, and finding that the mere fact of his being a chemist would, in the eyes of his friends, lower him in the social scale, and be a bar to his entry into the society of his quondam associates and equals, declines to give his permission, and the youth goes, as a matter of course, to swell the already overcrowded ranks of one of the recognised professions.

Popular ignorance on scientific subjects is still so astounding that the general public is quite unable to realize the fact that scientific medicine is impossible without scientific pharmacy, and I think it must also be acknowledged that the ordinary run of practitioners in medicine are not half alive on the subject. High-class pharmacy might here and there be received with favour, especially in large centres, and by the eminent of the profession; but, as a rule, a well-educated pharmacist would find himself unappreciated, and his carefully acquired knowledge daily growing rusty for want of use. Magistrates and public bodies in general would first apply for a chemical opinion, not to a professed chemist, but to a medical man, who, having been examined at the medical school on no end of ologies, must necessarily in their opinion be the best authority on any scientific point.

In days gone by, there were encyclopædists; there were also, at a remoter date, megatheriums, but both have disappeared for ever. Such is the vastness of the field of scientific investigation at the present day, and such the minuteness with which it is worked, that it is simply impossible for one intellect to grasp the whole or any considerable fraction of it.

In order to obtain a useful and a fruitful knowledge of any subject, attention must be concentrated upon it. We might even go further, and state that the whole of either of the more expanded sciences is too much for any one intellect to know and use effectively. Witness chemistry, whose successful cultivators in the present day have earned distinction by concentrating their attention on one or two departments of the science. It perhaps would not be too much to say that a life's work is to be found in opium, in Peruvian bark, in digitalis.

If the pharmacist claims, as his department of scientific work, the chemistry of drugs and of disease, he will have claimed enough and have done something to relieve the overtaxed capabilities of his medical coadjutor, and enable him, perhaps, to do what his distractions now so often prevent him from doing—tread the difficult path of original investigation.

So much has been said and written on the operation of the Adulteration Act, that I shall, I fear, in referring to it at all, be telling a thrice-told tale. The conception of the Act was doubtless laudable in the extreme, and by no class of persons was it more sincerely welcomed than by the honest tradesman, who saw in it a defence from the dishonest competition from which he so frequently suffers. The operation of the Act has, however, been far from satisfactory, and the good it has undoubtedly done in checking adulteration has been more than counterbalanced by the injury inflicted on innocent traders. And this has been caused mainly by a straining of the Act on the part of the lawyers, by sensational evidence, and by the lack of commercial knowledge and even of common sense on the part of the analysts.

The greatest sufferers have, I suppose, been the grocers, who have been repeatedly fined for selling as tea what had really been received as such at her Majesty's Custom House, and upon which duty had been paid; for selling as coffee the usual mixture of chicory and coffee, which every one expects to have when he buys the cheap article, and which many prefer to the pure, the packet all the time being labelled plainly, "This is sold as a mixture of chicory and coffee." But the magistrate ruled that that was not sufficient; it ought also to have been declared by word of mouth. In the sale of butter, also, they have been much harassed, the Liverpool case being a notable one, costing a large sum of money in the defence, and after the usual conflict of scientific evidence, ending in the acquittal, and possibly the ruin, of the butterman.

The milkmen have probably furnished as many cases as any, and in most instances have suffered deserved penalties, for I suppose no article of food has been so systematically tampered with as milk. Yet the dealer who had it proved against him that he had removed the cream, selling skim milk when ordinary milk was asked for, and therefore committing a fraud, was allowed to escape scot-free, because he had *added* nothing to it, whereas his neighbour, who, according to the analyst, had sold, as pure, milk containing an adulteration to the extent of five per cent. of water, was punished!

Finally, the chemist has had his turn. The great citrate of magnesia case depended on the use of a popular, and, if you will, an incorrect designation of a well-known article, and was exempt from even a suspicion of fraud or carelessness. Yet the seller was fined and his business so injured that he had to leave the neighbourhood.

The *bonâ fide* nature of the sale of sweet nitre cannot be doubted, nor can the case that arose from it be described otherwise than as a straining of the law to catch a man who ought never to have been put in jeopardy.

If one commercial fact is more firmly fixed in a chemist's mind than another, it is this—that Howard's preparations are always to be relied upon for purity. Yet we find a most respectable man indicted for selling as citrate of iron and quinine, an article adulterated with cinchonine, that article having been supplied by Messrs. Howard who explained the slight difference observed by the fact of the article having been overheated during preparation.

The scammony prosecutions again point to a most unsatisfactory state of things, and must have caused many an honest pharmacist to wonder whether it would be his turn next to defend his reputation on some trumpery charge.

The report of the Select Committee on the operation of the Adulteration Act has been generally received as satisfactory: it is therefore much to be regretted that the state of public business will not permit of action being taken upon it this session.

The amendments suggested by the Committee are both numerous and important. It was found that some magistrates, regarding the charge as a criminal one, would not allow the defendant to give evidence. That manifest injustice is in a fair way of being remedied; both the defendant and his wife are recommended to be allowed to enter the witness-box, and explain what very often they only would be able to explain. Then again it is recommended that when an article purchased of a wholesale dealer under guarantee is found to be adulterated, the wholesale dealer should be summoned as well as the retailer. This will be a great boon to pharmacists, who will, I have no doubt, very generally avail themselves of the guarantee system, and be content to pay accordingly. The pharmacist will, however, I should imagine, be held liable for manifest carelessness in not detecting what ought to have been self-evident. He, of all tradesmen, should be the last to shelter himself by a plea of ignorance; but as for his being expected to subject every one of the thousand articles in which he deals to chemical examination, it is simply absurd.

The report treats the analysts very fairly, but admits that some have shown more zeal than discretion, that others have shown a want of chemical knowledge, and recommends that the latter class should be weeded out by subjecting them to a practical examination. It has been affirmed, on good authority, that some of these gentlemen have set up as analysts after a three months' course only of chemistry, and that, in one case at least, undertaken after the receipt of the appointment. We need not wonder, then, at the occasional display of incompetence.

A main cause of the breakdown of the Act has been the difficulty of obtaining competent analysts possessing a requisite amount of commercial knowledge. It is suggested that in a few years' time there will be an abundant supply of *reliable scientific analysts*, and that, until that time, consolidation should be recommended. But a few years will not give a man the experience that would justify one in placing the reputation, and therefore the living, of a tradesman in his hands. In not taking precaution to prevent the introduction into court of cases of a doubtful character, the Select Committee have scarcely shown sufficient appreciation of the extreme delicacy of a tradesman's reputation. It seems that no discretionary power is to be conferred on any one. Should the analyst's certificate report adulteration to the extent of, say, 1 per cent., the inspector must cause a complaint to be made before a justice of the peace, and thereupon such justice shall issue a summons, etc., whereas it would seem that the justice of the case would often be met by a caution sent privately by the bench, on the recommendation of the analyst.

Cases have already occurred where, technically, the dealer was wrong, but practically, right, so that, after suffering all the annoyance and injury attending a charge which was really unsubstantiated, he still had to pay costs and a nominal fine. This reminds one of the recommendation to mercy of a west country jury, who, when asked their reason for the recommendation, answered, through their foreman, "Because, sir, we don't think he ever done it."

The plan that I should approve of would be this:—Abolish all local appointments of analysts, and establish at convenient points some five or six analytical laboratories, each superintended by a gentleman of eminence and experience as a chemist, and with some acquaintance with commerce and manufacture. Under him should be placed two or three juniors, who should receive from their superior numbered samples for examination. Each sample received should be twice examined, the analysts being unaware of the source of the samples before them. No sort of collusion could then be practised. On the results being returned to the superintendent, it should be his duty to compare them; if they were alike he would probably conclude that they were exact; if they did not tally, he would inquire the reason why, and direct, or undertake for himself, a further examination. His report to the justices, recommending prosecution or otherwise, might then be acted upon without much danger of inflicting injustice.

The analysts should, of course, be paid by salary, and not by fees, and the right of appeal should be conceded.

An omission, evidently a slip on the part of the authors of the Act, will be supplied, and the fraudulent abstraction of important properties of any commodity will be regarded as a punishable offence.

There is, I am happy to say, some hope of the present Act being practically suspended in its operation until it has undergone amendment.

The question of co-operation remains *in statu quo*: but occasionally evidence is afforded us that such associations are subject to the same misfortunes as other trading concerns. The announcement of the demise of the Universal Drug Supply Association, Limited, did not probably evoke any sincere regrets on the part of London pharmacists.

It is not likely that any action will or can be taken on the general question in the way of repression, but it is still open to question whether the servants of the Crown ought to be allowed to devote their spare time and official training to trading with the general public, to the injury of the shopkeepers who contribute so largely to the taxes out of which their salaries are paid.

The system, if fully carried out, would simply obliterate the middle classes. Should that consummation ever be arrived at, I fear the saving of 5 per cent. on the incomes of the rich will fail to repay the inconvenience the plutocracy will suffer on being brought face to face with the proletariat.

We are likely, if not wide awake to the fact, to be peculiarly injured by this style of trading. Co-operators cannot get advice from the store; they will therefore go to the local chemist for it on pretence of some trifling purchase. We must therefore be on our guard against this gratuitous brain-sucking.

I should like to say a word or two about the trade in patent medicines, a subject to which the attention of the Legislature ought, I think, to be directed. I find that during the financial year ending March 31st, 1873, stamp duty was paid on no less than 12,731,753 packages of patent medicines—considerably over a million more than during the previous year. The revenue thence derived amounted to £95,812 for stamp duties on the medicines, and £7,283 for excise duty on patent medicine vendors. The aggregate of these sums is, of course, a mere bagatelle in the revenue of this great country, so that financial considerations need not be regarded in considering the question whether or not it is advisable that the present system should be continued. I regard the whole system as rotten, and believe it to be productive of great evil. For to what has advertising patent medicines now sunk? It is in the main (I allow some honourable exceptions) a systematic exploitation of the ignorance and credulity of sick people, and, therefore, calls loudly for some sort of regulation, if not extirpation. The medical profession, who are more nearly concerned with the public health than are the chemists, will best appreciate the extent of the evil, and to them rather it appertains to suggest a remedy for the abuse.

At a meeting of the Society of Pharmacy of Paris, it was announced by M. Boudet, that the committee appointed for the purpose had prepared its report on the International Pharmacopœia in readiness for presentation to the St. Petersburg Congress. The nature of the report did not transpire. It is to be hoped that its recommendations will not be too elaborate, a failing to which the French are inclined, and that the attention of the Congress may be fixed on assimilating the formulæ for the preparation of a small number of what may be termed heroic remedies.

The number of drugs actually necessary for the treatment of disease by a true physician is comparatively small, and one can venture to hope that if the scope of the International Pharmacopœia be limited to these, something might be effected in this generation. The Denarium Medicum of Bernardus Penotus, published at Berne in 1608, proposes to show how all internal diseases may be cured by the ten remedies he describes. Isaacus Wollandus requires three only; Paracelsus only one, and justifies himself as follows:— Out of the trunk of one tree you may carve as many as 600 images, but one fire will consume the whole of them. In the same way, the various kinds of disease which are almost innumerable, may yet with one not over-violent remedy be all cured." It has already been decided that the text shall be in Latin, and the weights used the metrical. Professor C. W. Thomas, suggests that proportional parts by weight would be more convenient at the present; but I do not see how, when the dose comes to be apportioned, a definite unit can be dispensed with. His other suggestion—a general Pharmacopœia for all English-speaking communities—is a very good and seemingly practical one. The Germans and the Scandinavians have already accomplished something of the kind, but their task, owing to the absence of colonies, was a comparatively light one.

When works of this magnitude have to be undertaken, we look around for men equal to the occasion, but every year, unfortunately, it is the melancholy duty of the president to have to refer to the removal of one or more of the pillars of pharmacy. This year the task is especially heavy, as we have lost in Henry Deane our first president, who, if not the originator, may truly be styled the founder, of the Conference. It was to his wisdom, displayed in guiding the course of the Conference during the first years of its existence, that we owe much of its present prosperity, and to him we were indebted for some of the best papers that have been presented to it. Mr. Deane's reputation as a man of science was, however, by no means limited to this field; his fame, more especially as a microscopist, was widely and generally known. His social qualities were better known to many present than to me. We never realize the value of a thing till we have lost it, and now it often occurs to me how foolish I was not to avail myself more frequently of opportunities of cultivating his society. Mr. Deane had his gay as well as his grave moments, and then no man could be more genial or amusing. I am not one to say "we ne'er shall look upon his like again," but am hopeful that the contagion of his example will spread among the rising generation, and produce equally good results in future years. We then shall be able to say, in the words of the epigrammatist,—

"Mira cano, Sol occubuit, nox nulla secuta!"

In Mr. George Dymond we have lost a useful and talented member, who has held office in the Conference, and to whom we often were indebted for remarks of great value in our discussions; he was also a contributor to our transactions. He died at the early age of 44, when to all appearance he had before him a long life of activity and usefulness.

We never again shall see amongst us the familiar form and genial countenance of Thomas N. R. Morson, who also has departed. Mr. Morson's reputation as a pharmaceutical chemist was literally world-wide. He was not only the first manufacturer in this country of many of the rarer chemicals, but was for very many years reputed the best. His connection with the Conference was, I believe, limited to membership. As a contributor to our discussions no man spoke with greater weight or was listened to with more respect. A few observations from Mr. Morson would make an otherwise sterile paper at once fruitful with good—in that capacity we shall much miss him. His death has left a void in scientific society that will not readily be filled up.

In concluding my address, which, I fear, has already become tedious, I will, as shortly as I can, refer to the action taken by the French pharmaciens when it was proposed to subordinate, in the French army, pharmacy to medicine. The movement was begun by the doctors, and on their representation referred to the Academy of Medicine to report thereon. In the end the doctors were defeated, pharmacy retaining its old independent position. The advocates on the side of pharmacy were MM. Bussy, Boudet, Poggiale and Dumas, the latter of whom, himself a pharmacien by education, delivered a speech full of sentiments worthy of remembrance by the pharmacists of England.

"If it be true, he says, that the pharmacien, in dispensing the prescription of the medical man, is really his subordinate, how is it in the case of the selection, preparation, and titration of drugs and preparations, in all of which most important operations the pharmacien is the sole responsible person, and for the control of which medical men are and must be wholly incompetent? '*On ne fait pas de bonne Chimie en passant*,' was a dictum of no less a person than Gay-Lussac, and the fact of a physician's time being so fully occupied by his medical duties, and rendered fragmentary by frequent and unexpected calls for his services, renders it impossible that he ever can be able to devote that continuous application to chemical details from whence alone proceed good pharmacy and sound chemical hygiene." "From the ranks of French pharmaciens have issued many distinguished discoverers. To mention those only who have departed, Rouelle, Baumé, the two Pelletiers, Robiquet, Serullas, Soubeiran, Pelouze, Balard." "Let medicine, then, exalt the level of its instruction, and extend the area of its services, all the world will applaud it for so doing; but let the Academy be convinced of this, that to diminish the importance of pharmacy is not necessarily to increase that of medicine. The art of healing cannot be separated from the highest chemistry; it needs its help at every moment, and if clinical studies and physiological experiments point the way, it is the chemical analysis of the normal and morbid products of the economy which sustain its steps and prevent them going astray."

The pharmacists of England, now in a very slow state of transition, will have some difficulty in realizing the feelings of their brethren across the water under the above circumstances. The time, however, will come when throughout Europe the position of pharmacists will be assimilated. It must not be forgotten that the desired change cannot be effected in a day by Act of Parliament. "They who would be free themselves must strike the blow," and the British pharmacist, in order to achieve the object of his ambition, must be prepared both to do and suffer in the cause. If trading instincts are allowed to smother professional feeling and practice, a trader he will and must remain; if otherwise, pharmacy will eventually in this country attain the status it has so long enjoyed on the Continent, and render services equally beneficial to the community.

Mr. Cayley, in proposing a cordial vote of thanks to the President, said: An able and interesting address we should expect from Mr. Groves, whom we have known for so many years, and whose writings we have all read. I doubt not that this meeting will, in all respects, equal, and probably surpass, the meetings which have been held in other places; and I am sure that Mr. Groves will acquit himself as the Presidents on previous occasions have done, and that we shall all have good cause to be pleased with his election. I will not comment on any portion of the address, which we shall have an opportunity of reading at our leisure, but I would make a remark on just one subject. We have lost three eminent members of the Conference, Mr. Deane, Mr. Morson, and Mr. Dymond, during the past year. Those who remember what the Pharmaceutical Society was twenty-four or twenty-five years ago, will recollect what very important members the two first-named gentlemen were. I look back with great pleasure to passing through the rooms upstairs when those two gentlemen sat as examiners; their kindness and their courtesy was such as could not be surpassed and I, for one, have great cause to remember them with respect and gratitude. I beg to propose that a cordial vote of thanks be given to Mr. Groves for his very able and interesting address.

Mr. Gostling: I have very great pleasure in seconding the motion. The address is so comprehensive that it would ill become me to attempt any comment on the various points which are introduced; but the wise suggestions which were made on the various matters so ably brought forward will doubtless receive the patient and careful consideration of every member of the Conference, in reading them. It is impossible for us to carry in our minds so many points as the President has brought before us, but there are many of great importance which will have to receive the consideration, not only of ourselves, but of the Pharmaceutical Society, such, for instance, as the prospects of the rising chemists, their titles and their qualifications, and their interests in the future. As fathers introducing sons into our businesses we feel great interest respecting them, and sometimes have some fear whether the next generation will do as well as the honoured generation before us have done. I have much pleasure in seconding the vote of thanks to the President.

Mr. T. H. Hills: As President of the Pharmaceutical Society, I beg to support this motion, and to offer to the President the best thanks of the Council and members of the Society, not only for this address, but for the honour that he and the members have done us in coming and occupying our rooms. I consider the Pharmaceutical Society and the Pharmaceutical Conference are one. I have the honour to hold the office of Vice-President of the British Pharmaceutical Conference, although I have done very little beyond looking on and saying, Go on, my young friends. I think they have made a capital commencement, and I am sure they will successfully carry out what they have begun so well.

The resolution having been carried unanimously.

The President said: Gentlemen, I can assure you, when I was proposed to occupy the very important position that I hold, I accepted it with great trepidation; and the matter of the address was to me a very serious affair. When I came to compose it, I found the number of subjects to be included was something alarming. I should have preferred giving a scientific *résumé* of the work done during the year, but these things are rather overdone in the present day, or are likely to be; and, therefore, I decided to follow the line I have adopted. In doing so, I am afraid I have trodden on the corns of not a few, and do not at all suppose that my opinions will meet with general approval; but I hope they may act as a ferment, and set others thinking, and do good in that way. There are many points of which I know I hold views peculiar to myself, but still I thought I was bound honestly to bring them forward. If you will only accept my effort in that spirit I shall be well satisfied.

(*To be continued.*)

EXHIBITION OF OBJECTS OF INTEREST RELATING TO PHARMACY.

This Exhibition was held in the rooms of the Society, in Bloomsbury Square, and commenced on Wednesday morning. We propose to give a short notice of most of the articles exhibited in the various rooms, in the order in which the rooms were numbered, but want of space compels us to reserve a considerable portion of this notice until next week. In the reception-room were two magnificent pictures of lions by Landseer, the truthfulness to nature and grandeur of which are too well known to call for any comment here. These and several other very valuable paintings were lent for the occasion by the President of the Society. A portrait of Pierandrea Mattioli, a celebrated Italian physician, botanist, and writer on drugs, and an old pharmacological work of his dated 1574, were exhibited by Mr. D. Hanbury. In this room also was an immense leaf of that magnificent water lily the Victoria regia, and a splendid flower of the same plant, which had been kindly sent for the purpose by Mr. Sowerby, the Secretary of the Royal Botanical Society.

Of the objects exhibited in room No. 1, the following are deserving of notice. An electrical recorder for registering time, speed, distance run, and number of passengers inside and out, of tram-cars and omnibuses, exhibited by Mr. Wildman Whitehouse, forming a very pretty and interesting apparatus.

Some photographs of fluorescent substances, showing that solutions of quinine, æsculin, etc., give figures as black as ink does, when photographed, and that figures drawn on paper with these solutions, although not visible to the eye, show black in a photograph.—Lent by Dr. Gladstone, F.R.S.

A series of thermometers used in experiments to ascertain the relative sensitiveness of different kinds of thermometers, and whether there is any regular law with regard to the increase of sensitiveness according to the decrease of size of the bulb.—Exhibited by Mr. G. J. Simmons.

Among chemical apparatus may be mentioned Beindorff's complete and very compact steam apparatus for pharmaceutical laboratories, from Zimmermann & Co.; a large and valuable set of apparatus, occupying the centre of the room, and Dr. E. A. Parkes' chemical cabinet for the analysis of food, air and water, from Messrs. J. J. Griffin and Son; Becker's scientific and chemical balances, combining great accuracy with a moderate price, from Mr. H. Gillman; milk testing apparatus from Mr. W. W. Stoddart, a full account of which will be found among the Conference papers; a bath for making suppositories, by Mr. E. R. Learoyd.

Elegant pharmacy was well represented in this room, and included sugar-coated pills, from Mr. Hampson; sugar-coated pills and pilules, from Messrs. Bullock and Crenshaw, of Philadelphia, the pilules being about the size of homœopathic pilules, and containing $\frac{1}{10}$ gr. of podophyllin, $\frac{1}{40}$ arsenious acid, and $\frac{1}{60}$ of strychnia respectively; soluble pearl-coated pills, syrup of erotonchloral, in which the taste was well disguised, and other preparations, from Messrs. J. Richardson and Co., of Leicester; castor-oil jelly, in which the taste of castor-oil could not be perceived, from Mr. R. Niven.

By Messrs. H. and T. Kirby and Co. were exhibited coated pills and glycerols; the latter being a kind of lozenge, made of glycerine and gelatine, in shape somewhat resembling Pate de Guimauve lozenges, and medicated with every imaginable medicine. They have an elegant polished appearance, and really look too tempting to contain nauseous medicines. The same firm also exhibits some very compact portable medicine chests, which can be carried in a great-coat pocket, and contain coated pills of all the more important drugs, together with a few of the most useful surgical appliances. Nor is elegant pharmacy restricted to human beings alone. Physic balls and other medicines, both liquid and solid, for horses and dogs, were exhibited, enclosed in gelatine capsules, so that "the merciful man may be kind unto his beast" in the matter of medicine, and ought to have no trouble in administering these tasteless boluses to the patients for whom they are intended.

Dropping and sprinkling stoppers are exhibited by Messrs. R. J. Ellis and Co., and will be a valuable acquisition to those who have to take medicine in drops, although scarcely applicable to very powerful medicines. These stoppers consist of a glass stopper with a slightly tapering end passing through and beyond a cork, the glass being enlarged above and below the cork, so as to admit of its being raised a short distance, and the tapering end of the glass thus fitting loosely to the cork, admits the passage of a small quantity of fluid.

Self-acting label cabinets, which consist of a set of drawers, weighted at the bottom, and suspended by wire at the sides, so that a touch on the handle of the drawer opens it, and when the label is taken out it swings back by its own weight. These were exhibited by Mr. Shephard.

Apparatus for consecutive percolation, and various pharmaceutical products of excellent quality obtained by this process, were exhibited by Mr. R. Giles; specimens of Cortex Rhamni Frangulæ and preparations made from it by Mr. H. C. Baildon; very neat poultice bags consisting of muslin on the side to be placed nearest the skin, and gutta percha sheeting on the other side, thus protecting the clothes from being stained, while the muslin prevents the poultice from soiling the skin, by Mr. J. Broad. M. Cornélis, of Diest, Belgium, exhibited through his London agent, M. Léon Vallez, his bottles for preserving vegetable or deliquescent substances indefinitely; these bottles have an ordinary hollow stopper, containing fragments of quicklime, which is prevented from falling into the bottle by a piece of leather fastened to a rim at the bottom of the stopper. In one of the bottles, violet flowers seven years old were as brightly coloured as if only dried yesterday, and conium leaves were as green and odorous as if collected this season instead of four years ago. Stramonium powder which was seven years old had not the least appearance or smell of dampness, but was as good as if just powdered. An interesting series of bottles containing extracts of meat, showing the proportion utilized and wasted in the several methods of obtaining the soluble portion of meat, and accompanied by a diagram, were exhibited by Messrs. Darby and Gosden. These specimens were to show that while by Liebig's process only a little more than a quarter of the soluble matter is extracted, and by the ordinary process rather less than one-third is extracted, the whole available amount is obtained by Darby and Gosden's process; also, that in stewing meat, the whole of the soluble matter is not extracted.

It is noticeable, however, that Darby and Gosden's extract is a fluid extract of the consistence of treacle, while Liebig's extract is almost solid, and the extract of meat prepared by the ordinary process is dry and hard so that the difference is not quite so great as at first sight, would seem to be the case.

In this room were also some very pretty seaweeds, including several rare species, such as *Carpomitra cabreræ*, *Gigartina pistillata*, and *Chrysomenia rosea*, from Mr. J. Gatcombe, of Plymouth.

Some rare and valuable specimens of curious alkaloids and other products of cinchona bark were exhibited by Mr. J. E. Howard; also some samples of Dr. De Vrij's sulphate of amorphous quinine, in powder. Mr. Meggeson exhibited a series of medicated lozenges, including those of the Throat Hospital. Among the latter may be mentioned lozenges of benzoin, guaiacum, logwood, cream of tartar, carbolic acid, and cubebs, the last being used as an anti-sialogogue. A magnificent specimen of cantharidine, as well as fine specimens of meconine, *Tela vesicatoria*, and liquid blister, were exhibited by Messrs. T. and H. Smith, of Edinburgh, as well as a large specimen of cryptopia, the new alkaloid discovered in opium, by the same gentlemen.

MEETING OF PUBLIC ANALYSTS.

A preliminary meeting of the public analysts of the country was held at the Cannon Street Hotel, on Friday, August 7, 1874; Dr. Redwood in the chair.

The following were present:—Mr. A. Winter Blyth, of Devonshire; Mr. Thomas Fairley, of Leeds; Mr. John Horsley, of Cheltenham; Mr. Wentworth Scott, of Wolverhampton; Mr. Wanklyn, of London; Mr. J. H. Gramshaw, of Gravesend; Mr. J. Wiggin, Ipswich; Mr. A. H. Allen, Sheffield; Mr. G. W. Wigner, London; Mr. C. H. Piesse, London; Mr. F. J. Burge, London; Mr. C. Estcourt, Manchester; Mr. J. C. Bell, Salford; Dr. W. H. Corfield, London; Mr. G. A. Rogers, London; Dr. J. N. Vinen, London; Dr. Thos. Stevenson, London; Mr. F. M. Rimmington, Bradford; Mr. E. W. T. Jones, Wolverhampton; Dr. Bernays, London; Dr. Tripe, London; Dr. Dupré, London; Mr. George Jarmain, Huddersfield; Mr. Charles Heisch, London.

The Chairman, in commencing the business of the meeting, said: Gentlemen, the objects of this meeting have been communicated to you by a circular, which I presume you have all seen, and to which I am very glad to find so general and cordial a response by the public analysts throughout the country, for those who have attended here on the present occasion are but a portion of the gentlemen from whom communications have been received. The immediate cause of our meeting has undoubtedly been the Report of the Select Committee of the House of Commons, in which it is recommended that certain alterations should be made in the Adulteration Act that appear to some of us to be very undesirable, and in which also there are certain remarks made in reference to public analysts that we think at least call for explanation. But although the report of the Committee, and some of the evidence upon which that report is founded, have been the circumstances which have prompted us to immediate action, there are, quite irrespective of those circumstances, sufficient reasons, we think, to justify the public analysts coming together on the present occasion, and associating for the purpose of promoting their common interests, and improving, as far as they can, the security for the performance of their duties efficiently. There are, therefore, three objects which are now before us; first, the refutation of unjust imputations; secondly, the repudiation of proposed measures of interference with our professional position and independence; and, thirdly, the formation of an association, having for its objects the promotion of mutual assistance and co-operation among public analysts. Now, these objects will all be dealt with in the propositions which will be submitted to the meeting, and I am very glad to see so many gentlemen here on the present occasion, who are fully able to deal efficiently with all that is required for the substantiation of our position. A good deal has been said in the evidence given before the Committee, and something also in the report of the Committee, which appears to me to be unfair and unjust to the body we represent. A disposition has been manifested to throw all the blame attaching to any imperfections in the carrying out of the Adulteration Act, upon the analysts; and in fact the analysts have been made a sort of scapegoat for the relief of other parties. Now, I am not prepared to say that all the analysts that have been appointed under this Act are skilled and experienced chemists, capable of undertaking the investigation of any case of food or drug analysis that may be submitted to them; but if there should be deficiency of qualification in some of those who are appointed, it appears to me that the blame, at any rate in great measure, rests, first, with those who have framed the Act, and, secondly, with those who are carrying it into execution. That the Act is defective is admitted by all, but there is one defect which I think has not been referred to so prominently as it deserves to have been. I allude to the definition which is given in the Act itself of the qualification of an analytical chemist. The highest, and only real and sound qualification, is made subordinate to one which is really of comparatively little importance. It appears to me that it has been a great mistake to put medical knowledge before chemical knowledge as a qualification for appointment to this office. And it is not to be wondered at that parochial and other local authorities should have been misled by the incorrect views which have been put before them as to the qualification of those to be appointed as analysts. Then the effect of making chemical knowledge subordinate to medical knowledge as a qualification, has been further aggravated by depreciating the value of chemical analysis—a result which necessarily must ensue from the naming of such a fee as 2*s.* 6*d.* for an analysis. Now, it appears to me that these are fundamental errors which have been committed, and which have caused many of the shortcomings and defects which have been complained of in the administration of this law. If chemical knowledge had been called into requisition, and credited at its true value,—although there probably may have been a smaller apparent, there certainly, I think, would have been a greater real amount of valuable work resulting from the operations under the Act. Under existing circumstances, however, the local authorities, with the imperfect guide afforded them by the Act which has been put into their hands, have been seeking for analysts possessing all the qualifications indicated in the Act, and willing to undertake the performance of a large amount of work for very little pay. Now, I should be very glad to see an amended definition of the qualifications of analysts under this Act, and some provision made for better and more uniform remuneration of the class of public analysts. If this were done, I feel assured that there would soon be a practical refutation afforded of the statement which has been put forth by Dr. Voelcker in reference to the number of competent analytical chemists to be found in the kingdom. But the report, after indicating that there are no qualified chemists to be found, seems to imply that they are to be produced to order at South Kensington, and there is not even much confidence apparently felt in this mode of proceeding, for it is proposed that the authority of the analysts, when certified even in that way, should be superseded by a higher authority at Somerset House. Now, I think, and the Committee think, that it is our duty to consider whether the suggested arrangements are likely to prove satisfactory and beneficial. The Committee who have called this meeting together have drawn up the propositions which will be submitted to you. There are a large number of these to be considered, and I hope you will give your best attention to the subjects as they are individually brought before you, and that, as briefly as is compatible with their due consideration, you will signify your opinion with respect to them. This is really the object with which we have met on the present occasion. I have one proposition, the first motion which was to have been proposed by a gentleman, Dr. Hassall, who is not able to be here to-day, who, however, signified his concurrence with what we are doing. I may state that, since the circular was issued, there has been an addition made to the Committee, first of Dr. Hassall's name, and since then of the names of Dr. Bernays, Mr. Estcourt, and Mr. Wanklyn. We propose those gentlemen to be added to the Committee. Perhaps before I proceed to put before you the first proposition, it may be as well to call upon one of the Secretaries, Mr. Wigner, just to indicate any information that he has to convey to you, as regards the extensive correspondence which has taken place between him and members in different parts of the country.

The Secretary: From published lists, as far as we have been able to obtain them, we found the names of 77 public analysts holding something like 110 appointments. Circulars were sent to every one of them, but as the addresses of some of them were imperfect, some six or more which were sent appear not to have been received. The number of replies received has been 57, consisting of the resolutions filled up and slightly altered. Of those all except two express themselves as favourable in almost everything with respect to the scheme. And to the names of those two I have put a query, because there are some points which are essential, as I think, to the success of the scheme, in which they differ from us.

The CHAIRMAN: Now, gentlemen, I will propose the first resolution, to the effect—

"That the analysts present at this Conference, having read and carefully considered the Report of the Select Committee of the House of Commons on the Adulteration Act, are of opinion that it is desirable to take this report into joint consideration, and to suggest amendments in the present Act, with a view to impending legislation next Session."

I need say nothing more than I have already addressed to you in support of this resolution.

The SECRETARY: The only suggestion which has been made with reference to this is by Mr. Wentworth Scott, to omit the words from "desirable" to the end.

Mr. A. H. ALLEN: I will rise, as a matter of form, to second the motion. I think the omission suggested by Mr. Scott does not bear very greatly upon the meaning of the resolution, and I hope we shall have very little difficulty in passing it as it stands; we are all so generally agreed upon it.

The motion was put and carried unanimously.

Dr. DUPRÉ: The second proposition has just been put into my hands—

"That the analysts present consider that the proposed reference of disputed cases to Somerset House Laboratory, or to any body of persons whose decision is to be considered final is objectionable, because it would supersede the skilled personal work of an analyst, the result of which had been given on oath, by the official work of a department for which no person could be held responsible. They are of opinion that no referee's decision in a disputed case should be accepted as final, unless it be given on oath, and tested by cross-examination."

There are but very few remarks necessary to be made in support of this proposition, and many remarks which I had intended to make have already been made in the speech of the Chairman. But, first, I would say that the proposition to appoint referees proceeds upon an assumption that many of the analysts' certificates that have been given have been wrong, and that in consequence a great deal of hardship has been inflicted. Now, I must entirely dissent from that. I have carefully followed all the published cases, and I must say that, with very few exceptions, I have not come across any case whatever where the analyst was wrong. I do not believe that the hardship has any real foundation in fact. Secondly, that as the law at present stands, the person against whom the analyst's certificate has been given has all the remedies he need have. He can have a second analysis made, which I believe has been only once or twice refused, and in case the second analysis is in his favour, the Board which has appointed the analyst must pay all the costs. Now, that is very good as it stands. I therefore really think it is not at all necessary for a Board of Referees to be appointed. But if it should be at all thought expedient to have a Board of Referees, it is absolutely essential that their certificate should not be considered final without their presence in court, and without their giving the analyst an opportunity of cross-examining them. Because I am quite convinced that no analyst who respects himself, who values his reputation, or who takes care of his word, and who does not give his certificate before he is perfectly sure that there has been adulteration, could for a moment submit to have that certificate set aside, by whatever authority it might be, without his having an opportunity of testing by cross-examination such a decision. I am far from saying that it is impossible to make a mistake,—for everybody is liable to mistakes,—but the analyst ought to have the opportunity of testing whether the referee has not made a mistake in his analysis.

The SECRETARY read the following extracts from letters he had received. Dr. Letheby objects to Somerset House and to Kensington, but thinks references should be made to responsible officers appointed by the Board of Trade or Local Government Board, as is the case at present with regard to disputes concerning the quality of gas in this metropolis. Mr. J. Shea thinks traders are fully protected, as a second analysis may be ordered, or the trader may appeal. Mr. C. H. Piesse suggests that chemical assessors should be appointed to assist the judges. Mr. E. W. T. Jones thinks there should be a fixed analytical authority for reference, of three good men, selected for their special knowledge; all of whom must attest the certificate, to be considered final. Mr. Scott suggested to insert the words, "if objected to by the analysts" (after the word "final"). Mr. Campbell Brown thinks "the best body would consist of three of the most eminent chemists of the country, nominated by the Local Government Board, or by the analysts, with the approval of the Local Government Board. They should retire in rotation periodically." Mr. C. W. Heaton writes: "Court of appeal necessary. Somerset House best now available for London. Actual referee analyst should give evidence on oath." Mr. Fairley thinks referees' work should be tested by other samples, sent at the same time.

Mr. WANKLYN: In rising to second this motion, I have to observe that the proposal to refer to Somerset House as a court of final appeal is to be objected to on this ground, that the authorities in Somerset House have no special knowledge of the work that we have to do, and that many persons who have been appointed as public analysts, or, at any rate, several of them, are more eminent than the people at Somerset House, and to refer to Somerset House would be to refer from higher to lower authorities. With regard to the proposition to have referees at all, there is something to be said for it; but there is only one Court of Referees to which I, for one, should be disposed to submit, and that is to the public analysts themselves as a body. We are more capable of doing this work than any body of people in this country, and I will make bold to say that, notwithstanding all that has been alleged against public analysts as a body, we are quite as respectable as the practitioners of medicine or surgery in this country as a body, or as the pharmaceutists as a body, and certainly as respectable as those persons who are named chemists in this country. And there is no Court of Referees which would have any authority, and which would be submitted to, except the general body of public analysts.

Mr. WENTWORTH SCOTT: I have some little experience which bears upon the proposed reference to Somerset House, and I know something of the way in which they perform their work in that department; and I, for one, should certainly object to any reference being made there of disputed cases. That Court of Referees, in any shape or form, will have to be an institution almost as definite as an Adulteration Act. I, for one, have no doubt that that Board of Referees must emanate solely and simply from our own body, and from no other source, and although there may not be a very large per-centage of our own body at the present time who have given their sole attention to the question of food analysis, or so much as one could wish, still that is a fault which will correct itself day by day and year by year, and in a very few years we shall be able to turn our attention so minutely to this particular subject, and in a manner that no other class of men will, that for referees, the public analysts as a body will be the only persons to supply them from among themselves. I have very great pleasure in supporting this proposition.

The CHAIRMAN: If no other gentleman has any remark to make upon it, I will proceed at once.

Mr. ALLEN: I would simply say, as the originator o the notion, in my evidence before the Committee, how thoroughly I endorse all that has been said with respect to the desirability of having a Board of Analysts elected by ourselves from our own number. I think we must agree that there is no one so fit to adjudicate upon such cases as those whom we know to be the best men. We know who are competent, and upon whom we should have personal reliance, on their honour and honesty, as well as on their scientific skill. And on that account it seems desirable that if any such Board should be appointed, it should really be by the analysts themselves.

Mr. RIMMINGTON: It was asked whether it is desirable to have the alteration made "unless accepted by the analysts" just before the last line.

Mr. WENTWORTH SCOTT: I thought that that very brief suggestion was simply to avoid complication, in case of there being no question of the matter. I thought as the party most interested, the analyst whose certificate is impugned, should have the power of objecting to the acceptation of a referee's decision unless it was given on oath and tested by cross-examination, or he should have the option equally of saying I am willing to abide by the certificate.

The CHAIRMAN: Perhaps you would allow me to state what the reasons were that induced the committee not to introduce that modification or alteration. It appeared to the committee that it would have the effect of giving a preference to the analyst over the accused party. Now, according to the usual understanding in matters of this description, the accused party is certainly supposed to be placed rather in a favourable position than otherwise. This would appear to be placing him in an unfavourable position. If the referee's verdict was against the accused, no further appeal: if against the analyst, further appeal admitted. Now it does not appear that there is really good ground for making this distinction, and we would rather wish it to appear that the defendant was placed in as favourable a position as possible, and that no preference or advantage was given to the analyst over him.

Mr. BLYTH: As it appears to be the general opinion that there should be a Board of Analysts appointed as referees or analysts, persons selected by our own body as referees, I put it to the public analysts present whether it would not be better to modify the proposition somewhat, and instead of the words "they are of opinion that no referee's decision in a disputed case should be accepted as final," "that they are of opinion that the referees should be appointed by themselves." I think in that way we should render the resolution more complete, and I must say that I consider these few sentences unnecessary, "they are of opinion that no referee's decision," etc.

Mr. ALLEN: Perhaps the subject is scarcely ripe to appoint referees on the present occasion.

Mr. DUPRÉ: I most strongly object to the appointment of any referees whatsoever, if they are not to be tested by cross-examination.

The CHAIRMAN: Perhaps it would be well also to take cognizance of this fact, that we are not ourselves organized yet, and are hardly in a position to submit our body as a Court of Reference. That may come hereafter with better grace than on the present occasion.

Mr. HORSLEY: I think, Dr. Redwood, that if the statement or the analysis made by any chemist is doubted, and referred to somebody else, that analyst ought to be present at the time the experiments are made; because one analyst may make experiments very differently from another. I know, in my own case, that many persons cannot follow me.

The CHAIRMAN: That is a matter of detail, perhaps, which we might leave for the future.

Mr. WIGGIN: I merely wish to say in support, that I was induced to come seventy miles to a meeting of the Chemical Society with the expectation of hearing some chemical information from one of the principal authorities of Somerset House. I did so, but there was not, I believe, five minutes' talk in the whole two hours about chemistry. It was all microscopy, and ought not to have been there at all; and I went away with the impression that Somerset House was the last place to which the public analysts of this country should be sent as a Court of Reference, because, if time allowed, I could go into the question of tobacco and other things that are their specialties, and are not ours. The adulteration of food is a thing that has not been brought before them, and therefore they are not in an equal position with us in the matter. With respect to all the rest, I think if the committee were appointed, it would be in the interest of the whole body of analysts to rest content with whatever that committee might decide. Whether they appoint a small body of referees, or whatever they may choose to do, I, myself, am content to go with the whole body.

The motion was then put and carried unanimously.

The SECRETARY: The next proposition has been altered from the form in which it appeared on the printed paper to the following:—

"That the analysts present object to a compulsory examination of public analysts at South Kensington or elsewhere, as such examination would lead to the exclusion of chemists of experience, whose time is too valuable to be expended in such a manner, and to the appointments falling into the hands of young and inexperienced men; but they, at the same time, suggest that if a public analyst, hereafter appointed, is not an analyst who has been for some reasonable time in actual practice, or cannot in any other way prove his ability for the appointment, he should be liable to be called upon toproduce proof of having worked for two years under some public or other competent analyst."

The observations and objections to this are as follow:—Dr. Letheby objects to any examination by any educational establishment, but thinks it necessary that some clear evidence should be given of a candidate's competence. Mr. John Shea thinks any retrospective legislation objectionable; the present appointments must stand. Mr. Piesse says it is desirable to have a recognized analytical degree, without which no one should be allowed to practise. Mr. Rimmington asks what examining bodies and what examination? Dr. Campbell Brown objects to actual practice as not sufficient evidence in some cases as to fitness. Dr. Tripe suggests to make the alteration which we have made, that newly appointed is too strong—it should be hereafter appointed. Professor Bloxam said for "reasonable time" substitute "three years," and omit from "or cannot" down to "appointment." For "having passed," etc., he proposes to substitute "having worked for three years under a competent instructor."

Dr. TRIPE: I have much pleasure in proposing what you have just heard read. I felt that to attempt to exclude any analyst who has been appointed, would be an act which would not be recognized by any Government. In this country vested interests are very powerful, and I am fully persuaded that the vested interest in his appointment held by a public analyst is one which should not be lightly put aside. And I, therefore, proposed an alteration which has been adopted by the committee, namely, that the words "hereafter appointed" should be substituted for "newly appointed," inasmuch as the words "newly appointed" would include the whole of the analysts who have been appointed under the recent Act, because it is a comparatively new measure—that is to say, of not more than about twelve months' standing. If you were to say that is not a new appointment, you would have to fix what "newly appointed" meant, and therefore, under these circumstances, I thought that the words "hereafter appointed" should be substituted. I must say that I agree with you, Sir, that too much stress has been laid upon medical knowledge. Medical knowledge has really very little to do with the matter, save and except in the very few instances in which we have to certify whether or not the adulteration is injurious to health;

but I think that common sense would tell persons, in a great many instances, whether the adulterations are injurious to health or not. But of the necessity of skilled practical knowledge, there can be no doubt whatever; and those who have worked at the subject have found the extreme difficulty in working themselves up to the present state of knowledge. I would much rather, in fact, not have taken the appointment which was really thrust upon me than have undergone the trouble I have taken to make myself competent to carry out the matter. I cannot help thinking that if the public examination takes place, instead of the appointment falling into the hands of the young men, it might have the contrary effect; and that instead of there being a larger number of young men, then you would have a few men appointed to a large number of districts. Instead of one man holding three appointments, you would have half a dozen, ten, twelve, fourteen, or sixteen rolled into one; so that the guarantee of personal supervision of the work becomes less and less. I think that is another very strong reason indeed why this examination should not be insisted upon. With these very few words I propose the resolution which has been read.

Mr. Heisch: I have great pleasure in seconding the motion, with the addendum (which I am not sure that Dr. Tripe heard when he proposed his resolution), if it be the pleasure of this meeting, to cut out the words that he shall produce proof of having passed a chemical examination by some competent examining body.

Dr. Tripe: That was cut out by the Secretary, and the Secretary did not say the length of time which is proposed here. It is proposed here that it should be two years' work under some competent analyst. I therefore propose the words "two years" to be inserted in the blank that is in the resolution. I do not think it necessary to read the proposition, it having been read already.

Mr. Heisch: Under those circumstances, Sir, I will not take up your time by adding more, but simply second the motion. We were led to strike out these words by feeling that at the present moment there was no examining body on the subject of analysis, that would have our confidence, and as to legislating for the appointment of any future examining body, we thought this was not the time or it, and if a man has worked in the laboratory under a competent analyst for a reasonable length of time—say two years, if you like, it is a point I would leave entirely to the meeting, but I think two years is not too much to say—it would be a far better guarantee that he knew what he was about, especially if the analyst under whom he worked were to say that he had worked to good purpose, than any examination which could be conducted in the course of a reasonable time. I would say that no gentleman who had anything to do could be expected to give up his time to attend. I have great pleasure in seconding the resolution.

Mr. Bell: In speaking about the examining body of public analysts, I would suggest that if there is to be an examining body of public analysts the referees that are appointed by the public analysts should be the examining body in future cases. Supposing there are five public analysts appointed as a Court of Reference—that these gentlemen should be constituted to examine any future public analyst, because, as has been said, we ourselves must know more about food analyses, and so on, than they do at South Kensington; and therefore we should be better qualified to find out whether a man was fit for his post or not. I should almost suggest that "newly appointed" be kept in, because if it is really known that there are men who have got the appointment now who are not fit to hold it, then I should say that it had better be kept in, and I see no objection, if newly appointed, that they should be removed.

The Chairman: It would be rather an onerous thing.

Mr. Wanklyn: There are very strong reasons why we should not call in question the appointments that have hitherto been made, and I should propose to accept them all. If it should happen that persons have been appointed in some instances who are not able to do the work, let them learn to do it. But I think it would be exceedingly bad policy in us if we were to question the appointments that have been made. We have plenty of precedent of that kind, and those persons who know the history of the medical profession may recollect what the medical profession has done in similar instances, and we may take that as a precedent. We should pass resolutions only in regard to future appointments, and I think we should be wise in admitting that a great variety of proofs may be offered that a man can do his work. For instance, his having worked in the laboratory of competent analysts should stand for proof, and let his having passed a decent examination stand for proof. It would be very unwise to let South Kensington, for instance, have any preference over any other examination. We should acknowledge, I think, an examination at King's College, at the University College, at the University of Edinburgh, or anywhere over the country, as standing equally well with an examination at South Kensington. But I think we ought to insist in future on having proof of some, and it may be of various kinds, either of practical work in a laboratory, or else the passing of a proper examination. But I think we should be very unwise if we were to call in question any appointments that have been made hitherto. I believe a few, and only a few, have been improperly made, and I think we can afford to let these appointments stand.

Dr. Tripe: Allow me to suggest a slight alteration. It seems to me that these words, "under some competent analyst," are somewhat vague. Allow me to propose instead, "some public or other competent analyst;" you would then, to a certain extent, define what was meant by the word competent. I will therefore, with your permission, Sir, make the alteration.

Mr. Wentworth Scott: I beg permission to make a few remarks. Supposing that the word "hereafter" is inserted in the resolution, and the words "newly appointed" omitted, then I am entirely in its favour; and I must say I should protest strongly upon two points, namely, calling in question the appointments that have been made, or the abilities—be they good, bad, or indifferent—of the men holding those appointments for the time being. There would be a great many technical and social objections, in my opinion, to making them, in any shape or form, open to question. But I should also be inclined to insist upon practical work in a laboratory as the only safe means of enabling us to decide whether a man was competent to hold the appointment of public analyst for the future or not. If we were to accept a South Kensington examination, a King's College, or any other examination, under, as I may say, the examining bodies as we at present know them, we might have some very clever people pass as public analysts who would be very strong upon metallurgical substances, and we might have some remarkably hard-working young men pass as public analysts, who as regards manures would be exceedingly clever, and upon the other hand—and this is the most important objection in my opinion—that we might have a series of men pass who would do anything in the way of theories and black boards and windmills, but they would not know how to touch a loaf of bread or a pound of tea.

Mr. Horsley: I agree with what Mr. Wanklyn and Mr. Scott have said, that it ought to be prospective, and not of a retrospective character.

The Chairman: Well, then, the proposition stands as it is, and I shall be glad, now, to take your decision in reference to it.

The motion was then put and carried.

The Secretary: The next proposition is slightly altered from the draft:—

"That the analysts present repudiate most emphatically the reported assertion of Dr. Voelcker (or a certain agricultural chemist), that 'there are not a dozen competent analysts in the kingdom,' which assertion is referred to in the report of the Committee, and can only characterize this statement as (to quote Dr. Voelcker's own language) very flippant and unwarrantable."

The quotation from the report of the Committee is, "One eminent chemist stated he did not think more than a dozen of such men existed." And the remarks we have received from different writers are as follow: Dr. Letheby says, "I think it very imprudent to make any reference whatsoever to Dr. Voelcker's statement." Mr. John Shea "proposes to omit the words after kingdom." Mr. Baker: "Quite unnecessary to notice." Mr. C. H. Piesse adds, "And we are surprised that the Committee should receive Voelcker's evidence, passing over so many analysts capable of giving useful evidence founded on experience." Mr. J. Young thinks it might be omitted as not being worth the honour of such a notice. Professor Bloxam: "Not dignified to notice Voelcker." Mr. Scott: "Not worth noticing." Mr. Rimmington: "Quite right, but too mild." Mr. Fairley: "Not wise to notice Voelcker's statement, unless facts are given in support of it."

Mr. ALLEN: In rising to propose this motion, which you see we are somewhat divided upon, I think it is only fair to say that we should not have considered it worth while noticing the opinion of Dr. Voelcker, or any other man who might so express himself, if it had not been that the Adulteration Committee have evidently given credence to it more or less, and have placed considerable confidence in his statement, and they laid stress upon it, inasmuch as they actually refer to it in their report. Now, when they have omitted noticing a great deal of evidence of an opposite character, given by Dr. Hassall and others, it is a very curious thing that they should have hit upon that, if it were not that they really believed it. It is, therefore, highly desirable that we should do everything in our power to disabuse the minds of the Committee and the public on this particular point, and when I see before me some three or four dozen analysts, representing the towns of the United Kingdom, and we are told by that very eminent agricultural chemist that there are not a dozen competent analysts in the kingdom, it is quite certain that there are some three out of every four of us here not competent, if what he says is true. And I am quite sure that there is no one who would like to come forward and say that he was not competent. For my own part, I have no doubt that Dr. Voelcker's assertion is inaccurate. Dr. Voelcker has said that he would not like to be a food analyst, and be classed with them, because there were some who did not stand very high in their profession. I am not an agricultural chemist, and I should object to be an agricultural chemist, because I might be classed with Dr. Voelcker. On this account I think it only right that we should express our opinions on the subject, but I would recommend this form, and leave out the name.

The CHAIRMAN: Our proceedings might be simplified by leaving out the name, and saying that the analysts present repudiate most emphatically the assertion that there are not a dozen competent analysts in the kingdom, which assertion is referred to in the report of the Committee.

Mr. ALLEN: I have no doubt the man whom the cap fits will know whom it is intended for.

Mr. BLYTH: I rise to ask the gentleman who proposed it to withdraw it. I believe it is perfectly unwarrantable that such an assertion should be brought before gentlemen from all parts of the United Kingdom. I did not understand that we were met to talk about or speak against any particular person. The assertion itself is not even fixed upon Dr. Voelcker. He has not even been mentioned by name, and though I am not a friend of his, I think it would be a most undignified proceeding for us to say anything about it, and I ask the gentleman who moved it simply to withdraw it, so as to stop all discussion on the matter. It is very likely mere conversational utterance, and if we pass any resolution upon it, it would be giving his assertion a dignity which that particular chemist's professional position in no degree warrants.

Mr. ALLEN: It was no mere conversational utterance, but was given in evidence before the Adulteration Committee.

Dr. DUPRÉ: I may say I was present on the occasion at the Committee, and I heard him say it, and it was no mere conversational utterance. If a man goes out of his way and throws dirt, so to speak, upon a public body, which fortunately, as it happens, does not deserve it, I believe we are not at all going out of the way, nor are we doing anything undignified, in alluding to it. I am of opinion that we should leave his name in. I know Dr. Voelcker personally, and I respect him; but I think he was perfectly unwarranted in making such a statement that there are not a dozen competent analysts in the kingdom, and that the analysts are in the habit of giving their evidence in a flippant manner.

Dr. TRIPE: Having discussed this matter and given our opinions expression, through the press, to the world, will not the object of the proposition be attained, and therefore would it not be better to withdraw it?

Mr. ALLEN: I am willing to withdraw it under these circumstances. We have expressed our opinions, and no doubt that is all that is necessary.

The CHAIRMAN: I think, myself, that that is the wisest course.

The motion was then withdrawn.

The SECRETARY: The next proposition is—

"That the analysts present are of opinion that the report of the Committee is defective, inasmuch as it does not state what does and what does not constitute adulteration, and this omission will increase rather than diminish the liability to difference of opinion between analysts."

Dr. Hassall says, "The resolution is too mild. The re-report is imperfect, partial, utterly erroneous in many of its statements, and if its recommendations were carried out, the interests of the public would be greatly prejudiced thereby." Mr. Piesse thinks it is "defective because no reference is made to examination of drugs." Mr. Young suggests "better leave it for the amended Act." Professor Bloxam: "No definition possible; should be a schedule." Mr. Scott: "Unnecessary, as to his knowledge it will be embodied in the new bill." Mr. E. H. Moore: "A definite schedule might be composed, based on actual work." Dr. Tripe: "Should be a list of synonyms; for instance, that laudanum is tincture of opium, etc., and that all medicines or drugs should be equal to the standard of purity fixed by the Pharmacopœia."

Mr. WANKLYN: I rise to move the resolution that has been read. The difficulty in the Act depends upon the definition of adulteration. If the word adulteration were to be received in its literal sense, it would not cover the purposes of the Act at all, for the spirit of the Act, and the way in which the Act is being interpreted by the judges, is one thing, and the literal interpretation of the Act is another. In order to make this Act work as it is desirable that it should be made to work, and the judges are endeavouring to make it work, we require to deal with cases in which an article of commerce has been rendered less valuable, not by the putting in of things extraneous to them, but by leaving something out that they ought to contain, and clearly taking the word adulteration in its literal sense, it does not cover that at all. I propose that we should define the word adulteration ourselves, or rather define a word that should have been in the Act, instead of the word adulteration.

The CHAIRMAN: You would not attempt that now, Mr. Wanklyn.

Mr. WANKLYN: That would be necessary for us to do, and I move that the report of the Committee is defective because it has failed to do that which it is imperatively necessary to do.

Dr. ROGERS: I have very much pleasure in seconding this motion. It appears to me that this is a fundamental defect, and I am strongly of opinion that the omission should be supplied. If it remains unsupplied, it will increase the difficulties in the working of the Act very considerably, and I fully agree with the resolution that this omission will increase rather than diminish the liability to difference of opinion between analysts. Mr. Wanklyn has touched upon the desirability of providing for the abstraction of substances rather than the addition, or as well as the addition, and I think that ought to be considered too, and that at some future time we should give a definition of what is and what is not an adulteration.

The CHAIRMAN: I may be allowed to state that there will be a motion further on referring to that particular subject. The secretaries have received communications from 50 analysts making various suggestions, and it will be proposed to have the subject submitted to a committee with a view to arriving at some definite proposal.

Dr. TRIPE: I think it would be necessary that a list of synonyms should be referred to the Committee, because I have been defeated in proceedings which I have taken in consequence of things having been obtained, such as precipitated sulphur having been obtained as milk of sulphur; there is no such thing as a standard milk of sulphur, and consequently we could not go on.

Mr. WENTWORTH SCOTT: Mr. Wanklyn has very properly pointed out both the defect in the report of the Committee, and also the difficulty which appears to exist in some people's minds in relation to what does and what does not constitute adulteration; and he pointed out an extraneous substance being added to articles sold, as well as some valuable constituent being abstracted. However, I think that is no real difficulty. The same thing was brought before me in a certain district for which I act, and I was pretty well told that in relation to such a common thing as skim milk, however much cream was abstracted, I could not get a conviction on that point.

The CHAIRMAN: Will you allow me to suggest that that will more properly come by-and-by. You have heard the motion read.

Mr. WENTWORTH SCOTT: I abide your decision.

The motion was then put and carried.

The SECRETARY: The next proposition is—

"That the analysts present are of opinion that the facing of tea is essentially an adulteration, and as such to be opposed; but they further think that if faced green tea is to be allowed at all (as recommended by the Committee), the amended Act should specify a distinct limit as to the per-centage of facing to be allowed, since the wording of the report leaves it open to the analyst to determine what is fairly faced green tea, and will thereby increase the difference of opinion on certain samples."

The opinions are: Dr. Wanklyn says, "ash in tea not to exceed 7 per cent." Mr. A. J. M. Edger, "faced tea should not be allowed at all." Dr. Hassall, "if facing be allowed in any case, it must be so in all." Mr. Baker, substantially the same as Mr. Edger. Mr. Young, "not exceeding 2 per cent." Mr. E. W. T. Jones, "facing should be condemned." Mr. Scott, Mr. Bancroft, Mr. Davies, the same opinion. Dr. Campbell Brown, "no such thing as fairly faced green tea,—might as well talk of fairly coppered pickles." Mr. Jarmain proposes for "if faced tea is to be allowed at all," to substitute "the sale of faced tea should be prohibited, but if allowed at all," etc.

Mr. ESTCOURT: I will call the attention of the gentlemen to the word "green" in this motion, between faced and tea, since without that, it would legalize the facing of black tea. If you read it carefully, you will see it would have that effect. There can be no question about it.

The SECRETARY: Would you not include the word "green?" That is the only facing that would be permitted. Facing black tea would be an adulteration.

Dr. TRIPE: Facing black tea I should consider an adulteration now, because that is passing it for a thing which it is not.

Mr. ALLEN: Would you say colouring instead of facing?

Mr. ESTCOURT: In their report under the head of facing they imply colouring as well. I have great pleasure in proposing the resolution that has been read with that change.

The CHAIRMAN: Is there any gentleman prepared to second this resolution relating to the facing of tea?

Mr. HEISCH: I rise with great pleasure to second this motion, and in the abstract I agree with those who say tea ought not to be faced at all, but I do not think, speaking as a practical man, that we have the slightest chance of carrying that for a good many years, and therefore I concur in this resolution which says "that if faced tea is to be sold at all." I put it as a thing that we only admit because it is almost impossible at present to prevent it, and with that reservation I have great pleasure in seconding the resolution.

Mr. WENTWORTH SCOTT: Perhaps it would be as well, Sir, as I am bound to oppose that resolution almost *in toto*, if I propose an amendment of mine before any remarks are made upon the subject. I am quite of the opinion of both the proposer and seconder in the abstract sense, but I should object decidedly to anything like a public confession of weakness on our part like that suggested by Mr. Heisch. I do not think a line could be drawn between a little facing and a little more facing, which you could go on increasing indefinitely. I beg to propose an amendment. "That in the opinion of this meeting no dyed, faced, or otherwise adulterated tea should be allowed to be sold after a certain reasonable period has elapsed for the exhaustion of present stocks, as the legalization of one species of adulteration would probably open the door to other and more serious malpractices."

Mr. BURGE: I have great pleasure in seconding the amendment.

Dr. TRIPE: I am somewhat unwilling to speak again, but as I think one of the most important principles we have to discuss is whether or not we shall give our countenance to what is really an adulteration—I care not what is expedient—our duty is to do not what is expedient, but what is right; and I shall, therefore, support the amendment strongly, because I do not think it is right or just in us in the slightest degree to countenance what is undoubtedly an abomination. As far as I myself am concerned, nearly all the samples of tea that I have had faced or coloured have been black tea coloured green. Now, that is an undoubted adulteration. If you allow the facing of green so as to make green more green, why should you object to the facing or colouring of black tea to make black more black, or to make black tea look like green? Surely it is passing off on the public, and supporting it by our authority, that such things may be done. I protest against any such thing, and therefore it is I most emphatically support the amendment.

Mr. WANKLYN: In respect to the observations made on the facing of tea, I would wish to remark that it is not clear that the facing of tea is an adulteration.

Dr. TRIPE: It is a legal adulteration.

Mr. WANKLYN: It is not within the interpretation put upon the Act; it does not seem to be. If by facing tea you were to render it poisonous, then the tea would be adulterated in the meaning of the Act. If, by facing the tea, you were to make it so that a given weight of the tea would not yield you as much of the beverage, then that would be an adulteration according to the meaning of the Act. But in the mere fact of facing, I do not see any adulteration at all. Let us take a parallel case. There is the well-known case of cheese. Cheese, as we know, is generally faced with annato, and yet we could not hold that the colouring of cheese is an adulteration of cheese. And suppose the Food Act were to extend throughout commerce so as to apply to clothes, we could not regard the dyeing of clothes as an adulteration of them. Aud the facing of tea I should regard much in the same light as I should any article of commerce. It may be done for the purpose of deception. When it is so practised, let the person be prosecuted for deception, but not for facing of any teas. I think we should make a great mistake if we were to stretch the Act too far, and make it apply so as to fetter commerce at all, without gaining any benefit, and I do not think we should object to the facing of tea, unless the tea be poisoned, or unless the tea be rendered sensibly weaker by it. In the answer that I returned, I proposed that we should require that the ash of tea should not exceed 7 per cent.; that will be equivalent to allowing something like 2 per cent. for accidental dust and for facing, and I think it would be reasonable to allow that in a substance so variable as tea. It would be unwise to insist upon a stricter standard.

Mr. Jones: I am one to support the amendment of Mr. Scott very staunchly, for I think that if the public analysts recognize the facing of tea, they ought also to recognize slight watering of milk, or slight skimming of milk, or any other slight adulteration. I think that we, as a body of public analysts, should decidedly set our faces against anything that could be termed an adulteration to any extent.

Mr. Wiggin: I think with respect to the assertion of Mr. Wanklyn, about its being poisonous or injurious to health, the mere fact of adding turmeric, Cayenne pepper, and flour to mustard is an adulteration, and therefore I think that definition is quite beyond the question. It is an adulteration of the article, and we ought to be the body above all others that should stand up for purity.

Dr. Dupré: I am very strongly in favour of the amendment. I strongly object to analysts as a body recognizing any kind of adulteration whatever; and even supposing we have not at present the power of carrying such an amendment of the Act, still we give to the public what we consider to be a standard; and I think the standard should be the highest possible that we can get. With regard to Mr. Wanklyn's illustration, I should think that if any person sold me cotton clothes that looked like wool, because the cotton was dyed, I should not be satisfied; or if I buy cotton which is so skilfully manipulated that it looks like silk, I should object to it. We have heard of the poor Indians buying coats that when washed all ran away in facing.

Dr. Stevenson: With regard to the facing of tea, if it is used for the purpose of concealing what the tea really is, or of making the purchaser think that it is one thing when it is another, I should sharply deprecate such facing of the tea; but at the same time I believe that there are many green teas of high quality, which are not faced for the purpose either of adding to their weight or bulk, or of increasing their value; but we know that people have a fancy for certain appearances on the tea which they may have been accustomed to associate with that kind of tea, and I think we have no chance whatever of overcoming that prejudice for some years to come. Any admission that the facing of tea would be permitted under the Act would not be binding, I apprehend, for any great number of years. And gradually it would come to pass that unfaced tea would be more appreciated than faced tea. I think that this meeting should not insist upon what they have no chance whatever of carrying, for the Adulteration Committee have it in their evidence, and they have strong evidence to show, that the facing of tea is not in all instances a practical adulteration, and that, in a great many cases, it is not done with such an object. I think it is far better for us—whilst not admitting that faced tea ought to be allowed, and whilst we do not admit that the opinion of the Committee is right that faced tea should be allowed—to aim at what is a practical rather than at what we consider would be the highest standard. I think we should aim at what is possible rather than at a theoretical standard, and that for the present we should be satisfied with passing the original motion, which does not commit us to any opinion that facing tea is admissible; but it recognizes the fact that the Committee have had sufficient evidence to alter the law so as to admit the facing of tea. We should do all we can to stop this facing of tea from going beyond a certain point.

Mr. Allen: I must say that I agree with Mr. Wanklyn and others who have said that we must not consider the facing of tea an adulteration in every case. We must distinguish very carefully between ordinary facing, and the case of black tea which is made to look green by being painted green, and which, therefore, gives the consumer the idea of higher strength and superior price, and should be called an adulteration. But when olive green tea has been changed to a bright green, that should not be considered an adulteration, because it is not done for that purpose, but to suit the public, and is not the passing off an inferior quality. The public like bright yellow mustard, and they like brown vinegar instead of white, and it is a pure fancy on their part, and as long as the fancy for one colour is unobjectionable, and as long as there is no cheating over it, in the sense of making an article appear of superior value than that which it really is, I do not think that we have any right to oppose it.

The Chairman: I think, perhaps, gentlemen, that the views of some of those who do not consider this proposition quite stringent enough would be met by a little modification in the form, which the mover of it is prepared and disposed to make; and if you will allow Mr. Estcourt, I think he will submit to you a slight alteration, which, I think, will meet the views of all. I confess that I am not prepared to go to the extent of this proposal. It would be going too far, and it would commit us to a principle which we should find it impossible to carry out. There are a great many cases where it would be impossible to carry it out. Mr. Allen has referred to the case of vinegar. There are many other cases where a slight colouration is practised, which does not exert any influence at all upon the quality of the article, but it has this good effect, that it enables the dealer to equalize the general appearance of a great number of samples, which in regard to their intrinsic properties and value, resemble each other, but which may have some slight difference to the eye, and I do not think that the use of a slight amount of colouring matter to meet the prejudices in cases of that description can be objected to, where it can be shown that it is not at all injurious, and does not affect the pocket, and does not increase the quantity at all. We should be very careful how we attempt to draw the line too stringently. I think that it would tend greatly to depreciate the supposed value of the application of this law on the part of the public, if we were proceeding upon what might be considered to be very slight grounds of that description. But, however, the question now is as to the modification of the original motion.

Mr. Estcourt: As the mover of the original motion I may perhaps be allowed to make this alteration. There is no question amongst us, I believe, that there is a great objection to the adulteration of tea, but the resolution went simply to the point of permitting it in any quantity. I propose this modification, therefore, to meet the views of Mr. Scott, and those who support him. After the word "samples" add "and they are also of opinion that faced or coloured teas should be deemed adulterated when the ash exceeds 7 per cent."

Dr. Tripe: If you will not object to these words being put in, I think we might then come to an agreement. After the words "as recommended by the committee," insert, "but what this meeting objects to." If you protest here at this meeting that you object to faced tea altogether, I have no objection to withdraw my support of the amendment. And perhaps you will consent to take the per cent. of ash as six and a half instead of seven. The half per cent. may not seem much, but it really makes a great deal of difference.

The Secretary: I would suggest that the resolution should commence, "That the analysts present are of opinion that the facing of tea is essentially an adulteration, and, as such, ought to be opposed ; but they are of opinion that if faced tea is to be allowed at all (as recommended by the Committee)," and so on.

Mr. Estcourt : That would meet the views which have been expressed, as it does not affect the question of the ash, which would be an after question.

The Chairman : Will that meet your views, Mr. Scott ?

Mr. Wentworth Scott : Hardly so. When the discussion has ceased, I will say a few words, with your permission.

The Chairman : Mr. Scott, as the mover of the amendment, did not make any observations in moving it, and we will therefore hear what his views are.

Mr. Scott : It is this. The last speaker has, I think, unconsciously entered upon what I may call the keystone of a very large difficulty in relation to the resolution or the amendment in question. There are some propositions made in relation to a legalized adulteration—I can call it nothing less—of 7 per cent. My friend on my right, Dr. Tripe, suggested $6\frac{1}{2}$ or 6 per cent. I have not the slightest doubt that if you ask the opinion of every gentlemen present in the room, and if you go beyond this room, and ask the opinion of all the other public analysts in the country, you would get every possible modification that is known to arithmetic, from the smallest decimal fraction upwards, and therefore I do not think there would be the slightest chance of our agreeing as a body to 6, or $6\frac{1}{4}$, or $6\frac{1}{2}$, or 7, or any other particular amount being allowed.

The Chairman : You are aware, Mr. Scott, that 7 per cent. refers to the total ash of the tea, not the ash that represents the facing.

Mr. Wentworth Scott : Perfectly. That allows for 1 or 2 per cent. of adulteration, but I would put it first, that I think it is bad on principle, so to speak, to give the exhibition to the British public of a body of analysts going about, as it were, on uncertain footsteps and with bated breath, saying, "Well, we will accept the recommendation for adulteration to this extent. We will allow a little skim milk here and a little copper there, if you do not do us much harm." I must protest against a compromise of this sort, as being against the dignity of this Association, if it is to be an Association at all. And I may say, from facts in my possession, that that view is very much shared outside this room. I may say, with regard to the facing of tea not being injurious, that it is very difficult to draw the line between where it is so and where it is not. Three weeks ago a poor woman called upon me, and brought a sample of green tea. She said, "I would like you, Sir, if you don't mind, to look at this. I think it has done my daughter some harm." Her daughter was suffering from throat disease. I found that tea rather largely faced. I said to the woman, "You say your daughter expectorates a good deal ; let me have some of the expectoration." She brought me some, and a microscopical examination showed me little sharp particles of mica, which must have been very injurious, and especially to a person suffering under that particular kind of throat disease. Therefore, I am of opinion that we ought to lay down a hard-and-fast line, and say that we cannot and do not permit adulteration in the shape of faced tea. Whatever may be our personal opinion upon the subject, it is surely within the compass of our dignity and quite within the compass of our knowledge as analysts. In writing our certificates—I am sure I speak now for every gentleman in the room—none of us would countenance a mere trumpery prosecution upon one per cent., or one and a half per cent., or anything of the decimal fraction order. I, for one, would not, and never have, and I think it may be safely left to the analysts' good sense, and to their general and official dignity, to avoid injury of that kind to vendors, and also to their own reputation. With the utmost respect for all the remarks that have been made, with many of which I cordially agree, I think it would be more satisfactory, Sir, to allow the amendment to rest as it is.

Dr. Dupré : Perhaps, as I made some remarks on the resolution, I may say a few words. It would be very desirous that if possible we should be unanimous, and perhaps we might be so if we altered the resolution in some way like this : "That the analysts present are of opinion that if faced tea is to be allowed at all, the facing should not, at all events, be permitted for the purpose of converting one quality of tea into another."

Dr. Tripe : You cannot take that amendment until the other is disposed of.

The Chairman : I think we cannot. Then, gentlemen, I will put the amendemnt.

There appeared for the amendment, 9 ; against it, 12.

The Chairman : The amendment is lost. Then, shall I now put the original motion in its original form? It appears to me that really Mr. Estcourt's modified proposition comes very nearly to what Dr. Dupré has said.

The Secretary having again read the motion with the modification proposed, it was carried by 11 to 6.

The Secretary : The next proposition is—

"That tea being an article subject to duty, the analysts now present see no objection to its being examined in bond, in accordance with the recommendation of the Committee."

Not one of the 55 replies takes any notice of that.

Dr. Stevenson : I have great pleasure in proposing this resolution, and hope it will be carried without much discussion, to show the public and the House of Commons, too, that we, as public analysts, have no desire to assume any work that can fairly be carried out by any other body. If tea can be subjected to examination before it has passed into the hands of the public and the analysts, a great benefit would be conferred upon the consumers, and much expense would be saved to the country. The analysts would not desire to examine tea if it could be fairly examined elsewhere. At the same time I must point out that such a resolution would not prevent the analyst examining tea if any adulteration should be practised in this country, if it fell into the hands of the analyst.

Mr. Wentworth Scott : I can second this motion, because the mover of it has made use of almost the very words which I have inserted in my copy, that the examination in bond should form no bar to conviction, should the tea afterwards be found to be adulterated. The object of this is to meet the case of some grocer or lawyer coming down to the court with a piece of blue paper and saying, "Oh, here is the Government certificate; you cannot go into the case."

The Chairman : I confess it seems to me unnecessary to make such an addition, but, of course, it is open to you.

Dr. Tripe : As a matter of form I will second Dr. Stevenson's motion.

The Secretary : Do you wish to move an amendment, Mr. Scott?

Mr. Wentworth Scott : I will do so, or leave it in the hands of the meeting. I have no wish to press it.

The motion was then put and carried unanimously.

The Secretary : The next proposition is—

"That, while agreeing with the general recommendation of the Committee that mixtures should be labelled prominently, instead of a mere verbal declaration of the admixture being made, we consider that the per-centage of the ingredient under the name of which the mixture is sold, should be stated *on the label,* and any excess over the stated per-centage of diluent should be deemed an adulteration."

Dr. Corfield thinks that a verbal declaration should be given, even if the mixture is declared in print, as purchasers ought not to be put to the trouble of reading the labels. Mr. W. W. Stoddart asks, "Is not this too strong?" Dr. Hassall entirely differs. There should be both a written and a verbal declaration, and mixtures should be sold, not under the name of the principal constituent, as "coffee" or "mustard," but as "coffee mixture," etc. Mr. Piesse would add, "and if the actual amount of added matter be in larger proportion than stated on the label, the quantity in excess shall be deemed an adulteration." Mr. Young says "impracticable." Mr. Rimmington would insert the word "prominently" before "labelled." Mr. Moore says, "This is a necessity if the Act is not to be evaded." Professor Heaton doubts the wisdom of this.

Mr. E. W. T. Jones: In proposing this resolution I do so with very great pleasure, as I think it is of the highest importance that all articles should be distinctly and prominently labelled. There was a case of mine in the country the other day, where there was a serious adulteration of tea. There was no doubt about the adulteration, but the man happened to say, "Well, we believe this tea is pure, but we do not guarantee it to be absolutely genuine." The magistrate held that he had declared that that was an adulterated tea; the consequence was, the prosecution fell through. I really do think that all articles sold should be distinctly labelled, and in such a manner as to clearly represent what they are sold for.

Mr. Rimmington: I shall be glad to second this motion. I have inserted the word "prominently" in my copy, that is, that any notice that is put on the label should be prominently placed on the package—not stuck on one side or on the back of it, or anything of the sort, but that it should be boldly labelled what it is.

Mr. Estcourt: I would propose that the wording of the label should be of a larger type than the other printing of the package.

The Chairman: Do not you think that that is a matter of detail that would come into consideration afterwards in framing the Act? It would be wise to confine ourselves chiefly to broad matters of principle on the present occasion.

Mr. Wentworth Scott: I have very great pleasure in supporting the proposition which has been moved by Mr. Jones, and I have only to suggest that the word "approximate" should be expunged, and the word "minimum" be substituted therefor. And to save time I may say that Mr. Jones has already accepted that alteration. If you use the word "approximate," it opens the door to a lot of forensic waste of time as to what is and what is not an approximate per-centage. If we make it definite by using the word "minimum," it will save that.

The Secretary: "Strike out the word approximate."

Dr. Corfield: I should like to say, in the first place, that I think it necessary to insert the word "prominently," as it happened within my own knowledge that a mixture was sold and was labelled, but the statement that it was a mixture was put inside of the package, so that it was perfectly impossible for the purchaser to see it unless he could see it through the paper. So the word prominently is necessary on that account. The next thing that I should like to say is that I think it would be very much better if the motion ran as follows—"that mixtures should be labelled, and a verbal declaration of the admixture made." I say this because there are a great many persons who buy things and who cannot read, and I do not see why a person who cannot read should not have the article he pays for. There are a great many persons, too, who cannot speak the English language, and who cannot read it either, and there are a great many other persons who do not want the trouble to read all through a label when they buy an article, even when they can read.

Dr. Dupré: There is one difficulty in regard to a verbal declaration. The seller would have to state: "This contains 25," or "30," or "40," or "50 per cent." Suppose a child should be the purchaser, how long will he remember what was told him as to its contents? There will be no end of disputes. The child will say, perhaps, "He told me it was 48 per cent.," and the man will say, "No, I told him 50 per cent."

Mr. Heisch: But the verbal declaration is in addition to the label, not in substitution for it.

Dr. Corfield: I propose both, certainly, that when a mixture is sold it should be labelled, and at the same time a declaration should be made.

Mr. Allen: I think it is quite sufficient if it is expressed on the label prominently. At busy times, such as Saturday nights, it necessitates a great deal of trouble that everybody should be told, "This is a mixture." It is really quite the exception for a person not to be able to read nowadays. It is sufficient, I think, if you put it on the label.

Mr. Rimmington: I have a strong objection to this verbal declaration. A person might go into a shop on a Saturday night, and ask for coffee and get chicory and coffee, and the declaration may be made and the person never hear it. Besides, there are a great many difficulties in the way of carrying it out.

The Chairman: I will put the motion, and you will please understand, first, that the word "prominently" is inserted before labelled, and secondly that the word "approximate" is struck out.

The motion was then put to the meeting and carried unanimously.

Mr. Wiggin: I understand the proposed resolutions 9 and 10 are to be postponed until the meaning of "adulteration" is defined. I understood some time ago that the committee were going into the question of what is adulteration. I know that upon the discussion of these resolutions we shall have a lot of conversation and speechifying as to what is and what is not adulteration, and I humbly submit whether it is not better to settle the meaning of "adulteration" first.

The Secretary: I will read those resolutions, which are as follow:—

"That there are certain classes of mixtures, for instance, burnt corn and chicory in cocoa, which should be expressly prohibited.

"That while agreeing with the Committee's recommendation to make the sale of skim milk for new milk a punishable offence, we consider it essential that a minimum per-centage of 'butter fat' should be fixed by the Act in milk sold as new milk, and we suggest $2\frac{1}{2}$ per cent. as the minimum, and we further consider that a minimum per-centage of 'milk solids not fat' in milk should be fixed by the Act, and we suggest 9 per cent. as the minimum; the proportion by weight in each case being calculated in reference to 100 volumes of the milk."

The opinions on these are, "Dr. Letheby would not interfere with any kind of adulteration whatever, provided it is not unwholesome, and is declared by label on the article. Mr. Wanklyn before the words "sulphuric acid" would insert "more than a certain proportion of." Dr. Hassall thinks it unnecessary. To prohibit sulphuric acid you must repeal an Act of Parliament. Mr. Collins gives substantially the same opinion as Dr. Hassall. Mr. Young thinks it would necessitate repeal without inconveniencing any one. Professor Bloxam inquires, "Is not sulphuric acid necessary for the prevention of 'mothering' in vinegar?" Mr. Bancroft "would prohibit salt in beer." The ninth resolution is addressed simply to the question whether there should be a prohibitory schedule. It does not specify a single thing except by way of example.

Dr. Tripe: I will second the proposal to defer propositions 9 and 10.

Mr. Wiggin: I quite agree with all that has been said.

The Chairman: Allow me first to gather the sense of the meeting on the proposition made here as to whether we should like these two resolutions to stand over until we have disposed of the question of what adulteration is.

Mr. WIGGIN: I am quite agreeable to let the matter stand over.

The CHAIRMAN: This being assented to, I think then these two resolutions had better stand over for the present.

The SECRETARY: The next is—

"That we approve of the recommendation of the Committee that inspectors should be 'empowered to *take* samples upon tendering full payment.'"

And the written observations are, Mr. Piesse desires to add, "if the shopkeepers refuse to serve them with any article exposed for sale." Mr. Young asks, "Is it practicable?" Mr. Scott would insert after "inspectors" "either personally or by deputy."

Mr. BLYTH: I beg to propose the resolution with the addition, "that purchasers of samples should be a uniform body, and that their action in each town and district should be as equal as possible."

Mr. WENTWORTH SCOTT: This resolution has been placed in my hands, and your observations will come as well if you second the proposal.

Mr. BLYTH was about to make some remark, when

Mr. WENTWORTH SCOTT said: May I interrupt? I have very great pleasure in moving the eleventh resolution, with the very slight alteration which the Secretary has read. Perhaps I am peculiarly sensitive as to the great need for a resolution of that character, inasmuch as, within six months, seven assaults have been made upon one of my inspectors or deputies during the progress of his duties in purchasing samples; and a variety of amusing and, I may say, uncomfortable incidents have occurred. A packet of pepper was dropped on the inspector in one case, and in many cases samples have been lost. In a few instances fines have been inflicted for assaults connected with such acts. If it were made legal and generally recognized that inspectors had a right to take samples, either by themselves or by their properly appointed deputy, it would be taken as a matter of course as a legal right, and these assault cases would no longer be heard of. I have very great pleasure in moving the eleventh resolution.

Mr. E. W. T. JONES: I beg to second that motion.

Mr. BLYTH: Then what I propose would be really an amendment: "That it is desirable that the purchasers of samples should be a uniform body, and that their action in each town and district should be as uniform as possible." I propose this in consequence of what I know occurs in my own counties. I do not know whether the analysts of the metropolis will bear me out exactly, but I think that those who are country analysts, and do their work in the country, will bear me out. The Act says that the inspectors of samples should be either the inspectors of weights and measures, the inspectors of markets, or the inspectors of nuisances; so that there are three bodies to choose from, and, as a fact, local bodies often choose the least capable men of the three. The inspectors of nuisances are often connected with trade. One or two inspectors of nuisances in the county of Devon, who are empowered to buy samples and send them for analysis, are sellers of milk. They sell the very article that is to be examined. In counties there should be a uniform body appointed to obtain samples. I myself believe that superintendents of police would be the best; at all events, they have been found the best in the county of Somerset. That system works very well indeed there. They are a uniform body, and they are connected with no trade whatever. But I leave the question open. I do not propose that we should suggest that the superintendents of police, or anybody else, or any particular body, should be selected by the Government, but that some uniform body should be selected. It should not be left to the three classes of inspectors mentioned, unless they can be appointed uniformly all over the country. I am quite willing that there should be inspectors of weights and measures, or inspectors of markets, or inspectors of nuisances, if they are the same all over the country; but where the inspectors of samples are derived from different classes, you get a large excess of action in one part of the country, and none in another. In some parts of the county of Devon there is hardly any inspection, while another part is inspected too rigidly.

Mr. WIGGIN: You ought to have some power over the body who is to appoint.

No one seconding the amendment, the motion was then put, and carried unanimously.

The SECRETARY: The twelfth proposition is—

"That the proposal to leave a portion of the sample with the vendor is objectionable, and will at once open the way for fraud, because inspectors are not, as a rule, able to seal and secure a sample in such a way as to render it impossible to tamper with it. We consider that giving the vendor permission either to accompany the inspector to the analyst or to seal the sample himself, will entirely meet the necessities of the case, and afford the vendor all necessary protection."

Mr. YOUNG says, "the inspectors should be able to seal the parcels. The vendors accompanying inspectors is out of the question." Professor Bloxam recommends that the inspector should seal two samples, one to be delivered to the analyst, and the other to be deposited at the inspector's office for reference. Mr. Morgan would prefer the vendor's seal to his presence. Professor Heaton says, "I think that a duplicate sample should always be taken, sealed, and carried away by the inspector. It could then, by the desire of the tradesman, be handed direct to his analyst. Mr. Fairley thinks that no sample should weigh less than four ounces, and the inspector should secure eight ounces.

Mr. ALLEN: I have great pleasure in moving this resolution. I think we ought to use our very utmost endeavours to prevent ourselves being thrown on the mercies of the inspectors. The men themselves are sometimes men of a very low class of life, to whom a £10 note is a very great object; and if they are to be allowed to lend their seal for a few minutes to the vendor, the vendor might replace an adulterated article by a genuine. In that way he could upset your case and damage your reputation. We ought to strive our very utmost to prevent a sealed or authenticated sample being left with the vendor. If the vendor doubts the honesty of the inspector, he can accompany him to the analyst, and put any seal or mark he likes upon the sample, which the analyst ought to mention on his certificate, but on every ground I object to the inspector sealing and leaving an authenticated sample with the vendor.

Mr. BURGE: I have very great pleasure in seconding this motion. I think it is of very great importance that the sample should be sealed by the analyst, and I think that can only be done in the way which it is now, by being sealed in the presence of the analyst.

Dr. DUPRÉ: I am very greatly in favour of the resolution, but I think it would be a pity if we as analysts should make it appear as if we doubted our inspectors. The person whom we have to doubt is the dealer who adulterates, because the man who has already adulterated is just the person who would be willing to tamper with the sample. To pass this resolution on the ground that our inspectors might be bribed, I think would be a very great pity—if it were generally known or to become public that we as analysts have that notion.

Mr. BURGE: I beg to say that in seconding the motion I had no idea of that kind.

Dr. DUPRÉ: But Mr. Allen's remarks will no doubt be published amongst the rest, and it would be a pity if they were to pass without being noticed.

Mr. WIGGIN: If the order of the Act of Parliament were fully carried out it would prevent this.

Mr. WENTWORTH SCOTT: I, for one, should regret extremely that anything should go forth from this meeting to cast a slur upon any particular inspector or body of men. I happen to be particularly fortunate in my inspectors, and therefore I may be in a better position than others; but I should be sorry for any expression of the kind which has been described to go forth.

The CHAIRMAN: It would be a pity if any imputation of that sort went forth.

Mr. ALLEN: I was not speaking on that point at all.

The motion was then put and carried unanimously.

The SECRETARY: The next proposition is—

"That we consider that any mode of delivery of samples to the analyst other than a personal delivery is objectionable."

Very considerable numbers who have sent their opinions have been against it, and almost all the analysts in counties have opposed it. Therefore we have struck it out. The opinions received were as follow:—Mr. Horsley considered that it would not do for counties. It would occasion expense and loss of time. And Mr. A. J. M. Edger, Dr. Hassall, Mr. Young, Mr. Scott, Mr. Davies, Mr. Campbell Browne, Mr. Lecbody, and Mr. E. H. Jones, express substantially the same views as Mr. Horsley.

The next proposition is—

"That we maintain that, as public analysts, we occupy a perfectly independent position between the trader and consumer; that we have no interest whatever in instituting prosecutions or securing convictions, these proceedings being taken by the local authorities at their own expense; and that our duty is simply to act as analysts, and carry out the duties of the post assigned to us by the Act."

I have only one remark made by the 57 who have returned answers, and that is by Mr. Collins, who says, "Hardly true. The rejoinder might be, the more convictions, the more public alarm, and therefore more work for analysts."

Dr. CORFIELD: I have very great pleasure in proposing this, and I will say only one or two words, as the time is running short. We have, I think, quite enough to do without trying to do either the work of solicitors or the work of inspectors. I have seen once or twice on record that analysts have tried to do the work of solicitors. At any rate one or two have even done the work of inspectors. I consider that several, or I may say the majority of the mistakes into which some of us have fallen, have occurred from our trying to do the work of solicitors or inspectors. I am very glad I was asked to propose this, as only a few days ago I was the unfortunate recipient, from a person of whom I had never heard in my life, of a more or less insulting letter, in which he assumed that I had originated the proceedings—in fact that I was acting in a spiteful manner towards the tradesmen in my district.

Mr. RIMMINGTON: I have very great pleasure in seconding the motion. I cannot believe that any gentleman in the capacity of analyst can have any other interest than that of serving the intentions of the Act in protecting the public and doing justice to all parties concerned. He ought to know nothing at all about the samples or where they came from. He could not, therefore, entertain any feeling of vindictiveness or any notion whatever of doing anything that is not strictly right.

The motion was carried unanimously.

The SECRETARY: The next proposition has been slightly altered from the form in which it stood on the printed paper—an addition having been made. It now reads—

"That an Association of Public Analysts be formed for the purpose of mutual assistance and co-operation, and that the original members of the Association be the duly appointed public analysts who shall enrol their names at this meeting, or before the end of the current month in reply to a circular notifying the decisions of this meeting."

Mr. WENTWORTH SCOTT: Which would include other analysts besides public analysts.

Mr. WANKLYN: I beg to propose this resolution, and it is hardly requisite that I should make any remarks in proposing it. What I have already said bears upon the subject.

Mr. BLYTH: I beg to second it; I think no remarks are required.

It was carried unanimously.

The SECRETARY: The next resolution is:—

"That after the 1st September all analyists in actual practice shall be eligible for election as members of Association. Each candidate for election shall be proposed by four members of the Association, two at least of whom should testify to his fitness from personal knowledge. The election to be by ballot.

Mr. E. W. T. JONES: I have great pleasure in proposing this resolution. I do not think there are many remarks required upon it, but perhaps I may just say one or two words. I do not think we should be at all selfish just because we have been appointed public analysts, and exclude many equally scientific men who have been practising as analysts, but have not hitherto thought it desirable to take posts as public analysts. They may be thoroughly capable of doing so, and would probably like to be included in the Association.

Dr. TRIPE: I shall be very happy to second that. I think they should be eligible, but at the same time, except they choose to avail themselves of the month of grace during which it says they shall be eligible, then they must come under this resolution, that they shall be proposed by four members of the Association, two of whom must testify to their fitness from personal knowledge of the candidate. I think it is absolutely necessary that those who do not accept of the month of grace offered them to become members *de facto* from their appointments, should produce some testimony as to their fitness to make analyses.

Mr. WENTWORTH SCOTT: I have very great pleasure in supporting the general sense of this, the more so as I have been engaged in somewhat similar work myself quietly for some months past, upon a scheme not only involving public analysts, but private ones; and I think it would be rather objectionable, upon the ground that I will mention by-and-by, to entirely shut out those gentlemen who are not at present public analysts, but who may become so, for anything we know to the contrary, next week or next month, and who in many respects may be of equal or superior knowledge upon food analyses to some of our own body. But I think that anything like an institution which attracts an association of public analysts on one side as a kind of scientific Ishmaelite, who shall be against the public on one side and against the vendors on another, and against all the rest of their profession too, would be rather unadvisable. And, therefore, I think that some means should be found of letting in the outer world in the shape of those scientific gentlemen who are not at present public analysts.

The CHAIRMAN: They may be by-and-by.

Mr. WANKLYN: I think we should pause before we admit people who are not public analysts.

The CHAIRMAN: At the present time.

Mr. WANKLYN: I think we should pause before we admit those who are not public analysts. By making the Society very select, and restricting it to public analysts, we shall derive a certain element of strength. Afterwards it may be matter of consideration whether or not we should not admit others as honorary members. But I think we should not admit any persons as ordinary members of the Association unless they are in actual practice as public analysts. At any rate I think we should be wise to postpone arriving at a conclusion on the subject.

The motion was then put to the meeting, and carried unanimously.

The SECRETARY: The next proposition is, "That the name of the Association be, 'The Society of Practical Analysts.'"

Mr. ALLEN: I have had the resolution put into my hands to propose. Of course if we call it "The Society of Practical Analysts," or "The Association of Practical Analysts," that enables us to extend it, if we should desire to do so afterwards, to include other analysts in practice. At the same time it rather expresses that we ourselves are practical analysts, and I hope all the food analysts who are or will be appointed are literally so; and as far as the name goes, therefore, it is expansive. If we call ourselves "The Society of Public Analysts," it would define it perhaps too closely and restrict it too much; therefore it has been proposed to adopt the title of "The Society of Practical Analysts."

Mr. Heisch: I do not think there is much to remark upon it, and I simply second the motion.

Mr. Wanklyn: I should much prefer that it should be called by the name as it originally stood in a former resolution, "The Association of Public Analysts." There are a very great many reasons why we should make it very special.

Mr. Wentworth Scott: For my own part, Sir, I think that while the term "public" analyst is too restrictive in one direction, that of "practical" hardly conveys a sufficient idea of what we mean, and you would necessarily exclude from our midst some of the first scientific heads of this country by that very term. There are a great many people whom we should be proud to welcome amongst us, hereafter to whom that title would, to my knowledge, be objectionable. I beg to propose that it be, "The Society of British Analysts," which will not be so exclusive.

Mr. E. W. T. Jones: I beg to second it. I think that term will be better than the other.

Mr. Burge: I beg to move that the term "analysts" alone be used without any adjective before it.

Mr. Wanklyn: I beg to propose that it be "The Association of Public Analysts."

Mr. Piesse: I propose that it be called "The Association of Food Analysts."

The Chairman: I think that would not do, because the Act takes in medicine as well.

Mr. Rimmington: The term used in the former resolution is that which is used in the Act of Parliament. It has the authority of Parliament, and I think it would be better to use it. I do not think we can mend it.

The Chairman: Public analysts?

Mr. Rimmington: Yes.

Mr. Heisch: The proposer of the motion is quite willing, and I am also as the seconder, to accept Mr. Wanklyn's amendment proposing the term "public analysts."

The Chairman: It has been proposed as an amendment to the original proposition that the name of the Association be "The Society of Public Analysts."

The proposition was then put to the meeting, and carried with two dissentients.

Mr. Rimmington moved, Mr. Heisch seconded, and it was resolved unanimously, "That the members subscribe 10*s.* 6*d.* each to defray preliminary expenses."

Dr. Tripe observed that it did not define the subscription.

The Chairman replied that that could not be fixed just at present.

The Secretary: The next resolution is:—

"That the following gentlemen be appointed a committee (with power to add to their number), Messrs. Allen, Bernays, Dupré, Estcourt, Hassall, Heisch, Redwood (Chairman), Stevenson, Wanklyn, and Wigner."

Mr. Rogers: I beg to propose this motion:—

"The names are too well known to all here, and to the general public, to require any remark from me."

Mr. E. W. T. Jones: I beg to second it.

Carried unanimously.

Mr. Bell moved, Mr. Burge seconded, and it was carried unanimously:—

"That the committee be requested to draw up a code of rules as the basis for the Society, to be submitted for the approval of the next general meeting.

The Secretary: The next proposition is:—

"That Messrs. Heisch and Wigner be appointed Honorary Secretaries."

Mr. Scott would leave this open.

The Chairman: I am sure, gentlemen, that I can speak personally to the fact that we are greatly indebted to those two gentlemen for having so admirably, up to the present time, conducted all the business relating to the meeting on the present occasion and on previous occasions.

Mr. Burge: I have great pleasure in moving this. It is only necessary to look at the names in order to approve of them.

Mr. Allen: I have great pleasure in seconding the motion, for, having been connected with Messrs. Heisch and Wigner from the commencement, I happen to know what an enormous amount of work has devolved upon them in the organisation of the Society. We ought to thank them for what they have done already, as well as appoint them to act in future.

Mr. Wentworth Scott: I will make a few remarks. My hastily interpolated comment was not in any sense intended as antagonistic to the motion, but simply rather that we might add dignity to it, by its coming really before the public, to my thinking, better as the spontaneous result of this meeting rather than its being "cut and dried" in some chamber beforehand. I have very great pleasure in supporting it as coming with the approval of this meeting, and not as coming from some other place.

Carried unanimously.

The Secretary: The next proposition is:—

"That it be an instruction to the committee to carefully consider the various replies to questions 1 and 2, to revise the resolutions in reference to mixtures and milk; to draw up a definition of adulteration; and, if they consider it necessary, a schedule of exceptions, to be submitted to the next general meeting."

Dr. Tripe: I have great pleasure in moving this resolution. I do not think we need go into this question at all. You have decided that these questions shall be considered, and if you do not refer it to the committee your previous resolution can simply have no effect.

Mr. Piesse seconded the motion, and it was carried unanimously.

Mr. Wanklyn: I wish to move a vote of thanks to the press for the way in which it has taken up our interest, especially the *Chemical News* and the *Lancet*, which has had a well-written series of articles on the subject, and it would be graceful if we were to pass a vote of thanks to the editors of those papers.

Mr. E. W. T. Jones: I have very great pleasure in seconding the excellent resolution of Mr. Wanklyn.

Carried unanimously.

Mr. Piesse: I beg to move a vote of thanks to Dr. Redwood for the excellent manner in which he has presided on this occasion.

Mr. Rimmington seconded the motion, and it was carried unanimously.

Mr. Blyth: I beg to move a vote of thanks from the public analysts, as a body, to the committee who have called this meeting, and who have laboured so much for us. They have no benefit from their labour with the exception of our thanks, which I think we must give them most heartily.

Dr. Tripe seconded the motion, and it was carried unanimously.

The Chairman: Gentlemen, perhaps I may be allowed to speak on behalf of myself and the committee, and to thank you for your thanks, and to state that it has been really a labour of love to us. It has afforded all of us, I am sure, much pleasure in being able to carry out the several views which you have ratified on the present occasion. I must state, however, that it is to three or four gentlemen around me, more than to myself, that you are indebted for what has been done previous to this meeting. This, however, you may depend upon, that the committee will continue to devote their best attention to your interests.

The Pharmaceutical Journal.

SATURDAY, AUGUST 15, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CONFERENCE EXCURSION.

A BRIGHT sun and refreshing breeze, a lovely country and the pleasantest of company, together with excellent arrangements carried out without a single hitch, formed a "fortuitous concourse of atoms" which rendered the excursion of the members of the Conference on Saturday last a decided success. Just before eleven in the morning of that day a company numbering about one hundred and thirty pharmacists and philopharmacists, including a goodly sprinkling of ladies, left Paddington for Great Marlow, where they arrived, not quite so soon as was expected, but as early as the exigencies of a single line of rails beyond Taplow would allow. At Marlow, "light refreshments" having been partaken of, the re-invigorated travellers went on board the barges which were to convey them down the stream.

It were vain to attempt here to describe the charming scenes that presented themselves one after another as the barges glided past Cookham Dean and Cookham to Cliefden; the wooded hills on the southern banks, the verdant islets in the river, and the more extensive range of country visible beyond the less bold northern banks. Nor is it possible to tell the added beauties which were seen when, abandoning the smooth vibrationless travelling of the barges, the company climbed, under the guidance of the head gardener, to the height where once stood "Cliefden's proud alcove," erected by the witty and profligate GEORGE VILLIERS, Duke of Buckingham, afterwards used as the residence of FREDERICK, Prince of Wales, and destroyed by fire at the close of the last century. Whatever may have been the attractions of the Cliefden of POPE'S song, there was a general agreement of opinion among the visitors, whilst strolling through the present conservatory, where beautiful leaves vie with lovely flowers, or wandering through the grounds where the *ars celare artem* has been so successfully exercised, that the kind courtesy of the Duke of WESTMINSTER had contributed materially to the enjoyment of the day.

Once more on board the barges, the party was towed past fresh umbrageous hilly wonders—which now lined the northern bank of the river—until Maidenhead was reached. There the *déjeûner* was ready, as were also those who were to partake of it, and the next hour was spent in discussing the incidents of the trip and the merits of the viands, and in paying a well-merited compliment to the Local Secretary, Mr. MICHAEL CARTEIGHE. The company then broke up into groups, which, after paying their devotions at the shrine of FLORA, TERPSICHORE, OLD FATHER THAMES, or perhaps some better-loved deity, reunited at the Taplow Station. A quick run to town, followed by a general hand-shaking, and this most successful effort for the welfare of pharmacy was at an end. *Au revoir!*

ADULTERATION DEFINITIONS.

WHAT is an adulteration? What is food and drink? What is a drug? These are all questions that have arisen during the administration of the Adulteration Act, but which that Act has not always satisfactorily answered. Mr. ARNOLD'S opinion, for instance, that sweet spirit of nitre could not be considered a drug in the proper sense of the word, was not accepted without question, although it had some foundation in the origin of the word and trade practices, and it is possible that, had his decision in the Westminster case been based on that opinion, it would have increased the already abundant litigation to which absence of definitions from the Adulteration Act has given rise. In Canada, however, the Dominion Legislature has sought to facilitate the operation of an Adulteration Act which it has recently passed by defining the terms, "food," "drink," and "drug," as follows:—*Food* is to mean and include every article used as food in the state in which it is offered for sale, or that is used in the preparation of food by admixture therewith, either before, during, or after cooking. *Drink* is to mean and include any liquid used as a beverage and any article used in or for the preparation or part preparation of any beverage. *Drug* is to mean and include all articles used for curative or medicinal purposes.

With respect to the term "adulteration," concerning which there exists in this country such diversity of opinions, it is provided that it shall mean the admixture of any deleterious ingredient, or any material or ingredient of less value than is understood or implied by the name under which the article is offered for sale. In a schedule of articles which are to be deemed deleterious to "drink," are included cocculus indicus, common salt, copperas, opium, Indian hemp, strychnine, darnel, sud, extract of logwood, salts of zinc or lead, and alum, or compounds of them. The admixture or offering for sale articles of drink mixed with any of these substances is to be punished on the first offence by a fine of one hundred dollars. One point of novelty in the Canadian Act is that it allows the dealer the privilege of retaining under seal a portion of the samples sold. Perhaps by the time the Government is ready to introduce a Bill for the amendment of the English Act, some experience of the value of the above definitions may be available.

Our readers will be glad to see from the report printed in the preceding pages that a vigorous effort is now being made to place the whole subject upon a more satisfactory footing, and we hope that the new Association which has been formed will soon take an authoritative position in the guidance of public opinion in matters relating to adulteration.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

July 28*th*, 29*th*, 30*th*, *and* 31*st*, 1874.

Present—Messrs. Ainslie, Buchanan, Gilmour, Kinninmont, Tait, and Young.

Dr. Greenhow was present on the 28th and 29th of July, and Professor Maclagan was present on the 28th, 29th, and 30th, on behalf of the Privy Council.

MAJOR EXAMINATION.

Two candidates were examined. *One* failed. The following passed, and was declared qualified to be registered as a Pharmaceutical Chemist :—

Selkirk, James ....Edinburgh.

MINOR EXAMINATION.

Forty candidates were examined. *Twenty-one* failed. The following *nineteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

*Currie, Robert Kirkwood ......Glasgow.
*Cumine, Rupert Henry ....Kingston-on-Thames.
Frazer, Samuel McCall ....Glasgow.
Arthur, Charles.......................Edinburgh.
Baildon, Henry Bellyse ....Edinburgh.
Oakes, Henry ....Pickering.
Equal. { Bell, John Armour ....Glasgow.
Equal. { Robbie, William ....Aberdeen.
Wright, Robert.......................South Shields.
Murray, Matthew David.........Annan.
Equal. { Amery, John..........................Taunton.
Equal. { Anderson, George A. Coulson...Bournemouth.
Bullock, John Alfred ....South Shields.
Nockolds, Stephen William ...Horsham.
Equal. { Midgley, James Herbert.........Edinburgh.
Equal. { Thompson, James Hood ....Berwick-on-Tweed.
Alexander, Alexander ....Aberdeen.
Francis, James ....Liverpool.
Broadbent, Sidney ....Greenfield-in-Saddleworth.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Six candidates were examined. *Two* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists :—

Bingham, Robert ....Hull.
McDonald, Angus....................Glasgow.
Saunders, Frederick.............Manchester.
Young, John Matthew ....Glasgow.

PRELIMINARY EXAMINATION.

The certificate of the University of Cambridge was received in lieu of the examination of the undermentioned :—

Baildon, Henry Bellyse ....Edinburgh.

* Passed with Honours.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 119.)

After the President's Address the reading of papers was proceeded with. The first paper was on—

Pharmaceutical Tests for Cinchona Bark.

BY DR. J. E. DE VRIJ.

Notwithstanding the voluminous literature about cinchona barks, there are still many links wanting in our knowledge of this valuable medicine.

Thus for instance, although we are tolerably well acquainted with the chief therapeutical agents contained in good barks, viz. :—

1. Cinchona Alkaloids,
2. Cinchotannic Acid,
3. Kinovic Acid,

we know very little about the state in which they exist in the bark, and hence the little therapeutical value of many of the pharmaceutical preparations of bark.

Besides the powder which naturally contains the three mentioned therapeutical agents, I am only acquainted by my own experience with one pharmaceutical preparation which equally contains them, but without the vegetable fibre, viz., the alcoholic extract of bark. Water is, however, frequently the solvent used in the pharmaceutical preparations of bark, and, therefore, as I have found by experience that the quantity of the therapeutically active substances extracted by cold water from bark is very different in using different kind of barks, I consider that it will be beneficial for the pharmacist, if he is able, to test the bark which he wishes to use in his pharmacy.

The tests prescribed by some Pharmacopœias, besides that they require too much time to be generally applied in all pharmacies, are too one-sided, as they only determine the quantity of the total alkaloids, or of the quinine contained in the bark. This determination alone, although sufficient for the quinine manufacturer, is not so for the pharmacist.

If the physician in prescribing bark, or any of its pharmaceutical preparations, had only in view to prescribe the alkaloids contained in them, he would do much better to prescribe the alkaloids themselves, and I suppose, therefore, that he intends to apply also the other active substances of which the astringent matter, called cinchotannic acid, is preponderant. During my numerous investigations of Indian barks, I have found, by a pure accident, that the relative quantity of this substance in different barks may equally be ascertained, together with that of the alkaloids, in the following manner :—

One part of powdered bark is mixed with about four parts of distilled water to form a thin semi-fluid paste, which, after some hours' maceration, is packed in a percolator. When the liquid has percolated, more water is poured into the percolator till four parts of clear liquid are obtained.

To apply the test this liquid is divided into four equal parts.

One part is tested by strong hydrochloric acid.

One hundred grains require about fifty minims of acid.

Another part is tested by clear lime water, which is added till the liquid has a decidedly alkaline reaction.

These reactions, in applying them to different barks, will, after some experience, enable the operator to judge the pharmaceutical value of the barks, and convince him, for instance, that the Indian barks are in general better adapted for purely pharmaceutical purposes than the American barks.

This is illustrated by examples of the following Indian barks :—

1. Calisaya, from Java.
2. Hasskarliana seu Calisaya hybrida.
3. Officinalis (Ootacamund).
4. Pahudiana (Java).
5. Succirubra (Jamaica).
6. Ditto (Ceylon).
7. Bark from Apothecaries Hall, alk. 8 per cent., $[\alpha]j = 38{\cdot}3$ ↰ ; Indian succirubra.

If the operator wishes also to estimate the relative quantity of the total alkaloids, he may easily do so by testing a measured quantity of the percolated liquids by a standard solution of tannic acid, by which he can compare the amount of alkaloids fit for pharmaceutical use contained in the different barks subjected to his investigation.

The President : I am sure you will feel with me that we are highly favoured by the presence of Dr. De Vrij. I agree with him that we have yet a great deal to learn respecting these barks, probably, as I have already said, for their proper study, the labour of a life would be required. I am quite incompetent to criticise in any way Dr. De Vrij's statements, and probably after we have seen them in print we shall be able to make more of them. I am happy to say, however, that Mr. Broughton is present, who is also an authority on Indian barks, he being chemist to the Government on the cinchona plantations in India. We shall be happy to hear any remarks from him.

Mr. Broughton: I have listened with very great interest to the able paper we have just heard. The subject of the cinchona barks of India is rather a large one, and I shall not be able in the short time at your disposal to give any very general information on the subject; but I may mention that in the course of my work, I have determined with some precision the state of the alkaloids as they exist in the green bark. I find they exist nearly in the proportion of one-fifth of their total quantity as quinate, and the remainder as cinchotannate. The method by which I determined this point was as follows:—I obtained a quantity of fresh green bark of the *Cinchona succirubra*, and had it squeezed in a powerful press until it became nearly dry; but in order to be quite accurate the amount of water remaining was also determined. I found on analysis of the liquid which came from the bark, that one-fifth of the total alkaloids in the bark, which was also determined by analysis, was to be found in the liquid squeezed from it. I also determined the amount of alkaloids left in the bark after squeezing, and found that four-fifths of the alkaloids in the bark existed, after the soluble portion had been expressed, as tannates. Tannates of the alkaloids are but very slightly soluble in water, and it is for this reason that there is such a difference in barks on testing. If a bark contains a large amount of tannates, and has been kept for a year or a year and a-half, the tannate is oxidized, and forms an insoluble compound, with very little taste; but if, on the other hand, the alkaloids in the bark exist as quinates, the bitter taste is very perceptible, even after long preservation. I quite agree with Dr. De Vrij as to the very variable character of barks. For instance, the bark of the *Cinchona officinalis* has totally different characters, on analysis, in taste, in quinine, and in tannic acid, to that of the *C. succirubra* or the red barks. The quinovin in the bark, which is a very general constituent of all the cinchona barks I have met with, exists, not in combination with the alkaloids, but in an insoluble state, and only becomes apparent when the bark is exposed to the action of an alkaline solvent. I do not know that I can add anything more of special interest, and, as I have already said, the whole subject of Indian barks is too large to enter upon now.

The President: Are the barks ever treated in India in the green state for the production of quinine on a commercial scale?

Mr. Broughton: All the barks used in India are employed in the green state; but we do not make sulphate of quinine. The whole of the alkaloids are precipitated together, and so employed in medicine. The reason of that is that the succirubra, which is the most common of all the Indian barks, contains a very small proportion of quinine, but a large amount of cinchonidine. And it has been found, by very careful medical experiments, numbering, I believe, some 4,000, that cinchonidine is almost, if not quite, equal as a febrifuge to quinine. There has been no advantage found, therefore, in separating the alkaloids, as has been the custom for pharmaceutical purposes in this country.

Mr. Umney: I regret that I was not present at the beginning of Dr. De Vrij's paper, but I should wish to add that I have been working for some time at the fluid extract of cinchona, and have in my hand an incomplete paper on the subject. I have been more especially working at processes for the production of a fluid extract, because, as we all know, the process of the British Pharmacopœia is a most wasteful one, the amount of alkaloid left behind being almost as great as that dissolved by the water; perhaps about 60 per cent. is taken out, and about 40 per cent. left in. I certainly look upon the fluid extract of the British Pharmacopœia as an unnecessary concentration. It by no means follows, if you have fine Calisaya bark, that you will get a good fluid extract; on the contrary, sometimes the finest barks will not yield more than 18 or 20 per cent. of completed fluid extract, and this unsatisfactory. If you search the Pharmacopœias of Germany, America, and I doubt not others also, you will find no fluid extract carried to such a degree of concentration as we have in this country. The fact is we still follow the process given some forty years ago before the College of Physicians, when very little was known about cinchona bark. But I think we might well take as a standard the other fluid extracts of the Pharmacopœia, and make this extract of the strength of one drachm to the fluid drachm, and I believe that percolation with proof spirit for Fluid Extract of Bark would answer very well. I may also say that I have recently examined the fluid extracts of cinchona of trade, and in the majority of cases I am confident they are being made from Indian barks which do not contain quinia. After what Mr. Broughton has said, I am sure we shall not dispute that these barks are equal, if not superior, to those of South America in many respects; but as the matter stands at the present time, we have no right, according to our Pharmacopœia, to substitute these Indian barks, containing no quinia, for the Calisaya bark there prescribed. I say this because I find, on examination, that not more than one-fifth of the trade specimens yield a trace of quinia—almost the whole of the alkaloids in the fluid extracts being cinchonine and cinchonidine. I have made a fluid extract from some of the barks grown in India, containing 4 to 4½ per cent. of crystallizable sulphate of quinia, and these barks yield a beautiful fluid extract, and to such substitution I do not object. I hope shortly to publish many of the experiments I have made in this direction.

Mr. D. Hanbury: Is not Calisaya bark grown in Ceylon as well as in Bolivia?

Mr. Umney: Undoubtedly; but I referred to the flat Calisaya bark of the Pharmacopœia, such as we are accustomed to see from South America.

Mr. Giles: Unfortunately, every pharmacist who has anything to do with the manipulation of barks, must feel that this subject is one which requires the study of a life, and that it cannot be sufficiently exhausted, even by those who only are qualified to lead us in such matters—the chemists. In pharmacy we are all floundering about, and coming to the conclusion that such a thing as an efficient formula to represent the cinchona barks does not exist, though it is a great desideratum. I entirely concur in the observations which have been made by Mr. Umney as to the mistake in the preparation of the liquid extract; I think the process is carried too far, that it is wasteful, and totally unsatisfactory in its results. Frequently the extract, when it comes to be diluted to an extent which ought to bring it back to something like the pristine condition as obtained from the bark, is a horrible combination like mud and slime, offensive to the taste, and likely to disturb an unsettled stomach instead of being advantageous to it. When I examine barks for the purpose of obtaining one suitable for a liquid extract, it generally happens that I have to try half-a-dozen samples, which is a very tedious process, and I am sure we shall all welcome any suggestions from Dr. De Vrij, which will enable us to arrive more quickly at a conclusion. I have not found any experiments of any value except actual manipulation, and I generally take about seven pounds of bark, make an extract from it, and if it answers well, buy it. Of late years, however, it has been very difficult to get a bark at all satisfactory; sometimes you get one yielding a good product, but it is difficult to get a fair return for the original cost of the bark; and it is much more common to get a copious result, which is altogether distasteful—harsh, acrid, disagreeable, not bitter, and not fit to be sent out. This whole subject is in a most unhappy state, and we are all deeply indebted to Dr. De Vrij for bringing his scientific knowledge and practical experience to bear on the pharmaceutical aspect of this question. I believe cinchona bark is not only valuable in itself, but infinitely more valuable than quinine, and that no greater mistake has been made than in confining our attention to quinine, and rejecting all the other alkaloids. What we really want is to produce something which shall be cinchona bark *minus* the woody fibre. That is the great problem; it has occupied a great deal of my attention, because it presents more difficulties than almost any other, and it is utterly beyond my power to resolve. I hope Dr. De Vrij will kindly devote still further attention to the pharmaceutical aspect of this subject.

Dr. De Vrij begged to thank those gentlemen who had spoken so kindly of his efforts as to encourage him to continue his researches. He had heard with great satisfaction the remarks of Mr. Giles, which reminded him that some weeks ago he had been asked to deliver a lecture before the Society of Physicians of Holland on cinchona and its alkaloids from a medical point of view. He then gave a sketch of what was known of cinchona from its first introduction into medicine, and the unhappy fact that, by an entire accident, quinine only had received attention, the other alkaloids being almost neglected. He then went on to give it as his opinion that the only form in which cinchona ought to be prescribed was that of alcoholic extract, and that in order to make such an extract they should not use the Calisaya bark (which was much superior to all other kinds for making quinine), but the red barks, particularly those of India, they being much richer in the alkaloids in general, though not in quinine, and also in cinchotannic acid. He had lately had a proof of the efficacy of such an extract in his own family; the physician who had been attending his sister, after giving her sulphate of quinine, saying this must be followed by bark, but that as he (Dr. De Vrij) was better acquainted with the best forms, he would leave it to him to select it. On talking with the physician, he said he would make an extract, and tell him how much he got from a certain amount of powder, and he could then prescribe the dose. The physician ordered three grains to be taken four times a day, and it proved perfectly successful. Since then this physician had prescribed no other preparation of bark, and many others had also adopted it. Looking to the therapeutics of the future, he did not think quinine would be superseded, because it was a most valuable medicine, but he hoped to see introduced the mixed alkaloids from *Indian* red bark, which would in many cases be more useful. It would be desirable that the manufacture should be undertaken by some firm of established repute, possessing public confidence, because it would be very difficult for pharmacists in general to test it. He found no difficulty himself, because he was accustomed to use the polariscope, by the aid of which he could easily detect the red barks of India, as they possessed, on an average, a molecular rotation of 38° to the left.

Mr. Brady: I should like to ask what is the proper strength of alcohol requisite to form a preparation of the bark.

Dr. De Vrij: The alcohol should be of a strength of about 80 or 85 per cent. There is one observation I ought to have made, viz., that the Dutch and English are in many respects very much alike. One gentleman asked if it was allowable to use Indian barks for the preparation of the extract, and I am sorry that such a question should have to be put. But unfortunately both nations have done the same thing: they have both introduced the cultivation of bark in their Indian possessions, but neither allowed its pharmacists to use them; and not only so, but they have both lately had an appendix to the Pharmacopœia issued, and in neither is there any mention of the Indian barks.

Mr. D. Hanbury read the following paper by Professor Flückiger on "The Stearoptene of Oil of Nutmeg:"—

On a Substance called Myristicin.

BY PROFESSOR FLÜCKIGER, OF STRASSBURG.

From the statements recorded in Gmelin's *Handbook of Chemistry*, vol. xiv., p. 389, it would appear that the essential oil of nutmegs sometimes deposits a kind of camphor. The earliest notice of such a body is due to Johann Friedrich John, professor of chemistry, at Berlin, who, in the year 1821, made very extraordinary observations regarding nutmeg-camphor. Thus, according to that chemist, the substance under notice, which he termed *Myristicin*, is soluble in water, and even requires not more than 19 parts of boiling water for solution. We know of no other substance of the class of natural stearoptenes or camphors being to any considerable extent soluble in water. But still more astonishing is the assertion quoted by Gmelin, that the aqueous solution of myristicin is "*sometimes acid, sometimes alkaline!*" John even states that myristicin yields crystallized compounds with hydrochloric or tartaric acids! He, in fact, thought the substance to be a kind of alkaloid, a suggestion which may be excused when we remember the brilliant discovery of cinchonine and quinine which had been made shortly before by Pelletier and Caventou.

I am sorry to have been unable to see John's original paper in order to ascertain how he obtained this curious camphor.* Nor have I perused that of Bley, whose few observations, however, as found in Gmelin appear, to refer to an impure substance, inasmuch as he says his stearoptene melted above 100° C., leaving carbon when evaporated.†

Again, in 1839, Mulder examined a crystallized stearoptene, which is also noticed by Gmelin. This substance is likewise said to be soluble in boiling water as well as in *caustic lye;* Mulder assigned to it the formula, $C_{16} H_{32} O_5$, and represented it as melting at 112°C. From his paper it appears that he obtained it not, as supposed by Gmelin, from nutmegs, but from the essential oil of mace. As to the latter, there is found in Gmelin an observation of Bley's, according to whom this oil yielded an *emulsion with ammonia*, and a kind of *soap* with caustic lye.

Oil of nutmegs was again examined by Cloez in 1864; and oil of mace in 1862 by Dr. Schacht, of Berlin, and in 1865 by Koller; no one of these observers mentions any stearoptene.

The foregoing statements concerning the so-called *Myristicin* induced me to endeavour to procure this remarkable substance; and in this object I was aided by the kind liberality of Messrs. Herrings and Co., of London, In the laboratory of these gentlemen, there was submitted to distillation a large quantity of nutmegs, some of them being of the ordinary kind (*Myristica fragrans*), while others were the *long nutmegs* derived from *M. fatua.* On the third day of the distillation, a crystalline matter was noticed to collect with the oil on the surface of the water.

This was the substance which I received of Messrs. Herrings and Co. It was a greyish semi-solid mass, smelling strongly of nutmegs. By mixing it gradually with cold spirit of wine, sp. gr. 0·830, I found that the crystalline part of the magma might be separated and partially purified by washing with small quantities of spirit of wine. The crystals thus obtained have to be further purified by repeated crystallization from boiling spirit of wine. At length large, brilliant, colourless scales were obtained, the crystalline form of which, however, could not be ascertained, the scales being never fully developed; in polarized light they prove to be doubly refractive. The re-crystallization was repeated ten or twelve times, yet was ineffectual in removing from the substance the smell

* In the abstract of John's paper as contained in the *Journal für Chemie und Physik* of Schweigger und Meinecke, xxxiii. (1821) 250, myristicin is simply said to be deposited in the essential oil of nutmegs.

† Such is the statement in the English translation of Gmelin.

of nutmeg. It is, in fact, not possible to deprive it in this way of the odour; yet the odour is gradually lost when the crystals have been kept for some months, although even in a stoppered bottle. They are readily soluble in warm alcohol, crystallizing therefrom when sufficiently pure, even in summer, but separating more readily in cold weather.

The alcoholic solution is devoid of rotatory power; it reddens litmus slowly, but very decidedly and permanently. In water the crystals are insoluble. They melt at 54·5° C., and evolve offensive vapours, like a fatty substance; if they are heated in a glass tube, no crystallized particles are sublimed. On platinum foil they burn, leaving no residue, giving off at first the same vapours as when heated in a glass tube.

No difference whatever could be observed between the myristicin of *Myristica fatua* and that of the common nutmeg; the ultimate analysis of purified crystals from both sources likewise corroborates their identity. Crystals from *M. fragrans* afforded—

Carbon	75·77
Hydrogen	12·19
Oxygen	12·04
	100·00

while those from the oil of the long nutmeg, *M. fatua*, yielded:—

	I.	II.	III.
Carbon	75·23	75·66	75·02
Hydrogen	12·30	12·36	12·35
Oxygen	12·47	11·98	12·63
	100·00	100·00	100·00

In caustic alkalies the crystals of "*Myristicin*" dissolve readily; if a somewhat considerable quantity is dissolved in warm caustic lye, it will form, on cooling, a consistent jelly, which, in fact, is nothing else than a *soap*. Myristicin warmed for a day or two with absolute alcohol and an excess of anhydrous carbonate of sodium, yields, on cooling, a gelatinizing *neutral* solution. If this solution is liquified, filtered, and mixed with an acid, a crystalline layer will, on cooling, make its appearance on the surface of the liquid. This layer may be collected, washed with water, until the latter no longer reddens litmus, and then re-crystallized from hot alcohol, when crystals are obtained which prove to agree in every way with the original "*Myristicin.*" If this process of purification is repeatedly carried on with the same quantity of the substance, the odour of the latter diminishes, and at last disappears.

The crystals thus purified proved, upon analysis, to be composed of—

	I.	II.
Carbon	73·27	73·41
Hydrogen	12·25	12·25
Oxygen	14·48	14·34
	100·00	100·00

It became now evident that I had before me *Myristic Acid*, which, in form of *Trimyristicate of Glycerin*, is the chief constituent of the fatty part of nutmegs. The formula of the acid, $C_{14}H_{28}O_2$, requires:—

14 C	168	73·68
28 H	28	12·28
2 O	32	14·04
	228	100·00

The melting point of myristic acid is stated by Heintz to be 53·°8; my crystals melted not before 54° or 54·5°. Whether this difference is due to the perfect, I may say unrivalled, purity of my acid, or to a different way of observation, may remain undecided.

The "*Myristicin*" under notice is consequently nothing else than Myristic Acid, accompanied at the outset by essential oil. Whether the same mixture had been examined by John, by Bley, or by Mulder cannot be ascertained. It is obvious that some of their observations would agree with myristic acid, whereas others rather apply to a camphor, the existence of which has not been corroborated.

It is not astonishing to meet with myristic acid in the product of a prolonged distillation of nutmegs, for fatty acids generally are capable of being volatilized, especially by means of superheated steam, when the vegetable fats are resolved into glycerin and fatty acids. I am not aware, however, that special observations had ever been made as regards myristic acid. It is possible that free myristic acid is present in the nutmeg itself, and this would still more easily be carried over by the watery vapour. I have warmed a little powdered nutmegs with alcohol and anhydrous carbonate of sodium, and thus got a small amount of indubitable soap, from which I isolated myristic acid. This experiment shows that nutmegs contain a little myristic acid in addition to that combined with glycerin. As to the volatility of myristic acid, I may lastly remark that *Lauric Acid*, $C_{12}H_{24}O_2$, which is the next in the same series as myristic acid, has been found by Görgey and by Oudemans to be easily volatilized with steam. Myristic acid may doubtless be a little less volatile.

Myristicate of sodium had not yet been obtained, so far as I know, in distinct crystals; there is, however, no difficulty in preparing it in thin prisms, which are deposited if an alcoholic solution of the salt is allowed to evaporate very slowly. By mixing an alcoholic solution of this salt with an alcoholic solution of acetate of barium, I obtained an amorphous precipitate of *myristicate of barium*, 0·419 gramme of which yielded by incineration 0·142 gramme carbonate of barium, representing 0·0988 of barium, that is, 23·55 per cent. of that metal. The formula 2 $(C_{14}H_{27}O_2)$ Ba would require 23·15 per cent. The liquid, which I separated from this myristicate of barium yielded, after a short time, crystalline scales of another salt, namely, 2 $(C_{14}H_{27}O_2)$ Ba + 2 H_2O, which has not been obtained by other observers. This salt should yield upon incineration 31·39 per cent. of carbonate of barium; 0·2055 gramme of the crystals actually afforded me 0·0645 of carbonate, that is to say, 31·38 per cent.

By mixing an alcoholic solution of nitrate of silver with an alcoholic solution of myristicate of sodium, I obtained amorphous *myristicate of silver*, $C_{14}H_{27}AgO_2$, which, by theory, should give 32·24 per cent. of silver:— 0·7785 gramme of this salt was found to contain 0·2506 of silver, that is to say, 32·19 per cent.; in a second experiment 0·6450 of the same myristicate of silver left 0·2077 = 32·20 per cent. of metal. All these results are in full accordance with my previous statements, namely, that the crystalline matter separated from oil of nutmegs in the laboratory of Messrs. Herrings and Co., is *Myristic Acid.**

The PRESIDENT: Dr. Flückiger has pursued this subject with his usual thoroughness, and we are all indebted to him for so elaborate a paper. It is not a subject of the highest importance, but truth is always valuable. I imagine this crystalline body is often met with by pharmacists in making spirit of nutmeg. I often find a small deposit at the bottom of the bottle, which I have always regarded as stearoptene, but which is probably this myristic acid. I doubt not you will pass a vote of thanks to Professor Flückiger for his paper, which you will please signify in the usual way.

Mr. SIEBOLD: I should like to ask if it be possible to incinerate myristicate of barium without at the same time converting a considerable quantity of the carbonate left into the oxide. Whenever I have incinerated any preparation of barium containing an organic acid, I have always found it impossible to obtain pure carbonate as a residue.

---

* Some of the above analytical results have been ascertained in my laboratory by Dr. Buri.

Mr. Williams: Carbonate of barium stands a high temperature much better than carbonate of calcium, which is apt to become caustic.

Mr. Siebold: Whenever a barium salt containing an organic acid has been heated, I have always found that the residue was not pure carbonate, because the carbon which is present greatly facilitates decomposition.

Professor Tichborne: I would suggest that it is very easy to recarbonate any oxide of barium which is formed, by a little carbonic acid, or water aërated with carbonic acid.

Election of an Honorary Member.

The President: I have a recommendation to make to you with reference to adding to our list of honorary members. We have had the misfortune within two or three years to lose two very important honorary members, Messrs. Procter and Parrish, both Americans. I have now to ask you to elect a Canadian gentleman, Mr. W. Saunders, of London, Ontario. He is well known as a scientific pharmacist, both in America and here, and his communications often appear in our Journal. One was published last week on the insects that attack drugs. I think we may all feel honoured by electing him as an honorary member.

The election was unanimously agreed to.

The Exhibition of Objects of Interest relating to Pharmacy.

The President then proposed that the following gentlemen should be appointed a Committee to report upon the exhibition of pharmaceutical matters—Messrs. Atherton, Barnes, Deane, Gale, Giles, Ince, Martindale, Stanford, and Umney.

The names were unanimously approved of.

The Conference then adjourned for luncheon until two o'clock.

(To be continued.)

EXHIBITION OF OBJECTS OF INTEREST RELATING TO PHARMACY.

(Continued from page 120.)

In room No. 2 were exhibited several beautiful specimens of alkaloids, etc., by Mr. T. Morson. Those of narceia and podophyllin, thymic acid, crystallized hydrochlorate of morphia, and aconitine were particularly fine, while the glacial phosphoric acid had almost the brilliancy of a diamond.

Besides these were a series of all the different kinds of opiums, including English and Australian opiums; a Chinese opium-smoking apparatus, and a picture of a laboratory by Muller.

Messrs. Hopkin and Williams exhibited a number of new medicinal agents, some of the chemicals being splendidly crystallized. Among those more particularly worthy of note were monobromo-camphor, used in neuralgia; double cyanide of potassium and zinc, used to obtain hydrocyanic acid; sulpho-carbolate and permanganate of zinc, used for injections; and redistilled chloral hydrate and croton chloral hydrate, both being perfectly pure, and not showing the least trace of moisture. Among the liquid preparations exhibited by the same firm were nitrite of amyl and nitrate of amyl, the latter of which is so frequently ordered in mistake for the nitrite, from which it differs in physiological effect; trimethylamine, pure aldehyde, and specimens of oleate of mercury, containing 5, 10, and 20 per cent. of oxide of mercury respectively.

Messrs. Schmedes and Co. exhibited samples of chemically pure glycerine, sp. gr. 1·260, and crystallized glycerine, sp. gr. 1·265. Unfortunately, the heat of the weather prevented its assuming during the evening the crystalline form which it presents in the winter months.

Messrs. Corbyn, Stacey, and Co. exhibited a double valve inhaler, which is used in a box lined with baize to prevent loss of heat.

Messrs. Davy, Yates, and Routledge exhibited handsome specimens of biniodide of mercury, valerianate of quinine, benzoate of ammonia, and other chemicals.

An extensive series of chemical apparatus including wine-testing apparatus sets for volumetric analysis, for laboratory students, urinary cabinets, and pure chemicals for analytical purposes, were exhibited by Mr. M. Jackson.

Specimens of eau de Cologne, from most of the makers in Cologne, lent by Mr. F. C. Clayton, attracted a fair share of attention.

The India-rubber and Telegraph Works Company exhibited sections of submarine cables, medical coils and batteries, block-signalling instruments, and many useful articles made of ebonite for medical and pharmaceutical purposes. The patent Léclanché battery, made by this company, is remarkable for quickly arriving at its maximum strength, and its electro-motive force being 75 per cent. greater than Daniell's battery, whilst its resistance is 90 per cent. less. Other articles of interest in this room were improved soda-water bottles by Messrs. Barnett and Foster; electrical apparatus by Messrs. Zimmermann and Co.; improved gazogenes by M. H. Maldine; rotary pill machines, worked by hand or treadle, with improved presses for piping the pill-mass, by which from ten to thirty pounds of pills can be made in an hour, exhibited by Mr. J. M. Pindar. A collection of analysed drugs, pharmaceutical preparations, and a materia medica cabinet were exhibited by Messrs. Southall and Co., of Birmingham, as well as quinovia cocoa and chocolate, in which an extract containing the whole of the active principles of yellow cinchona bark is combined with cocoa, in the proportion of 15 grains of the former, to 4 ounces of the latter. Judging from the rapidity with which the quinovia chocolate lozenges disappeared, they must have been very palatable, and the bitterness of the quinovia completely masked. Messrs. Lynch and Co. exhibited a portable miniature water-bath; improved Higginson's enema, in which the tubes unscrew to admit of cleaning the valves, and the box is so made that the india-rubber tubes are not liable to compression; the best corkscrew mounts to insert in eau de Cologne or other bottles with short corks; and many other improvements in druggists' sundries which were well worthy of examination. Messrs. Roberts and Co., of Paris, exhibited improved enemas, and a goudronière or apparatus for diffusing the odour of tar. This consists of about six metallic perforated plates immersed in a metallic box half full of tar, the plates being attached to the lid of the box; when the lid of the box is raised it is supported by a spring, and the plates then expose the tar on their surface to the action of the air. Wafer envelopes and various dragees were also exhibited by the same firm. On the walls of rooms Nos. 1 and 2 were exhibited some interesting photographs of solar spectra, lent by Mr. J. Norman Lockyer, F.R.S.; a photograph of the house in which Priestley was born, presented by Mr. R. Reynolds, of Leeds, to the Council of the Society; some exquisite paintings lent by Mr. Vokins. In room No. 3, a large and most interesting collection of medicinal and economic plants, from the gardens of the Royal Botanical Society, were exhibited by Professor Bentley, among which we noticed healthy and vigorous young plants of *Eucalyptus globulus*, *Cinnamomum Zeylanicum* and *Cassia*, *Guaiacum officinale*, *Elettaria Cardamomum*, *Picræna excelsa*, *Quassia amara*, *Saccharum officinarum*, etc. Paper made from the bark of various species of Eucalyptus, and other Eucalyptus products, were also exhibited by Professor Bentley. A healthy young plant of the Calabar bean was exhibited by Mr. G. B. Francis. By the same gentleman was exhibited a jar of benzoinated lard, which was shown at the Conference meeting at Nottingham, in 1866. This specimen, after the lapse of eight years, apppeared to be perfectly free from rancidity. In this room were also specimens of labels of every conceivable kind, poison books, &c., by Messrs. Silverlock and Co.; French medicinal preparations, including Eucalyptus products, various dragees and capsules, exhibited by Clin and Co.; and a double-action tincture-press, by Messrs. Lynch and Co.

Messrs. Goosey and Rogers exhibited some very neatly spread adhesive and marginal plasters.

In room No. 4, the microscope room, Messrs. Tisley and Spiller's compound pendulum apparatus, recording the vibration of one or more pendulums in a series of exquisitely curved lines, attracted much attention, and the figures thus made were, through the kindness of that firm, distributed among and eagerly sought after by the visitors.

The recording thermometers of Messrs. Negretti and Zambra were here exhibited. One of these ingenious instruments records the temperature at any depth of the ocean, etc., being so arranged that when let down to the required depth, the first pull upwards causes the thermometer to become reversed, and by this means records the temperature at that depth, on the opposite end of the thermometer tube. Another thermometer records the temperature at any given time of day or night, being connected with a clock which, instead of sounding an alarum, reverses the thermometer at the time for which it is set, and so records the temperature. Among the objects exhibited by Messrs. Steward and Co., may be mentioned a curious and ingenious instrument lately patented, termed a cuiminoscope. It consists of a concave mirror ground to a particular curve, so that when a carte-de-visite is placed in front of the mirror at focal distance, the carte appears of full life-size. Among some beautiful transparent injections of animal tissues, was a full-length section of human kidney, and another very interesting one of the skin of a salamander. Their students' educational microscope is also worthy of note, as being one of the best made at a low price, the object glasses being of English make. Messrs. Baker and Co. exhibited a cabinet containing 144 pharmaceutical slides, comprising sections of roots, barks, seeds, and alkaloids, making altogether a most valuable series, which deserves a place in every collection of materia medica. The slides are by Möller, and are well mounted and authenticated. One object, known as the microscopic marvel, attracted much attention from its extreme beauty. It consisted of a minute bouquet, the flowers being made of diatoms and different coloured scales from butterflies' wings. Another most beautiful slide, which is quite a triumph of microscopical skill, consists of 100 valves of diatoms, each in the centre of a minute square, which contains its name and the authority for the name, the whole of the hundred squares occupying only a space that could be covered with a sweet-pea seed. The names and squares are micro-photographed first, and then the diatoms put in position by manual dexterity.

Other objects of interest in this room were a large yellow-tinted Cape diamond of 66 carats, valued at £20,000, and minerals found with diamonds, exhibited by Professor Tennant; a mass of crystallized gold, exhibited by Mr. W. C. Roberts, Chemist to the Mint, and a picture, by Millais, of the president (Mr. T. H. Hills), which was generously presented by him on the same day to the Council of the Pharmaceutical Society.

In the laboratory of the Society were exhibited M. Orsat's apparatus for the analysis of gases, which is so constructed as to be available for use by any one of ordinary intelligence, and to furnish ready and comparatively trustworthy indications. It is especially intended for commercial purposes, and would probably be found useful in sulphuric acid manufactories, sugar works, etc.

Mr. Fletcher, of Warrington, also exhibited his well known portable gas furnaces, adapted either for a high or for so low a temperature as to enable the operator to dispense with a sand bath; also a muffle furnace for analytical purposes, and for burning in photo-enamels.

Mr. R. H. Davies, F.C.S., demonstrator in the laboratories of the Pharmaceutical Society, during the evening exhibited and explained Mr. Crooke's very interesting experiments, showing the attractive and repellent properties of light and radiant heat, Mr. Crooke's own apparatus being kindly lent for the purpose. The apparatus consisted of three globes, in each of which a piece of pith was attached to a slender rod suspended by a hair. When the heat of a candle was applied to the outside of the first globe, which had been exhausted of air, the pith was repelled, but attracted when a freezing mixture was applied. In the second globe, from which the air had not been removed, when the same agents were applied, exactly opposite results ensued. In the third globe, from which the air had been removed to a certain degree only, no movement of the pith occurred.

In the Museum, Mr. Geraut showed his complete and capacious soda-water machine in action, and exhibited a number of improved gazogenes, syphons, and similar apparatus.

Parliamentary and Law Proceedings.

The Charge against a Chemist and Druggist of Adulterating Quinine.

On Tuesday, at Burslem, Staffordshire Potteries, before Mr. H. C. Greenwood, stipendiary magistrate, Mr. W. S. Pearson, chemist and druggist, Kidsgrove, was summoned for having sold, as unadulterated, some quinine which was adulterated with sulphate of cinchonine. Mr. Fulford, barrister, instructed by the Clerk of the Peace for Staffordshire, appeared in support of the charge, and Mr. F. W. Tomkinson, solicitor, for the defence. The case was heard at great length at Tunstall, on the 2nd of July, when the certificate of Mr. Scott, county analyst, was put in as evidence, and Mr. Scott was called to state that the quinine, which was purchased from the defendant on the 18th of June, "was largely adulterated with sulphate of cinchonine, an alkaloid comparatively valueless for those or most of those purposes for which quinine is specially employed." The defendant had sent a portion of quinine (which he said was from the same bottle as that which was sold to the county inspector, and analysed by the county analyst) to Dr. Attfield, of London, who, in giving evidence, declared that it was pure quinine. The stipendiary magistrate consequently directed that that which had been retained by Mr. Knight, the inspector, should, for his (Mr. Greenwood's) satisfaction, be forwarded to Dr. Paul for analysis, the case being adjourned in consequence. Mr. Thistlethwaite, magistrate's clerk, having read over the charge,

Mr. Fulford said: I wish to make one remark, and only one remark, in this case, for the purpose or calling your attention to the evidence for the defence before you give your decision. You will remember that the defence was that the sample of quinine sent to Dr. Attfield, for analysis, was from the same bottle as that which was analysed by Mr. Scott, the county analyst, and which had been purchased from Mr. Pearson, by the inspector. When you take into consideration the certificates of Dr. Paul and Mr. Scott, you can scarcely conclude that they analysed samples of the same article as that which was sent to Dr. Attfield. The defence was——

Mr. Tomkinson: I object to the learned counsel proceeding to discuss the question.

Mr. Greenwood: Dr. Paul's certificate is simply for my own guidance. You are supposed not to have seen it.

Mr. Tomkinson: It is only for your worship to give judgment in the case. My friend is out of place in making a remark. He has no right to say anything.

Mr. Greenwood: I don't think you can say anything, Mr. Fulford.

Mr. Fulford: Ignorance was the defence set up, and——

Mr. Tomkinson: The learned counsel wants to make out we do not know what we are doing. I think we have shown that we do know what we are doing.

Mr. Greenwood: The object of the adjournment was to have a third analysis. Owing to the totally different opinions of Mr. Scott and Dr. Attfield, I ordered an analysis to be made by Dr. Paul to enable me to come to a proper decision. A portion of the sample purchased by Mr. Knight, which he retained in his possession up to the hearing of the case at Tunstall, was sent to Dr. Paul, and I have received his certificate, which altogether confirms the certificate of Mr. Scott. In one respect all the three analysts—Mr. Scott, Dr. Paul, and Dr. Attfield—agree; and that is in saying, that if more than 1 per cent. of cinchonine were found in quinine it must have been added, and must be an adulteration. Dr. Attfield said what he analysed was perfectly pure quinine. Mr. Scott said he analysed a portion of the sample purchased from the defendant by Mr. Knight, and it was adulterated with cinchonine to the extent of 10 per cent. Upon those statements being made, I ordered the remainder of the sample purchased from the defendant, to be analysed by Dr. Paul, who agreed with Mr. Scott. I feel bound to say this case is similar in all respects to that of Pendleton's, wherein the article analysed by Mr. Scott was not of the same quality which the defendant got analysed by a chemist of his own selection. In the case of the analysis of Dr. Paul, it singularly confirms that of Mr. Scott; for, whereas the amount of adulteration was stated by Mr. Scott as 10 per cent., Dr. Paul said it was from 8 to 15 per cent. That suggests that the cinchonine had been added, and was not correctly mixed with the quinine; the portion sent to Dr. Paul being more seriously adulterated than that analysed by Mr. Scott. I cannot, therefore, help thinking, that as the article analysed by Mr. Scott was, without doubt, adulterated, the article sent to Dr. Attfield was so sent for the purpose of misleading the court. I am sorry to say I cannot help feeling this; and under these circumstances I shall have to impose a fine; but as it was not stated that the adulteration was injurious to health——

Mr. Fulford: I beg your pardon. It is "injurious," according to the statute. The statute makes any mixture of a drug, which is sold as a particular drug, nominally "injurious," though it may not be really injurious.

Mr. Greenwood: That was explained by Dr. Attfield, who, I think, if I remember rightly, said that 4 per cent. of quinine was equal to 5 per cent. of cinchonine.

Mr. Fulford: Making a difference in the price.

Mr. Tomkinson: The benefit to us would be about a farthing on the quantity sold, or even less than a farthing.

Mr. Greenwood: I feel it is my duty to fine the defendant 20s. and costs.

Mr. Tomkinson: Now the judgment is given in the case, I think it only right to say I shall advise Mr. Pearson, whom Mr. Knight admits to be one of the most respectable tradesmen in the district, to take proceedings against the persons from whom he purchased his drugs. He sold the quinine as he received it.

Mr. Greenwood: It is for you to take your own course. My only duty is to deal with the case as it comes before me, and that I have done.

Sale of Laudanum by a Grocer.

An inquest was held at Goole, Yorkshire, on Tuesday, July 21st, before Dr. Graham, Coroner, on the body of an infant named Elizabeth Stephenson, aged nine months. It was stated that the child was taken ill on the previous Friday, and the mother obtained a mixture for it from Mr. Ekam, grocer, the same evening. The child died on Sunday morning.

Mr. Ekam showed the Coroner the recipe for the medicine, from which it appeared that a pint of it contained two ounces of syrup of poppies and five drachms of laudanum.

The Coroner pointed out that the evidence showed the child had taken a teaspoonful of the mixture, or three drops of laudanum, without counting what was in the syrup of poppies, the proportion of which varied. He said it was certainly a dangerous mixture to sell for children.

Mr. East (assistant to Mr. Morris, surgeon), who saw the child after death, said he was of opinion that the child died from natural causes. He did not think the dose of the mixture given on Friday had caused the child's death on Sunday. At the same time the mixture was a very improper one for children.

The Coroner in summing up said that the law ought to put a stop to the sale of these medicines by unqualified persons. He considered that to this cause was attributable, in great measure, the excessive mortality amongst children.

The jury returned a verdict of "Death from natural causes," adding an expression of opinion that the medicine was not a proper one to be sold. At their request, Mr. Ekam was called in, and cautioned by the Coroner.—*Hull News.*

Alleged Attempt to Poison a Child.

Maria Shehan, 20, a servant, was on Monday charged on remand, at the Highgate Police Court, with administering poison to her illegitimate child.

The accused had been remanded for the additional evidence of Mr. Pitman, a surgeon, who had on the last examination been able to give but partial testimony as to the poisonous ingredient said to have been mixed with the milk given to the child of the accused. Mr. Pitman now deposed that when the infant was brought to him by a nurse, to whom the mother had confided it, it was suffering apparently from some irritant poison. Witness had since analysed the milk left in the bottle, and found that it contained bicarbonate of soda in considerable quantity. In one dose this would not be fatal, though it would upset the stomach. The analysis showed that in one ounce of fluid there were 30 grains of bicarbonate of soda. He was not aware that any fatal case of poisoning had arisen from bicarbonate of soda, but it was undoubtedly an irritant poison. He did not think what was said to be the whole contents of the bottle while in prisoner's possession—about six ounces of fluid—would have destroyed life in one dose. Repeated doses would injure the coats of the stomach. It was not deadly poison, but it was an irritant. It would not prove fatal in the proportion given unless repeated doses were given at short intervals.

It was submitted there was not sufficient evidence on which to commit the prisoner, but the magistrates, after receiving some further formal evidence, remanded the prisoner for the attendance of Mr. Bodkin, who first heard the case.—*Daily Telegraph.*

Correspondence.

*** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

J. A. C. B.—The next examination in London, which will be held in October, will be conducted according to the new regulations.

"*Sussex.*"—Syrupus papaveris is in some districts sold as Syrupus corum, "corum" being possibly a corruption of "Diacodion."

J. H. Thring.—We think the precipitate will be principally pure quinia, separated by the slight alkalinity of the salts, and probably mixed with a little oxide of iron, as aqueous solutions of commercial citrate of iron and quinine deposit a little of this when kept a short time.

[We are compelled by want of space to postpone notices of several communications.]

Communications, Letters, etc., have been received from Mr. J. Barker, Mr. Cardell, Mr. Bennett, Mr. Hill, Mr. Smith, Mr. Druce, Mr. Bartholomew, Mr. White, Mr. Long, Mr. Hustwick, Mr. Balcomb, Mr. Carent, Mr. Shenstone, Mrs. Hart, T. P. B., W. R., F. C., A. J. R., F. A. B., R. M., W. W. W., X. Y. Z., G. B. "Young Man from Country," "Apron."

The Pharmaceutical Journal.

SATURDAY, AUGUST 22, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ENGLISH AND AMERICAN HONOURS TO PRIESTLEY.

IF it be true of individual gratitude that it is sometimes a lively sense of favours to come, it is equally true of public gratitude that it is generally a tardy recognition of favours received. It appears to be the present fashion to scrutinize the benefits conferred upon the world in a past century, and every now and then to give vent to the accumulated gratitude of a hundred years in a centennial festival, or a statue, or both. One good result of this apparent negligence is, that the "judgment of posterity," so often appealed to, comes into play, and that many men who were opposed, despised, or ignored by their contemporaries are thus brought into the front rank, to the displacement of others whose reputation was temporarily inflated by circumstances. This is eminently true of the man, JOSEPH PRIESTLEY, who, one hundred years since, was the first to discover oxygen; who, a few years afterwards withdrew from the violence of his fellow townsmen and the ostentatious neglect of his scientific brethren to seek a home beyond the Atlantic; though the England of to-day points with pride to his birthplace as America does to his grave.

As was fitting, it is in Birmingham, where intolerant ignorance reduced PRIESTLEY's house to ashes that his statue is now set up in marble. Professor HUXLEY pronounced the *éloge* of the chemist, philosopher, politician, and theologian, and no one could have done it more appropriately It is chiefly in the first of these capacities that the world of to-day is influenced by PRIESTLEY; although there appears to have been sufficient *odium theologicum* displayed at Birmingham—by abstention on one side and castigation on the other—to suggest that it would be necessary to adopt the recent example of Ireland, and hold millennial celebrations, if they are to be conducted quite dispassionately.

It is not without interest to pharmacists to note that the details of the discovery of oxygen might almost be described in the words of one of the present Pharmacopœia tests. The apparatus consisted of of a phial filled with mercury, into which PRIESTLEY had introduced a substance then called "mercurius calcinatus per se," now known as red precipitate. This substance floated upon the top, and was exposed to the sun's rays, concentrated by means of a lens. Let him continue the story in his own words—

"I presently found that, by means of this lens, air was expelled from it very readily. Having got about three or four times as much as the bulk of my materials, I admitted water to it, and found that it was not imbibed by it; but what surprised me more than I can express was that a candle burned in this air with a remarkably vigorous flame, very much like that enlarged flame in which a candle burns in nitrous air, exposed to iron or liver of sulphur; but as I had got nothing like this remarkable appearance from any kind of air besides this particular modification of nitrous air, and I knew no nitrous acid was used in the preparation of *mercurius calcinatus*, I was utterly at a loss how to account for it. In this case also, though I did not give sufficient attention to the circumstances at that time, the flame of the candle, besides being larger, burned with more splendour and heat than in that species of nitrous air; and a piece of red-hot wood sparkled in it exactly like paper dipped in a solution of nitre, and it consumed very fast—an experiment which I had never thought of trying with nitrous air."

Simultaneously with the celebration in Birmingham, on the 1st of the present month, the centenary of the discovery of oxygen—or "oxygen day" as it has been named—was commemorated in the United States by a gathering of chemists and other scientific men at Northumberland, Pennsylvania, within sight of which town is PRIESTLEY's grave. We learn from newspapers just received that the proceedings commenced on the 31st July, under the presidency of Professor C. F. CHANDLER, and lasted during two days. Among the incidents of the meeting were an exhibition of relics associated with PRIESTLEY's philosophical labours; an address on his life and labours, by Professor CROFT, of Toronto; a review of a century's progress in theoretical chemistry, by Professor STERRY HUNT, and another of a century's progress in industrial chemistry, by Professor J. LAWRENCE SMITH; whilst Professor SILLIMAN read an essay on American Contributions to Chemistry. A "memorial address" was delivered in the cemetery by Dr. HENRY COPPEE.

The meeting at Northumberland was formally adjourned to the 1st of August, 1974. What science may accomplish before that day arrives none can guess; what is possible is suggested by the words of Professor HUXLEY, that JOSEPH PRIESTLEY's time was "before the day of LAPLACE, before the day of DAVY, before the day of FARADAY, before the day of HUTTON, in geology; and that he was contemporaneous with the time when LINNÆUS was bringing botany from chaos into order."

THE BRITISH ASSOCIATION.

ON another page will be found the address of Professor TYNDALL to the members of the British Association, at Belfast, on Wednesday evening. As an eloquent exposition of the antiquity of the doctrine of atoms and summary of the arguments in favour of the more modern theory of evolution, it will be read with interest, but towards the solution of the problem of the origin of life it cannot be said to contribute much. "Though Dr. TYNDALL may "prolong the vision backward across the boundary "of the experimental evidence, and discern in that "Matter which we in our ignorance, and notwith- "standing our professed reverence for its Creator, "have hitherto covered with opprobrium, the promise "and potency of every form of Life," he will still be confronted by the question, how came that Life there?

It is reported that the number of members in attendance at the meeting of the Association is about fourteen hundred, and that, notwithstanding the promise that there would be no increase in the ordinary charges for accomodation, the demands range from ten to twenty shillings per night. This obnoxious extortion is now becoming so systematic as to constitute a serious impediment to that promotion of science which is the aim of the British Association, and we think it would be worthy of its leaders to endeavour to put a stop to the practice.

THE INTERNATIONAL PHARMACEUTICAL CONGRESS AT ST. PETERSBURGH.

THE fourth international congress of pharmaceutists was commenced at St. Petersburgh, on Friday, the 14th inst., by an address from Mr. Privy Councillor TRAPP, Director of the Pharmaceutical Society in that city. Twelve different Societies were represented by seventeen delegates. Unfortunately, the delegates from the German General Pharmaceutical Society, were, at the last moment, prevented from attending through a convocation of a pharmaceutical *enquête-commission* by the German Chancellorate.

After being reminded by Mr. TRAPP that the principle followed in former Congresses was to choose an apothecary in actual practice as president, the Congress proceeded to the election of officers, with the following result:—President of the Congress, Dr. v. WALDHEIM, of Vienna (Austrian Pharmaceutical Society); Vice-Presidents, Messrs. MADSEN, of Copenhagen (Danish Pharmaceutical Society), and TRAPP, of St. Petersburgh. The Secretaries chosen were Dr. MÉHU (Société de Pharmacie, Paris); Mr. F. SUTTON (Pharmaceutical Society of Great Britain); Mr. JANAUSCHECK (Pharmaceutical Society, Prague); and Mr. RENNARD (Pharmaceutical Society, St. Petersburgh).

It was unanimously decided that German should be the "business language," and that Question 3 in the programme (Is it necessary that a professorship of pharmacy should be held only by a pharmacist?) should be forthwith discussed. Questions 1 (the responsibility of assistants), 2 (committee of revision) and 4 (International Pharmacopœia), were remitted to the previous consideration of committees. After the discussion had concluded it was resolved unanimously, that "It is very desirable that the professorships of pharmacy should be held by pharmaceutists, and it is further desirable that, where circumstances will allow, there should be two chairs, one for materia medica and one for pharmaceutical chemistry."

We hope to be able next week to give a further report of the proceedings of the Congress.

THE Meeting of the American Pharmaceutrical Association for 1874 will be held in the city of Louisville, Kentucky, on Tuesday, 8th September, under the presidency of Mr. JOHN F. HANCOCK, of Baltimore.

THE statement on p. 139 of our last issue, respecting the portrait by MILLAIS was incorrect. The picture in question was kindly lent for the occasion by the President.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE

(*Continued from page* 138.)

On the Conference re-assembling, Professor ATTFIELD read the following paper by Professor Flückiger:—

ON THE CHEMISTRY OF ELEMI.

BY PROFESSOR FLÜCKIGER,

of Strassburg, Hon. Member of the Pharmaceutical Society of Great Britain.

Towards the year 1820, George Samuel Perrottet, a Swiss botanist, then a collector for the Jardin des Plantes at Paris, brought to Lausanne, from Manilla, a specimen of the resin of a tree known in the Philippines as *Arbol-a-brea*, i.e., *Pitch-tree*. The tree is thus called on account of its abundant resin, which is much used in the Philippines for the caulking of boats, for torches, and also in medicine, but the resin does not appear to have been at that time collected for exportation.

At Lausanne this resin was examined by the distinguished chemist, Samuel Baup, who found it to have "*un peu de ressemblance avec la résine élémi.*" It is, in fact, nothing else than that kind of elemi which is now largely exported from Manilla, and has long superseded the other sorts of this drug, which had successively made their appearance in the European market. I am not aware of the exact period at which Manilla elemi first reached Europe in large quantities, yet Baup, in his paper, "*Sur les Résines de l'Arbol-a-brea et de l'Elémi,*" contained in the *Journal de Pharmacie et de Chimie*, vol. xx. (1851), pp. 321-332, was not of the opinion that Perrottet's specimen agreed with elemi as then found in commerce. We may, however, presume that Baup was no longer thoroughly familiar with the drug market, since he had in 1823 already retired from practical pharmacy. But there is another fact which seems to me in favour of Baup's opinion that the elemi of his time was not that from Manilla. The essential oil of elemi was found, in 1841, by H. Sainte-Claire Deville,* to be strongly levogyre and to yield easily a crystallized compound, $C_{10}H_{16}+2\,HCl$, whereas elemi of Manilla, which I have repeatedly examined, affords a *dextrogyre* oil, incapable of yielding this solid hydrochlorate. This, I think, is sufficient to show that in 1841 Manilla elemi was not yet the prevalent sort, or, at least, that Deville's drug was not such. I had the opportunity, on the other hand, of examining a small fragment of the very substance which came into Baup's possession,† and think it agrees with the Manilla elemi of the present market, only differing from the latter in being *black*. This is due to the smoke of the torches, which were applied to the tree in order to promote the outflowing of the oleo-resin. As to the *Arbol-a-brea*, and its botanical characters, nothing precise and satisfactory has yet been made out.

Among the substances isolated from Manilla elemi by Baup, I shall notice now only those *soluble in water*, which he termed *Bryoidin* and *Breïdin*. He obtained them in the following way:—As elemi consists chiefly of essential oil, a crystallizable resin sparingly soluble in cold alcohol, and an amorphous resin easily removable by the latter liquid, Baup first boiled the drug with alcohol of 90-95 per cent. On cooling, the colourless crystallizable resin (*la sous-résine*) is deposited, and may be washed with cold alcohol of 85 per cent. These crystals were called *amyrin*, because at that time a Brazilian tree, *Amyris elemifera* Linn., was thought to furnish the elemi of commerce; and Baup regarded the amyrin

* *Comptes Rendus*, vol. xii. (1841) p. 184.

† I am indebted for it to Mr. Roux, late pharmacien of Nyon, Lake of Geneva, the author of '*Notice biographique sur Samuel Baup, chimiste*' in the *Schweizerische Zeitschrift für Pharmacie*, December, 1862, Appendix.

obtained from the latter as identical with the crystallizable part of the oleo-resin from the Philippines. The alcoholic solution, separated from the amyrin, was then submitted to distillation, in order to drive over the essential oil and the alcohol. The residue in the still consisted of the soft amorphous brownish resin, and a turbid, aqueous liquid. The latter was decanted, the resin repeatedly washed with alcohol of only 50 per cent. (about ·916 sp. gr.); the mixed liquids were then evaporated, to deprive them of essential oil and alcohol. Finally, a brown, oily aromatic* mass separated and sunk, while, upon cooling, delicate, white needle-shaped or moss-like crystals made their appearance, and were termed by Baup *Bryoidin*. The liquid, on further evaporation, separated into two layers, of which the heavier proved to contain chloride of potassium and other inorganic salts; the upper thickish layer (resembling the before-mentioned "aromatic" mass) afforded, when boiled with a little water, some more bryoidin. These latter crops of crystals, after repeated purification by water, finally gave crystals of a substance which, according to Baup, did not agree with bryoidin, and he therefore distinguished it as *Breïdin*.

The characters of the two substances are thus described by Baup—*Bryoidin* is a little *bitterish* and somewhat acrid; its silky crystals may be sublimed between two watch-glasses, when they form moss-like tufts. The crystals melt at 135° C.; they require, at 10°, 350 parts of water for solution. This solution is neutral; acetate of lead, either neutral or basic, produces in it a precipitate. Bryoidin is much more abundantly soluble in alcohol, ether, essential or fatty oils, or acetic acid. With concentrated sulphuric acid it assumes a red colour.

Breïdin, according to Baup, is in prisms, exhibiting angles of 102° and 78°, and terminating in four-sided pyramids; 260 parts of water, at 10°, are sufficient to dissolve one part of breïdin; and the solution is precipitated by basic acetate of lead. Breïdin is freely soluble in alcohol, not much so in ether. The crystals melt at a little over 100° C., and are volatile, like those of bryoidin. These characters are, it will be observed, no very well marked differences between the two substances, and I believe that they are not really different at all.

I am not aware that any chemist attempted to repeat Baup's observations until last winter, when my friend, Mr. Hanbury, caused to be distilled a quantity of Manilla elemi, and took the opportunity of examining the watery liquor remaining in the still for bryoidin. He succeeded perfectly in obtaining this substance in colourless crystals, by a method which we have described in the work on drugs which is about to appear under our joint authorship. Since those observations were printed, I have carried on the experiments a little further, and, after various trials, have adopted the following as the best process for extracting bryoidin, as it appeared evident that weak alcohol is a good solvent of bryoidin. I placed four kilogrammes of elemi in a copper still, and had it gently warmed in the water-bath for a day or two, with twenty kilogrammes of alcohol of ·972 sp. gr., that is to say, a weak spirit containing but 22 per cent. of alcohol. The essential oil which came over was separated, and the spirit of wine, from which it was removed, was returned to the still. After this operation had been sufficiently carried on, the still contained a solid resin, and a weak alcoholic solution, *A*. The resin was now boiled for a day with much water, and afforded another portion of essential oil, which I found to be dextrogyre, like that obtained by means of dilute alcohol.† The water in the still (*B*) was separated, and the resin warmed with about twelve kilogrammes of alcohol, sp. gr. ·830, and two kilogrammes of water. After cooling, the liquid (*C*) contained the amorphous resin, the other resin being deposited in white crystals, agreeing with Baup's *Amyrin*.

In order to get bryoidin, I submitted the liquid *A* to distillation, and subsequently evaporated the merely aqueous liquid from which the alcohol had been abstracted. During the evaporation a very small amount of crystallized amyrin, contaminated with a trace of the amorphous resin, first separated. The weakness of the alcohol which had been used prevented any larger amount of resin being dissolved. It is important not to evaporate at once all the liquid *A*, and especially not to allow it to boil. After having tried the preparation of bryoidin in different ways, I came to the conclusion that the best plan is to evaporate on the water-bath small successive portions of the liquid until they begin to yield crystals of bryoidin floating on the surface. The liquid should then be allowed to repose for 24 hours, when the bryoidin can be removed from it, the mother liquid being reserved for further evaporation. By heating the solutions to full ebullition, bryoidin itself would evaporate to some extent. By gradual evaporation as just described, it is obtained at once in a state of approximative purity. But if the concentration of the liquid is carried on without separating the crystals as soon as they appear, the final purification of the latter becomes difficult by reason of another principle occurring in elemi. This is a brown *bitter substance* which is more abundantly soluble in water than bryoidin. In the treatment of elemi just recommended, this bitter substance is contained in the aqueous liquid *A*, together with bryoidin. If this liquid is concentrated, brown drops of the bitter substance separate at a certain moment, and form a thickish resinoid deposit. Now, if the crystals of bryoidin have not been taken out of the liquid, they will be enveloped and thrown down by this resinoid matter, and can only be recovered therefrom with some difficulty.

As to the liquid *B*, I have evaporated it with the same care, and got from it a little bryoidin, yet scarcely enough to repay the trouble. The same must be said with reference to the solution *C*; if this is deprived of alcohol, the amorphous resin separates, but the aqueous liquid proves poor in bryoidin. As a rule, I cannot therefore recommend to include the liquids *B* and *C* in the process. The whole amount of bryoidin which I have been able to remove from elemi scarcely exceeds ·3 per cent., that is to say, of nearly pure bryoidin; its appearance in the mother-liquors is much more promising, owing to its extreme lightness and flocculent aspect.

To purify bryoidin, it must be repeatedly re-crystallized from boiling alcohol of 22 per cent. At first the solutions are slightly brownish, a little turbid, bitterish in taste, and yield precipitates with tannic acid or with neutral acetate of lead. All this is but due to traces of the bitter principle, for after several re-crystallizations, using also a little charcoal, the solutions become colourless, perfectly clear, weaker in taste, and miscible with either neutral or basic acetate of lead, without being precipitated. The final yield of pure bryoidin is unfortunately much reduced by purification. Instead of the voluminous moss-like tufts obtained in the earlier stages of the operation, bryoidin may be at last got in brilliant prisms by allowing the solution to evaporate spontaneously. This is, I think, the substance that Baup called *Breïdin*. I have been unable to find any real difference between it and my bryoidin; under the microscope the prisms display a remarkable tendency to split longitudinally, which is well in accordance with the usual moss-like growth of the substance. The latter shows under the microscope very long, soft, thread-like crystals. In polarized light the crystals are seen to be refractive; they consequently do *not* belong to the cubic system.

There can be no doubt that Baup's observations are correct; yet it is evident that some of the properties he assigned to bryoidin apply to the imperfectly purified substance; his investigation must nevertheless be com-

* Its peculiar smell is not at all that of the original essential oil of elemi.

† See *Pharmacog.*, p. 132, where we already stated another sample of oil of elemi to deviate also to the right hand.

mended as a remarkably successful one,* when it is considered that he had but very little of the "*Resin of the arbol-a-brea*" at his command.

At 135°—136° C., bryoidin melts, and at a more elevated temperature can easily be sublimed; it volatilizes in fact below 100°, so that very nice tufts are produced by exposing it for some days to the heat of the water-bath only. The crystals are anhydrous, giving off no water, either over sulphuric acid or at 100° C. They are readily soluble in alcohol, bisulphide of carbon, chloroform, ether, acetic acid, also in essential oil of elemi or glycerin; their solubility is not increased by the presence of alkalies or acids. Cold concentrated sulphuric acid slowly dissolves bryoidin, and assumes, when warmed with it, a reddish hue. By cold nitric acid, bryoidin is liquefied and forms brownish drops not soluble in the acid.

Bryoidin purified by repeated re-crystallization and sublimation assumes a fine red colour if it is exposed to dry hydrochloric gas; it is subsequently liquefied, and turns violet, then a most brilliant *blue*, and lastly an intense *green* being developed. The colours are permanent for several days; the liquids are soluble in chloroform, yet I have not succeeded in getting a solid compound by the hydrochloric treatment. These reactions are not at all displayed by amyrin, the before-mentioned crystallizable resin of elemi. As to the amorphous part of the drug, it turns only a little reddish by hydrochloric gas, probably on account of a trace of bryoidin which it obstinately retains. The essential oil of elemi, if saturated with anhydrous hydrochloric gas, assumes a dark violet tint.

I have failed in ascertaining satisfactorily the solubility of bryoidin in water. I found one part of it to be contained in 384 parts of a solution saturated at 28—30° C.; but another solution prepared at 25° C. afforded one part of bryoidin in 492 parts. A solution prepared by boiling water with bryoidin in excess, and then allowed to remain for a week that the crystals should deposit, yielded one part in 523 parts of the solution. In every case the solutions were carefully concentrated at a temperature not exceeding about 70° C., and then fully evaporated over sulphuric acid. The loss of bryoidin to any appreciable amount was thus avoided. I think the discrepancies are due to the formation of supersaturated solutions.†

In boiling water, bryoidin is not much more soluble than in cold, for 200 parts of it are able to dissolve but one of bryoidin, of alcohol 22 per cent. (0·972 sp. gr. at 15° C.) 147 parts dissolve one of bryoidin at 28° C., yet much more when warmed. The solutions taste aromatic.

The analysis of bryoidin afforded, on an average, carbon, 74·21 per cent., and hydrogen, 11·52; these numbers may refer to the formula, $C_{20}H_{38}O_3$, namely:—

				Analysis.
20 C	240	equal to	73·62	74·21
38 H	38	„	11·65	11·52
3 O	48	„	14·73	14·27
	326		100·00	100·00

Thus bryoidin may be regarded as a hydrate of the essential oil contained in elemi, that is to say, as answering to the composition—$2(C_{10}H_{16}) + 3\,H_2O$; yet it must be borne in mind that it contains no water of crystallization. By submitting it to sublimation it undergoes no alteration, as already proved by its melting-point remaining the same as before, namely, 135°—136° C. This view is supported by the composition of the amyrin, which I believe to answer to the formula, $C_{20}H_{34}O$. This substance might be regarded as $C_{20}H_{32} + H_2O$, and bryoidin, $C_{20}H_{32} + 3\,H_2O$; there can be but little doubt that elemi will also afford the intermediate compound, $C_{20}H_{32} + 2\,H_2O$.

In its general behaviour, bryoidin resembles terpin, $C_{10}H_{16} + 3\,H_2O$, the crystallized hydrate of essential oil of turpentine, or rather of the substance $C_{10}H_{20}O_2$, which is obtained when terpin, by melting, parts with H_2O, that is, losing 9·47 per cent. This anhydrous terpin melts at 150°, and is soluble in 200 parts of cold, or 22 parts of boiling water, and freely soluble in all alcoholic or ethereal liquids. There are, however, great differences between bryoidin and terpin. By boiling the latter with very little dilute sulphuric acid, *Terpinol*, $C_{20}H_{34}O$, a fragrant liquid, is formed. No such thing is produced with bryoidin. Nor is terpin coloured by hydrochloric gas. Again, if bryoidin is brought into contact with acetyl chloride, a very energetic action and effervescence takes place, whereas terpin quietly dissolves, so does likewise amyrin.

Bryoidin and terpin agree inasmuch as they are volatile and, in solution, devoid of rotatory power, although both these compounds are derived from essential oils, $C_{10}H_{16}$, which possess that optical characteristic.

It would appear possible that the constituents of elemi may be allied thus:—

Essential oil	$C_{10}H_{16}$
Crystallized resin (elemin or amyrin)	$2(C_{10}H_{16}) + H_2O$
Amorphous resin (?)	$2(C_{10}H_{16}) + 2\,H_2O$
Bryoidin	$2(C_{10}H_{16}) + 3\,H_2O$

But further researches are needed to prove the correctness of this suggestion.

The *bitter substance* already mentioned is by no means abundant in elemi, though it appears to be present to a somewhat larger amount than bryoidin. I have in vain endeavoured to isolate from it a well-defined compound. The resinoid brown mass, which at last separates from the concentrated aqueous solutions, *A* or *C*, has a very intensely bitter, and at the same time aromatic, non-acrid taste. The latter reminds one of orange peel, and is certainly due to the substance itself, not to essential oil of elemi. An entirely different and strong odour is evolved by the bitter mass, if it is boiled with dilute sulphuric, nitric, or hydrochloric acid. In this case, the odour is somewhat suggestive of melon, caraway, or especially of a fresh terebinthinous varnish. By this treatment with acids, the bitter taste disappears; I have not been able to ascertain whether sugar is, at the same time, produced, because the brown bitter mass would appear already to contain some sugar, seeing that it is capable, to a small extent, of reducing alkaline tartrate of copper. If the bitter mass is warmed with a moderately concentrated mineral acid, it assumes an intense violet or blue colour, and is also coloured in the same way by dry hydrochloric gas. From a solution in dilute alcohol, the bitter semi-fluid mass is partially thrown down by absolute alcohol; yet this precipitate proves to be by no means a pure substance. Its aqueous solution is partly precipitated by tannic acid or by neutral acetate of lead, another portion remaining unaltered in solution. I have failed in removing from the bitter substance the inorganic matters which, as shown by incineration, it largely contains. Baup was well aware of the large amount of mineral substances occurring in the extracts of elemi; in fact they appear to constitute the chief amount of the brown bitter deposit.

The PRESIDENT: This paper of Professor Flückiger's is another instance of his laudable zeal in pharmaceutical chemistry. Elemi is a resin now very rarely used, but I think it might often replace to advantage the common resin. We are very glad to hear the chemistry of it, and we must thank Professor Flückiger for so fully investigating it. I beg to propose that you accord to Professor Flückiger a vote of thanks for his paper.

The vote of thanks was carried.

Mr. D. HANBURY: It is rather difficult to follow the

* Like many others due to that zealous man; we may quote, for instance, his valuable contributions to the knowledge of quinine, cinchonine, kinic acid, citric acid, aconitic acid, and equivalent numbers. Baup was born 15th May, 1791, at Vevey, on the Lake of Geneva, and died 9th February, 1862, at Lavaux, not far from the former place. In 1816 he paid a visit to London, and saw Brodie and Brande.

† To this circumstance may be due the remarkable separation of *flocks*, described in our *Pharmacographia*, p. 134.

details in a paper on this subject, and therefore I may perhaps be excused for making a remark with the object of simplifying some of the explanations given. When I prepared the substance on the table, I was not aware of all the facts subsequently discovered by Professor Flückiger. I obtained bryoidin by simply evaporating the watery liquid in the still, after obtaining the essential oil of elemi. In this way, I got colourless crystals, which, by a little special manipulation, were obtained in a state of comparative purity. One of the most interesting characters of bryoidin is the easy way in which it sublimes. If you put a little of it into a watch glass, cover it with a piece of window glass, and then hold it over the flame of a lamp or a candle for a few moments, the substance will collect upon the upper glass in beautiful minute crystals. Professor Flückiger alludes to the curious separation of *flocks* which takes place, and I may perhaps explain what it is. When you obtain a crystallization of bryoidin from water, there is of course a mother liquor left, and when it is poured off and filtered, you have a perfectly clear solution; if you heat this solution, it immediately becomes turbid, and deposits what looks like pieces of white paper or wool. It is a curious circumstance, and occurs, I suppose, through the supersaturation which is alluded to. If you examine this substance, it will be seen to consist of filamentous crystals which do not redissolve either by heating or cooling. With regard to amyrin, that is easily prepared, not only from Manilla elemi, but from other varieties. If you take the elemi of South America or Mexico, and treat it with cold spirit of wine, a white matter separates, which is wonderfully crystalline, and may be readily purified and obtained in distinct crystals: that is amyrin, and, as far as we know, is the same in the elemi from these different sources. It is a beautiful example of crystallizable resin, and one that may be easily investigated by students.

Note on Pomegranate Root-Bark.

BY DR. J. E. DE VRIJ.

Dr. De Vrij then called the attention of the Conference to the different opinions existing as to the efficacy of pomegranate root-bark. Formerly the bark collected in the South of France or in Italy enjoyed a good reputation. Some were of opinion that the real root-bark had gradually been substituted by the stem-bark. Others were of opinion that fresh root-bark ought to be used. Others supposed that only the root-bark grown in India was efficacious. Lately he (Dr. De Vrij) heard in a meeting of physicians the assertion that only the extract made in India from fresh root-bark was efficacious. As he did not agree with all these opinions, and his own opinion was that all *real* root-bark, wherever collected, is efficacious, he used root-bark collected by himself, in 1863, in Java, and consequently eleven years old, to prepare an extract by percolation with cold water. He obtained 40 per cent. of extract, of which 56 pills, each of one grain, were sufficient to expel a tapeworm nine metres long. Every quarter of an hour seven pills were administered, so that the cure was terminated within two hours.

Mr. W. W. Stoddart: Dr. De Vrij's paper is very valuable in two particulars; first of all it is a singular thing that we in Bristol use the pomegranate bark rather extensively, especially with foreigners who come to Bristol, and who use it for dysentery. I should like to ask if the head of the tapeworm came away in the specimen shown?

Dr. De Vrij: Yes, it has been examined.

Mr. W. W. Stoddart: In the second place I have to thank Dr. De Vrij for corroborating my view, which I mentioned here two or three years ago with reference to percolation. You get the powder, mix it up into a thin cream, put it into the percolator, and then put water on the top. When I mentioned that process before, several gentlemen thought it was not practicable, but I am glad to find that Dr. De Vrij agrees with me that it is the proper mode of percolation.

The President: We will not diverge into the question of percolation, which would last us a whole day, but Dr. De Vrij has done very much to rehabilitate the character of this pomegranate root-bark, and we are very thankful to him for his experiments. He says it is not necessary to use the fresh root-bark, although that has been the opinion of many. Only the other day my brother wrote to me with regard to the Italian herbs in popular use, saying that their idea was that the root-bark, to be efficacious, should be fresh; that, however, appears to be erroneous. It is really wonderful to me that the tapeworm should exist at all, considering the number of remedies we have, and it is to be hoped that some day we shall abolish the animal altogether.

Mr. Hanbury: We must remember that it has not its sole habitat in man, but has a variety of homes to which it can retire to get out of the way.

Dr. De Vrij: I should like to know if tapeworm is very frequent in England.

Mr. W. W. Stoddart: It is, very.

Dr. De Vrij: I supposed it must be so, because I notice that you like to eat underdone meat. I have never suffered from tapeworm, but I have known those who do, and who are accustomed to eat underdone meat, and therefore I asked if it was frequent in England.

Mr. W. W. Stoddart: I can speak positively on the subject, because some experiments were made in Bristol some six years ago upon it. I had then an opportunity, from the house in which I lived, of seeing a butcher's shop; and it was there a very frequent occurrence for the boy to cut off bits of meat and eat them raw; and it was also a curious fact that those boys had often suffered very much from tapeworms. Besides that, Dr. Brittan, Physician to the Bristol Infirmary, some time ago took up the subject, and prepared a paper upon it for the Microscopical Society of Bristol. He told his colleague he wished to find out whether eating raw meat induced tapeworm; and on a certain morning he gave to several patients attending the infirmary two drachms of the extract of male fern, and directed them to come back on a certain morning, and if any of them had passed tapeworms, to bring them. The result was that there was something like two buckets full of tapeworms. The patients were principally cooks, and, upon being questioned, they confessed they were in the habit of cutting off bits of raw meat and eating them before cooking. This corroborated Dr. Spencer Cobbold's observation, that tapeworm did not arise so much from eating pork as from eating beef.

Dr. Frazer: The subject of tapeworm has attracted a great deal of attention lately in Ireland, but until I began my researches hardly any tapeworm was known there, except the one derived from the swine, the *Tænia solium*. It was very rarely that one met with the *T. mediocanallata*, and in one case only, and that a very remarkable one, was there found a *Trichocephalus*. The case was remarkable, because the person affected had never been out of the United Kingdom. I may say authoritatively that, if properly used, the *Filix mas* extract is undoubtedly a perfectly effectual cure, though the worm is not expelled alive, but dead.

Mr. Siebold: The comparative merits of the various remedies for tapeworm have been discussed many times, and there seemed as many different opinions expressed. But Dr. Küchenmeister, who is one of the greatest authorities upon the subject, maintains that the Cortex radicis granati is the most successful of all. He also points out that it is very essential that it should be boiled at least six hours in water. Certainly, his experiments show a very remarkable degree of success. Still there is no doubt the male fern and its preparations are exceedingly valuable. But there seems to be a vast difference between the *Filix mas* which we get in our shops, and the fresh article. There is a woman living in Hamburg who advertises to cure every one of tapeworm within twenty-four hours, and she does certainly do so, for I have known scores of cases where people who had made many unsuccessful attempts to discharge the worm went there, and came back completely cured. Her secret is only, I believe, that she cultivates in her own garden the *Filix mas*, and administers it in its fresh state, and I have never heard of a single failure. The worst remedy of all seems to be kousso, which generally causes the worm to be discharged in small pieces without the head.

Mr. Hanbury: I do not understand how the fresh rhizome can be administered.

Mr. Siebold: I believe it is scraped with a knife so as to get a kind of coarse powder or paste, then an infusion is made with warm water, and after the infusion is cool, more powder is stirred in. I cannot state that positively, because all my knowledge is derived from patients, who, of course, are not very familiar with the *modus operandi*. I may add that the dose of male fern given in the Pharmacopœia seems very small; it is only fifteen to thirty minims. I believe one or two drachms are required as a rule to produce a successful result.

(*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The forty fourth Annual Meeting of the British Association for the Advancement of Science was commenced at Belfast, on Wednesday, by a meeting of the General Committee in the College Library.

Resignation of the Treasurer.

The report of the Council and of the Treasurer were received and adopted. In the former was announced the intention of Mr. Spottiswoode, F.R.S., to resign the office of Treasurer, which he has held for thirteen years. The resignation was received with a general expression of regret, and a vote of thanks to Mr. Spottiswoode was passed upon the motion of Mr. Bramwell, F.R.S., seconded by Dr. Gladstone. It was then agreed to elect Professor Williamson to the vacant office.

Professor Tyndall's Inaugural Address.

A General Meeting was held in the evening, at the Ulster Hall, which was entirely filled. Professor Williamson, the retiring President, briefly introduced his successor, Professor Tyndall, who proceeded to deliver the following address:—

Ladies and Gentlemen,—

An impulse inherent in primeval man turned his thoughts and questionings betimes towards the sources of natural phenomena. The same impulse, inherited and intensified, is the spur of scientific action to-day. Determined by it, by a process of abstraction from experience we form physical theories which lie beyond the pale of experience, but which satisfy the desire of the mind to see every natural occurrence resting upon a cause. In forming their notions of the origin of things, our earliest historic (and doubtless, we might add, our prehistoric) ancestors pursued, as far as their intelligence permitted, the same course. They also fell back upon experience, but with this difference—that the particular experiences which furnished the weft and woof of their theories were drawn, not from the study of nature, but from what lay much closer to them, the observation of men. Their theories accordingly took an anthropomorphic form. To supersensual beings, which, "however potent and invisible, were nothing but a species of human creatures, perhaps raised from among mankind, and retaining all human passions and appetites,"* were handed over the rule and governance of natural phenomena.

Tested by observation and reflection, these early notions failed in the long run to satisfy the more penetrating intellects of our race. Far in the depths of history we find men of exceptional power differentiating themselves from the crowd, rejecting these anthropomorphic notions, and seeking to connect natural phenomena with their physical principles. But long prior to these purer efforts of the understanding the merchant had been abroad, and rendered the philosopher possible; commerce had been developed, wealth amassed, leisure for travel and for speculation secured, while races educated under different conditions, and therefore differently informed and endowed, had been stimulated and sharpened by mutual contact. In those regions where the commercial aristocracy of ancient Greece mingled with its eastern neighbours, the sciences were born, being nurtured and developed by free-thinking and courageous men. The state of things to be displaced may be gathered from a passage of Euripides quoted by Hume. "There is nothing in the world; no glory, no prosperity. The gods toss all into confusion; mix everything with its reverse, that all of us, from our ignorance and uncertainty, may pay them the more worship and reverence." Now, as science demands the radical extirpation of caprice and the absolute reliance upon law in nature, there grew with the growth of scientific notions a desire and determination to sweep from the field of theory this mob of gods and demons, and to place natural phenomena on a basis more congruent with themselves.

The problem which had been previously approached from above was now attacked from below; theoretic effort passed from the super- to the sub-sensible. It was felt that to construct the universe in idea it was necessary to have some notion of its constituent parts—of what Lucretius subsequently called the "First Beginnings." Abstracting again from experience, the leaders of scientific speculation reached at length the pregnant doctrine of atoms and molecules, the latest developments of which were set forth with such power and clearness at the last meeting of the British Association. Thought, no doubt, had long hovered about this doctrine before it attained the precision and completeness which it assumed in the mind of Democritus,* a philosopher who may well for a moment arrest our attention. "Few great men," says Lange, in his excellent 'History of Materialism,' a work to the spirit and the letter of which I am equally indebted, "have been so despitefully used by history as Democritus. In the distorted images sent down to us through unscientific traditions there remains of him almost nothing but the name of 'the laughing philosopher,' while figures of immeasurably smaller significance spread themselves at full length before us." Lange speaks of Bacon's high appreciation of Democritus—for ample illustrations of which I am indebted to my excellent friend Mr. Spedding, the learned editor and biographer of Bacon. It is evident, indeed, that Bacon considered Democritus to be a man of weightier metal than either Plato or Aristotle, though their philosophy "was noised and celebrated in the schools, amid the din and pomp of professors." It was not they, but Genseric and Attila and the barbarians, who destroyed the atomic philosophy. "For at a time when all human learning had suffered shipwreck, these planks of Aristotelian and Platonic philosophy, as being of a lighter and more inflated substance, were preserved and came down to us, while things more solid sank and almost passed into oblivion."

The principles enunciated by Democritus reveal his uncompromising antagonism to those who deduced the phenomena of nature from the caprices of the gods. They are briefly these:—1. From nothing comes nothing. Nothing that exists can be destroyed. All changes are due to the combination and separation of molecules. 2. Nothing happens by chance. Every occurrence has its cause, from which it follows by necessity. 3. The only existing things are the atoms and empty space; all else is mere opinion. 4. The atoms are infinite in number, and in-

* Hume, 'Natural History of Religion.'

* Born, 460 B.C.

finitely various in form; they strike together, and the lateral motions and whirlings which thus arise are the beginnings of worlds. 5. The varieties of all things depend upon the varieties of their atoms, in number, size, and aggregation. 6. The soul consists of free, smooth, round atoms, like those of fire. These are the most mobile of all. They interpenetrate the whole body, and in their motions the phenomena of life arise. Thus the atoms of Democritus are individually without sensation; they combine in obedience to mechanical laws; and not only organic forms, but the phenomena of sensation and thought, are also the result of their combination.

That great enigma, "the exquisite adaptation of one part of an organism to another part, and to the conditions of life," more especially the construction of the human body, Democritus made no attempt to solve. Empedocles, a man of more fiery and poetic nature, introduced the notion of love and hate among the atoms to account for their combination and separation. Noticing this gap in the doctrine of Democritus, he struck in with the penetrating thought, linked, however, with some wild speculation, that it lay in the very nature of those combinations which were suited to their ends (in other words, in harmony with their environment) to maintain themselves, while unfit combinations, having no proper habitat, must rapidly disappear. Thus more than two thousand years ago the doctrine of the "survival of the fittest," which in our day, not on the basis of vague conjecture, but of positive knowledge, has been raised to such extraordinary significance, had received at all events partial enunciation.*

Epicurus,† said to be the son of a poor schoolmaster at Samos, is the next dominant figure in the history of the atomic philosophy. He mastered the writings of Democritus, heard lectures in Athens, returned to Samos, and subsequently wandered through various countries. He finally returned to Athens, where he bought a garden, and surrounded himself by pupils, in the midst of whom he lived a pure and serene life, and died a peaceful death. His philosophy was almost identical with that of Democritus; but he never quoted either friend or foe. One main object of Epicurus was to free the world from superstition and the fear of death. Death he treated with indifference. It merely robs us of sensation. As long as we are, death is not; and when death is, we are not. Life has no more evil for him who has made up his mind that it is no evil not to live. He adored the gods, but not in the ordinary fashion. The idea of divine power, properly purified, he thought an elevating one. Still he taught "Not he is godless who rejects the gods of the crowd, but rather he who accepts them." The gods were to him eternal and immortal beings, whose blessedness excluded every thought of care or occupation of any kind. Nature pursues her course in accordance with everlasting laws, the gods never interfering. They haunt

> "The lucid interspace of world and world
> Where never creeps a cloud or moves a wind,
> Nor ever falls the least white star of snow,
> Nor ever lowest roll of thunder moans,
> Nor sound of human sorrow mounts to mar
> Their sacred everlasting calm." ‡

Lange considers the relation of Epicurus to the gods subjective; the indication probably of an ethical requirement of his own nature. We cannot read history with open eyes, or study human nature to its depths, and fail to discern such a requirement. Man never has been, and he never will be, satisfied with the operations and products of the Understanding alone; hence physical science cannot cover all the demands of his nature. But the history of the efforts made to satisfy these demands might be broadly described as a history of errors—the error consisting in ascribing fixity to that which is fluent, which varies as we vary, being gross when we are gross, and becoming, as our capacities widen, more abstract and sublime. On one great point the mind of Epicurus was at peace. He neither sought nor expected, here or hereafter, any personal profit from his relation to the gods. And it is assuredly a fact that loftiness and serenity of thought may be promoted by conceptions which involve no idea of profit of this kind. "Did I not believe," said a great man to me once, "that an Intelligence is at the heart of things, my life on earth would be intolerable." The utterer of these words is not, in my opinion, rendered less noble, but more noble, by the fact that it was the need of ethical harmony here, and not the thought of personal profit hereafter, that prompted his observation.

A century and a half after the death of Epicurus, Lucretius* wrote his great poem, "On the Nature of Things," in which he, a Roman, developed with extraordinary ardour the philosophy of his Greek predecessor. He wishes to win over his friend Memnius to the school of Epicurus; and although he has no rewards in a future life to offer, although his object appears to be a purely negative one, he addresses his friend with the heat of an apostle. His object, like that of his great forerunner, is the destruction of superstition; and considering that men trembled before every natural event as a direct monition from the gods, and that everlasting torture was also in prospect, the freedom aimed at by Lucretius might perhaps be deemed a positive good. "This terror," he says, "and darkness of mind must be dispelled, not by the rays of the sun and glittering shafts of day, but by the aspect and the law of nature." He refutes the notion that anything can come out of nothing, or that that which is once begotten can be recalled to nothing. The first beginnings, the atoms, are indestructible, and into them all things can be dissolved at last. Bodies are partly atoms, and partly combinations of atoms; but the atoms nothing can quench. They are strong in solid singleness, and by their denser combination all things can be closely packed, and exhibit enduring strength. He denies that matter is infinitely divisible. We come at length to the atoms, without which, as an imperishable substratum, all order in the generation and development of things would be destroyed.

The mechanical shock of the atoms being in his view the all-sufficient cause of things, he combats the notion that the constitution of nature has been in any way determined by intelligent design. The interaction of the atoms throughout infinite time rendered all manner of combinations possible. Of these the fit ones persisted, while the unfit ones disappeared. Not after sage deliberation did the atoms station themselves in their right places, nor did they bargain what motions they should assume. From all eternity they have been driven together, and after trying motions and unions of every kind, they fell at length into the arrangements out of which this system of things has been formed. His grand conception of the atoms falling silently through immeasurable ranges of space and time suggested the nebular hypothesis to Kant, its first propounder. "If you will apprehend and keep in mind these things, nature, free at once and rid of her haughty lords, is seen to do all things spontaneously of herself, without the meddling of the gods."†

During the centuries between the first of these three philosophers and the last, the human intellect was active in other fields than theirs. The sophists had run through their career. At Athens had appeared the three men, Socrates, Plato, and Aristotle, whose yoke remains to some extent unbroken to the present hour. Within this period also the School of Alexandria was founded, Euclid

---

* Lange, 2nd edit., p. 23.
† Born, 342 B.C.
‡ Tennyson's 'Lucretius.'

* Born, 99 B.C.
† Monro's translation. In his criticism of this work (Contemporary Review, 1867) Dr. Hayman does not appear to be aware of the really sound and subtile observations on which the reasoning of Lucretius, though erroneous, sometimes rests.

wrote his 'Elements,' and he and others made some advance in optics. Archimedes had propounded the theory of the lever, and the principles of hydrostatics. Pythagoras had made his experiments on the harmonic intervals, while astronomy was immensely enriched by the discoveries of Hipparchus, who was followed by the historically more celebrated Ptolemy. Anatomy had been made the basis of scientific medicine; and it is said by Draper * that vivisection then began. In fact the science of ancient Greece had already cleared the world of the fantastic images of divinities operating capriciously through natural phenomena. It had shaken itself free from that fruitless scrutiny "by the internal light of the mind alone," which had vainly sought to transcend experience and reach a knowledge of ultimate causes. Instead of accidental observation, it had introduced observation with a purpose; instruments were employed to aid the senses; and scientific method was rendered in a great measure complete by the union of Induction and Experiment.

What, then, stopped its victorious advance? Why was the scientific intellect compelled, like an exhausted soil, to lie fallow for nearly two millenniums before it could regather the elements necessary to its fertility and strength? Bacon has already let us know one cause; Whewell ascribes this stationary period to four causes—obscurity of thought, servility, intolerance of disposition, enthusiasm of temper; and he gives striking examples of each.† But these characteristics must have had their causes, which lay in the circumstances of the time. Rome, and the other cities of the Empire, had fallen into moral putrefaction. Christianity had appeared, offering the gospel to the poor, and, by moderation if not asceticism of life, practically protesting against the profligacy of the age. The sufferings of the early Christians and the extraordinary exaltation of mind which enabled them to triumph over the diabolical tortures to which they were subjected ‡, must have left traces not easily effaced. They scorned the earth, in view of that "building of God, that house not made with hands, eternal in the heavens." The Scriptures which ministered to their spiritual needs were also the measure of their Science. When, for example, the celebrated question of antipodes came to be discussed, the Bible was with many the ultimate court of appeal. Augustine, who flourished A.D. 400, would not deny the rotundity of the earth; but he would deny the possible existence of inhabitants at the other side, "because no such race is recorded in Scripture among the descendants of Adam." Archbishop Boniface was shocked at the assumption of a "world of human beings out of the reach of the means of salvation." Thus reined in, Science was not likely to make much progress. Later on the political and theological strife between the Church and civil governments, so powerfully depicted by Draper, must have done much to stifle investigation.

Whewell makes many wise and brave remarks regarding the spirit of the Middle Ages. It was a menial spirit. The seekers after natural knowledge had forsaken that fountain of living waters, the direct appeal to nature by observation and experiment, and had given themselves up to the remanipulation of the notions of their predecessors. It was a time when thought had become abject, and when the acceptance of mere authority led, as it always does in science, to intellectual death. Natural events, instead of being traced to physical, were referred to moral causes; while an exercise of the phantasy, almost as degrading as the spiritualism of the present day, took the place of scientific speculation. Then came the mysticism of the Middle Ages, Magic, Alchemy, the Neo-platonic philosophy, with its visionary though sublime abstractions, which caused men to look with shame upon their own bodies as hindrances to the absorption of the creature in the blessedness of the Creator. Finally came the Scholastic philosophy, a fusion, according to Lange, of the least-mature notions of Aristotle with the Christianity of the West. Intellectual immobility was the result. As a traveller without a compass in a fog may wander long, imagining he is making way, and find himself after hours of toil at his starting-point, so the schoolmen, having tied and untied the same knots, and formed and dissipated the same clouds, found themselves at the end of centuries in their old position.

With regard to the influence wielded by Aristotle in the Middle Ages, and which, though to a less extent, he still wields, I would ask permission to make one remark. When the human mind has achieved greatness and given evidence of extraordinary power in any domain, there is a tendency to credit it with similar power in all other domains. Thus theologians have found comfort and assurance in the thought that Newton dealt with the question of revelation, forgetful of the fact that the very devotion of his powers, through all the best years of his life, to a totally different class of ideas, not to speak of any natural disqualification, tended to render him less, instead of more, competent to deal with theological and historic questions. Goethe, starting from his established greatness as a poet, and indeed from his positive discoveries in Natural History, produced a profound impression among the painters of Germany, when he published his 'Farbenlehre,' in which he endeavoured to overthrow Newton's theory of colours. This theory he deemed so obviously absurd, that he considered its author a charlatan, and attacked him with a corresponding vehemence of language. In the domain of natural history Goethe had made really considerable discoveries; and we have high authority for assuming that, had he devoted himself wholly to that side of science, he might have reached in it an eminence comparable with that which he attained as a poet. In sharpness of observation, in the detection of analogies, however apparently remote, in the classification and organization of facts according to the analogies discerned, Goethe possessed extraordinary powers. These elements of scientific inquiry fall in with the discipline of the poet. But, on the other hand, a mind thus richly endowed in the direction of natural history, may be almost shorn of endowment as regards the more strictly called physical and mechanical sciences. Goethe was in this condition. He could not formulate distinct mechanical conceptions; he could not see the force of mechanical reasoning; and in regions where such reasoning reigns supreme he became a mere *ignis fatuus* to those who followed him.

I have sometimes permitted myself to compare Aristotle with Goethe, to credit the Stagirite with an almost superhuman power of amassing and systematizing facts, but to consider him fatally defective on that side of the mind in respect to which incompleteness has been just ascribed to Goethe. Whewell refers the errors of Aristotle, not to a neglect of facts, but to "a neglect of the idea appropriate to the facts; the idea of Mechanical cause, which is Force, and the substitution of vague or inapplicable notions, involving only relations of space or emotions of wonder." This is doubtless true; but the word "neglect" implies mere intellectual misdirection, whereas in Aristotle, as in Goethe, it was not, I believe, misdirection, but sheer natural incapacity which lay at the root of his mistakes. As a physicist, Aristotle displayed what we should consider some of the worst attributes of a modern physical investigator—indistinctness of ideas, confusion of mind, and a confident use of language, which led to the delusive notion that he had really mastered his subject, while he as yet had failed to grasp even the elements of it. He put words in the place of things, subject in the place of object. He preached Induction without practising it, inverting the

* 'History of the Intellectual Development of Europe,' p. 295.

† 'History of the Inductive Sciences,' vol. i.

‡ Depicted with terrible vividness in Renan's 'Antichrist.'

true order of inquiry by passing from the general to the particular, instead of from the particular to the general. He made of the universe a closed sphere, in the centre of which he fixed the earth, proving from general principles, to his own satisfaction and to that of the world for near 2000 years, that no other universe was possible. His notions of motion were entirely unphysical. It was natural or unnatural, better or worse, calm or violent—no real mechanical conception regarding it lying at the bottom of his mind. He affirmed that a vacuum could not exist, and proved that if it did exist motion in it would be impossible. He determined *à priori* how many species of animals must exist, and shows on general principles why animals must have such and such parts. When an eminent contemporary philosopher, who is far removed from errors of this kind, remembers these abuses of the *à priori* method, he will be able to make allowance for the jealousy of physicists as to the acceptance of so-called *à priori* truths. Aristotle's errors of detail were grave and numerous. He affirmed that only in man we had the beating of the heart, that the left side of the body was colder than the right, that men have more teeth than women, and that there is an empty space, not at the front, but at the back of every man's head.

There is one essential quality in physical conceptions which was entirely wanting in those of Aristotle and his followers. I wish it could be expressed by a word untainted by its associations; it signifies a capability of being placed as a coherent picture before the mind. The Germans express the act of picturing by the word *vorstellen*, and the picture they call a *Vorstellung*. We have no word in English which comes nearer to our requirements than *Imagination*, and, taken with its proper limitations, the word answers very well; but, as just intimated, it is tainted by its associations, and therefore objectionable to some minds. Compare, with reference to this capacity of mental presentation, the case of the Aristotelian, who refers the ascent of water in a pump to Nature's abhorrence of a vacuum, with that of Pascal when he proposed to solve the question of atmospheric pressure by the ascent of the Puy de Dome. In the one case the terms of the explanation refuse to fall into place as a physical image; in the other the image is distinct, the fall and rise of the barometer being clearly figured as the balancing of two varying and opposing pressures.

During the drought of the Middle Ages in Christendom, the Arabian intellect, as forcibly shown by Draper, was active. With the intrusion of the Moors into Spain cleanliness, order, learning, and refinement took the place of their opposites. When smitten with disease the Christian peasant resorted to a shrine, the Moorish one to an instructed physician. The Arabs encouraged translations from the Greek philosophers, but not from the Greek poets. They turned in disgust "from the lewdness of our classical mythology, and denounced as an unpardonable blasphemy all connection between the impure Olympian Jove and the Most High God." Draper traces still further than Whewell the Arab elements in our scientific terms, and points out that the under garment of ladies retains to this hour its Arab name. He gives examples of what Arabian men of science accomplished, dwelling particularly on Alhazen, who was the first to correct the Platonic notion that rays of light are emitted by the eye. He discovered atmospheric refraction, and points out that we see the sun and moon after they have set. He explains the enlargement of the sun and moon, and the shortening of the vertical diameters of both these bodies, when near the horizon. He is aware that the atmosphere decreases in density with increase of height, and actually fixes its height at $58\frac{1}{2}$ miles. In the Book of the Balance Wisdom he sets forth the connection between the weight of the atmosphere and its increasing density. He shows that a body will weigh differently in a rare and a dense atmosphere: he considers the force with which plunged bodies rise through heavier media. He understands the doctrine of the centre of gravity, and applies it to the investigation of balances and steelyards. He recognizes gravity as a force, though he falls into the error of making it diminish as the distance, and of making it purely terrestrial. He knows the relation between the velocities, spaces, and times of falling bodies, and has distinct ideas of capillary attraction. He improves the hydrometer. The determination of the densities of bodies, as given by Alhazen, approach very closely to our own. "I join," says Draper, "in the pious prayer of Alhazen, that in the day of judgment the All-Merciful will take pity on the soul of Abur-Raihân, because he was the first of the race of men to construct a table of specific gravities." If all this be historic truth (and I have entire confidence in Dr. Draper), well may he "deplore the systematic manner in which the literature of Europe has contrived to put out of sight our scientific obligations to the Mahommedans."*

Towards the close of the stationary period a word-weariness, if I may so express it, took more and more possession of men's minds. Christendom had become sick of the School philosophy and its verbal wastes, which led to no issue, but left the intellect in everlasting haze. Here and there was heard the voice of one impatiently crying in the wilderness, "Not unto Aristotle, not unto subtle hypotheses, not unto Church, Bible, or blind tradition, must we turn for a knowledge of the universe, but to the direct investigation of nature by observation and experiment." In 1543 the epoch-making work of Copernicus on the paths of the heavenly bodies appeared. The total crash of Aristotle's closed universe with the earth at its centre followed as a consequence; and "the earth moves" became a kind of watchword among intellectual freemen. Copernicus was canon of the church of Frauenburg, in the diocese of Ermeland. For three-and-thirty years he had withdrawn himself from the world, and devoted himself to the consolidation of his great scheme of the solar system. He made its blocks eternal; and even to those who feared it and desired its overthrow it was so obviously strong that they refrained for a time from meddling with it. In the last year of the life of Copernicus his book appeared: it is said that the old man received a copy of it a few days before his death, and then departed in peace.

The Italian philosopher, Giordano Bruno, was one of the earliest converts to the new astronomy. Taking Lucretius as his exemplar, he revived the notion of the infinity of worlds; and combining with it the doctrine of Copernicus, reached the sublime generalization that the fixed stars are suns, scattered numberless through space and accompanied by satellites, which bear the same relation to them that our earth does to our sun, or our moon to our earth. This was an expansion of transcendent import; but Bruno came closer than this to our present line of thought. Struck with the problem of the generation and maintenance of organisms, and duly pondering it, he came to the conclusion that Nature in her productions does not imitate the technic of man. Her process is one of unravelling and unfolding. The infinity of forms under which matter appears were not imposed upon it by an external artificer; by its own intrinsic force and virtue it brings these forms forth. Matter is not the mere naked, empty *capacity* which philosophers have pictured her to be, but the universal mother, who brings forth all things as the fruit of her own womb.

This outspoken man was originally a Dominican monk. He was accused of heresy and had to fly, seeking refuge in Geneva, Paris, England, and Germany. In 1592 he fell into the hands of the Inquisition at Venice. He was imprisoned for many years, tried, degraded, excommunicated, and handed over to the civil power, with the request that he should be treated gently and "without the shedding of blood." This meant that he was to be burnt, and burnt accordingly he was, on the 16th Feb-

* 'Intellectual Development of Europe,' p. 359.

ruary, 1600. To escape a similar fate Galileo, thirty-three years afterwards, abjured, upon his knees, and with his hand upon the holy gospels, the heliocentric doctrine. After Galileo came Kepler, who from his German home defied the power beyond the Alps. He traced out from pre-existing observations the laws of planetary motion. The problem was thus prepared for Newton, who bound those empirical laws together by the principle of gravitation.

During the Middle Ages the doctrine of atoms had to all appearance vanished from discussion. In all probability it held its ground among sober-minded and thoughtful men, though neither the church nor the world was prepared to hear of it with tolerance. Once, in the year 1348, it received distinct expression. But retractation by compulsion immediately followed, and thus discouraged it slumbered till the 17th century, when it was revived by a contemporary of Hobbes and Descartes, the Père Gassendi.

The analytic and synthetic tendencies of the human mind exhibit themselves throughout history, great writers ranging themselves sometimes on the one side, sometimes on the other. Men of lofty feelings, and minds open to the elevating impressions produced by nature as a whole, whose satisfaction, therefore, is rather ethical than logical, have leaned to the synthetic side; while the analytic harmonizes best with the more precise and more mechanical bias which seeks the satisfaction of the understanding. Some form of pantheism was usually adopted by the one, while a detached Creator, working more or less after the manner of men, was often assumed by the other.* Gassendi is hardly to be ranked with either. Having formally acknowledged God as the great first cause, he immediately drops the idea, applies the known laws of mechanics to the atoms, and thence deduces all vital phenomena. God who created earth and water, plants and animals, produced in the first place a definite number of atoms, which constituted the seed of all things. Then began that series of combinations and decompositions which goes on at the present day, and which will continue in the future. The principle of every change resides in matter. In artificial productions the moving principle is different from the material worked upon; but in nature the agent works within, being the most active and mobile part of the material itself. Thus this bold ecclesiastic, without incurring the censure of the church or the world, contrives to outstrip Mr. Darwin. The same cast of mind which caused him to detach the Creator from his universe led him also to detach the soul from the body, though to the body he ascribes an influence so large as to render the soul almost unnecessary. The aberrations of reason were in his view an affair of the material brain. Mental disease is brain-disease; but then the immortal reason sits apart, and cannot be touched by the disease. The errors of madness are errors of the instrument, not of the performer.

It may be more than a mere result of education, connecting itself probably with the deeper mental structure of the two men, that the idea of Gassendi, above enunciated, is substantially the same as that expressed by Professor Clerk Maxwell at the close of the very noble lecture delivered by him at Bradford last year. According to both philosophers, the atoms, if I understand aright, are the *prepared materials*, the "manufactured articles," which, formed by the skill of the Highest, produce by their subsequent interaction all the phenomena of the material world. There seems to be this difference, however, between Gassendi and Maxwell. The one *postulates*, the other *infers* his first cause. In his manufactured articles, Professor Maxwell finds the basis of an induction, which enables him to scale philosophic heights considered inaccessible by Kant, and to take the logical step from the atoms to their Maker.

The atomic doctrine, in whole or in part, was entertained by Bacon, Descartes, Hobbes, Locke, Newton, Boyle, and their successors, until the chemical law of multiple proportions enabled Dalton to confer upon it an entirely new significance. In our day there are secessions from the theory, but it still stands firm. Only a year or two ago Sir William Thomson, with characteristic penetration, sought to determine the sizes of the atoms, or rather to fix the limits between which their sizes lie; while only last year the discourses of Williamson and Maxwell illustrate the present hold of the doctrine upon the foremost scientific minds. What these atoms, self-moved and self-posited, can and cannot accomplish in relation to life, is at the present moment the subject of profound scientific thought. I doubt the legitimacy of Maxwell's logic; but it is impossble not to feel the ethic glow with which his lecture concludes. There is, moreover, a Lucretian grandeur in his description of the steadfastness of the atoms:—"Natural causes, as we know, are at work, which tend to modify, if they do not at length destroy, all the arrangements and dimensions of the earth and the whole solar system. But though in the course of ages catastrophes have occurred and may yet occur in the heavens, though ancient systems may be dissolved and new systems evolved out of their ruins, the molecules out of which these systems are built, the foundation stones of the material universe, remain unbroken and unworn."

Ninety years subsequent to Gassendi the doctrine of bodily instruments, as it may be called, assumed immense importance in the hands of Bishop Butler, who, in his famous 'Analogy of Religion,' developed, from his own point of view, and with consummate sagacity, a similar idea. The Bishop still influences superior minds; and it will repay us to dwell for a moment on his views. He draws the sharpest distinction between our real selves and our bodily instruments. He does not, as far as I remember, use the word soul, possibly because the term was so hackneyed in his day as it had been for many generations previously. But he speaks of "living powers," "perceiving" or "percipient powers," "moving agents," "ourselves," in the same sense as we should employ the term soul. He dwells upon the fact that limbs may be removed, and mortal diseases assail the body, while the mind, almost up to the moment of death, remains clear. He refers to sleep and to swoon, where the "living powers" are suspended, but not destroyed. He considers it quite as easy to conceive of an existence out of our bodies as in them; that we may animate a succession of bodies, the dissolution of all of them having no more tendency to dissolve our real selves, or "deprive us of living faculties—the faculties of perception and action—than the dissolution of any foreign matter which we are capable of receiving impressions from, or making use of for the common occasions of life." This is the key of the Bishop's position: "our organized bodies are no more a part of ourselves than any other matter around us." In proof of this he calls attention to the use of glasses, which "prepare objects" for the "percipient power" exactly as the eye does. The eye itself is no more percipient than the glass, and is quite as much the instrument of the true self, and also as foreign to the true self, as the glass is. "And if we see with our eyes only in the same manner as we do with glasses, the like may justly be concluded from analogy of all our senses."

Lucretius, as you are aware, reached a precisely opposite conclusion; and it certainly would be interesting, if not profitable, to us all, to hear what he would or could urge in opposition to the reasoning of the Bishop. As a brief discussion of the point will enable us to see the bearings of an important question, I will here permit a disciple of Lucretius to try the strength of the Bishop's position, and

---

* Boyle's model of the universe was the Strasburg clock with an outside Artificer. Goethe, on the other hand, sang

"Ihm ziemt's die Welt im Innern zu bewegen,
Natur in sich, sich in Natur zu hegen."

The same repugnance to the Clockmaker conception is manifest in Carlyle.

then allow the Bishop to retaliate, with the view of rolling back, if he can, the difficulty upon Lucretius. Each shall state his case fully and frankly; and you shall be umpire between them.

The argument might proceed in this fashion:—

"Subjected to the test of mental presentation (*Vorstellung*), your views, most honoured prelate, would present to many minds a great, if not an insuperable difficulty. You speak of 'living powers,' 'percipient or perceiving powers,' and 'ourselves;' but can you form a mental picture of any one of these apart from the organism through which it is supposed to act? Test yourself honestly, and see whether you possess any faculty that would enable you to form such a conception. The true self has a local habitation in each of us; thus localized, must it not possess a form? If so, what form? Have you ever for a moment realized it? When a leg is amputated the body is divided into two parts; is the true self in both of them or in one? Thomas Aquinas might say in both; but not you, for you appeal to the consciousness associated with one of the two parts to prove that the other is foreign matter. Is consciousness, then, a necessary element of the true self? If so, what do you say to the case of the whole body being deprived of consciousness? If not, then on what grounds do you deny any portion of the true self to the severed limb? It seems very singular that, from the beginning to the end of your admirable book (and no one admires its sober strength more than I do), you never once mention the brain or nervous system. You begin at one end of the body, and show that its parts may be removed without prejudice to the perceiving power. What if you begin at the other end, and remove, instead of the leg, the brain? The body, as before, is divided into two parts; but both are now in the same predicament, and neither can be appealed to to prove that the other is foreign matter. Or, instead of going so far as to remove the brain itself, let a certain portion of its bony covering be removed, and let a rhythmic series of pressures and relaxations of pressure be applied to the soft substance. At every pressure 'the faculties of perception and of action,' vanish; at every relaxation of pressure they are restored. Where, during the intervals of pressure, is the perceiving power? I once had the discharge of a large Leyden battery passed unexpectedly through me: I felt nothing, but was simply blotted out of conscious existence for a sensible interval. Where was my true self during that interval? Men who have recovered from lightning-stroke have been much longer in the same state; and indeed in cases of ordinary concussion of the brain, days may elapse during which no experience is registered in consciousness. Where is the man himself during the period of insensibility? You may say that I beg the question when I assume the man to have been unconscious, that he was really conscious all the time, and has simply forgotten what had occurred to him. In reply to this I can only say that no one need shrink from the worst tortures that superstition ever invented if only so felt and so remembered. I do not think your theory of instruments goes at all to the bottom of the matter. A telegraph-operator has his instruments, by means of which he converses with the world; our bodies possess a nervous system, which plays a similar part between the perceiving power and external things. Cut the wires of the operator, break his battery, demagnetize his needle: by this means you certainly sever his connection with the world; but inasmuch as these are real instruments, their destruction does not touch the man who uses them. The operator survives, *and he knows that he survives.* What is it, I would ask, in the human system that answers to this conscious survival of the operator when the battery of the brain is so disturbed as to produce insensibility, or when it is destroyed altogether?

"Another consideration, which you may consider slight, presses upon me with some force. The brain may change from health to disease, and through such a change the most exemplary man may be converted into a debauchee or a murderer. My very noble and approved good master had, as you know, threatenings of lewdness introduced into his brain by his jealous wife's philter; and sooner than permit himself to run even the risk of yielding to these base promptings he slew himself. How could the hand of Lucretius have been thus turned against himself if the real Lucretius remained as before? Can the brain or can it not act in this distempered way without the intervention of the immortal reason? If it can, then it is a prime mover which requires only healthy regulation to render it reasonably self-acting, and there is no apparent need of your immortal reason at all. If it cannot, then the immortal reason, by its mischievous activity in operating upon a broken instrument, must have the credit of committing every imaginable extravagance and crime. I think, if you will allow me to say so, that the gravest consequences are likely to flow from your estimate of the body. To regard the brain as you would a staff or an eyeglass—to shut your eyes to all its mystery, to the perfect correlation that reigns between its condition and our consciousness, to the fact that a slight excess or defect of blood in it produces that very swoon to which you refer, and that in relation to it our meat and drink and air and exercise have a perfectly transcendental value and significance—to forget all this does, I think, open a way to innumerable errors in our habits of life, and may possibly in some cases initiate and foster that very disease, and consequent mental ruin, which a wiser appreciation of this mysterious organ would have avoided."

I can imagine the Bishop thoughtful after hearing this argument. He was not the man to allow anger to mingle with the consideration of a point of this kind. After due consideration, and having strengthened himself by that honest contemplation of the facts which was habitual with him, and which includes the desire to give even adverse facts their due weight, I can suppose the Bishop to proceed thus:—"You will remember that in the 'Analogy of Religion,' of which you have so kindly spoken, I did not profess to prove anything absolutely, and that I over and over again acknowledged and insisted on the smallness of our knowledge, or rather the depth of our ignorance, as regards the whole system of the universe. My object was to show my deistical friends, who set forth so eloquently the beauty and beneficence of Nature and the Ruler thereof, while they had nothing but scorn for the so-called absurdities of the Christian scheme, that they were in no better condition than we were, and that, for every difficulty they found upon our side, quite as great a difficulty was to be found upon theirs. I will now, with your permission, adopt a similar line of argument. You are a Lucretian, and from the combination and separation of atoms deduce all terrestrial things, including organic forms and their phenomena. Let me tell you in the first instance how far I am prepared to go with you. I admit that you can build crystalline forms out of this play of molecular force; that the diamond, amethyst, and snow-star are truly wonderful structures which are thus produced. I will go further and acknowledge that even a tree or flower might in this way be organized. Nay, if you can show me an animal without sensation, I will concede to you that it also might be put together by the suitable play of molecular force.

"Thus far our way is clear, but now comes my difficulty. Your atoms are individually without sensation, much more are they without intelligence. May I ask you, then, to try your hand upon this problem. Take your dead hydrogen atoms, your dead oxygen atoms, your dead carbon atoms, your dead nitrogen atoms, your dead phosphorous atoms, and all the other atoms, dead as grains of shot, of which the brain is formed. Imagine them separate and sensationless; observe them running together and forming all imaginable combinations. This, as a purely mechanical process, is *seeable* by the mind. But can you see, or dream, or in any way imagine, how out of that mechanical act, and from these individually dead atoms, sensation, thought, and emotion are to arise? You speak of the difficulty of mental presentation in my case; is it less in yours? I am not all bereft of this *Vorstellungs-Kraft* of which you speak. I can follow a particle of musk until it reaches the olfactory nerve: I can follow the waves of sound until their tremors reach the water of the labyrinth, and set the otoliths and Corti's fibres in motion; I can also visualize the waves of ether as they cross the eye and hit the retina. Nay, more, I am able to follow up to the central organ the motion thus imparted at the periphery, and to see in idea the very molecules of the brain thrown into tremors. My insight is not baffled by these physical processes. What baffles me, what I find unimaginable, transcending every faculty I possess—transcending, I humbly submit, every faculty *you* possess—is the notion that out of those physical tremors you can extract things so utterly incongruous with them as sensation, thought, and emotion. You may say, or think, that this issue of consciousness from the clash of atoms is not more incongruous than the flash of light from the union of oxygen and hydrogen. But I beg to say that it is. For such incongruity as the flash possesses is that which I now force upon your attention. The flash is an affair of consciousness, the objective counterpart of which is a vibration. It is a flash only by your interpretation. *You* are the cause of the apparent incongruity; and *you* are the thing that puzzles me. I need not remind you that the great Leibnitz felt the difficulty which I feel, and that to get rid of this monstrous deduction of life from death he displaced your atoms by his monads, which were more or less perfect mirrors of the universe, and out of the summation and integration of which he supposed all the phenomena of life—sentient, intellectual, and emotional—to arise.

"Your difficulty, then, as I see you are ready to admit, is quite as great as mine. You cannot satisfy the human understanding in its demand for logical continuity between molecular processes and the phenomena of consciousness. This is a rock on which materialism must inevitably split whenever it pretends to be a complete philosophy of life. What is the moral, my Lucretian? You and I are not likely to indulge in ill-temper in the discussion of these great topics, where we see so much room for honest differences of opinion. But there are people of less wit, or more bigotry (I say it with humility) on both sides, who are ever ready to mingle anger and vituperation with such discussions. There are, for example, writers of note and influence at the present day who are not ashamed to assume the 'deep personal sin' of a great logician to be the cause of his unbelief in a theologic dogma. And there are others who hold that we, who cherish our noble Bible, wrought as it has been into the constitution of our forefathers, and by inheritance into us, must necessarily be hypocritical and insincere. Let us disavow and discountenance such people, cherishing the unswerving faith that what is good and true in both our arguments will be preserved for the benefit of humanity, while all that is bad or false will disappear."

It is worth remarking that in one respect the Bishop was a product of his age. Long previous to his day the nature of the soul had been so favourite and general a topic of discussion, that, when the students of the University of Paris wished to know the leanings of a new Professor, they at once requested him to lecture upon the soul. About the time of Bishop Butler the question was not only agitated but extended. It was seen by the clear-witted men who entered this arena that many of their best arguments applied equally to brutes and men. The Bishop's arguments were of this character. He saw it, admitted it, accepted the consequences, and boldly embraced the whole animal world in his scheme of immortality.

Bishop Butler accepted with unwavering trust the chronology of the Old Testament, describing it as "confirmed by the natural and civil history of the world, collected from common historians, from the state of the earth, and from the late inventions of arts and sciences." These words mark progress: they must seem somewhat hoary to the Bishop's successors of to-day.* It is hardly necessary to inform you that since his time the domain of the naturalist has been immensely extended—the whole science of geology, with its astounding revelations regarding the life of the ancient earth, having been created. The rigidity of old conceptions has been relaxed, the public mind being rendered gradually tolerant of the idea that not for six thousand, nor for sixty thousand, nor for six thousand thousand, but for æons embracing untold millions of years, this earth has been the theatre of life and death. The riddle of the rocks has been read by the geologist and palæontologist, from subcambrian depths to the deposits thickening over the sea-bottoms of to-day. And upon the leaves of that stone book are, as you know, stamped the characters, plainer and surer than those formed by the ink of history, which carry the mind back into abysses of past time compared with which the periods which satisfied Bishop Butler cease to have a visual angle. Everybody now knows this; all men admit it; still, when they were first broached these verities of science found loud-tongued denunciators, who proclaimed not only their baselessness considered scientifically, but their immorality considered as questions of ethics and religion: the Book of Genesis had stated the question in a different fashion; and science must necessarily go to pieces when it clashed with this authority. And as the seed of the thistle produces a thistle, and nothing else, so these objectors scatter their germs abroad, and reproduce their kind, ready to play again the part of their intellectual progenitors, to show the same virulence, the same ignorance, to achieve for a time the same success, and finally to suffer the same inexorable defeat. Surely the time must come at last when human nature in its entirety, whose legitimate demands it is admitted science alone cannot satisfy, will find interpreters and expositors of a different stamp from those rash and ill-informed persons who have been hitherto so ready to hurl themselves against every new scientific revelation, lest it should endanger what they are pleased to consider theirs.

The lode of discovery once struck, those petrified forms in which life was at one time active, increased to multitudes and demanded classification. The general fact soon became evident that none but the simplest forms of life lie lowest down, that as we climb higher and higher among the superimposed strata more perfect forms appear. The change, however, from form to form was not continuous—but by steps, some small, some great. "A section," says Mr. Huxley, "a hundred feet thick will exhibit, at different heights, a dozen species of Ammonite, none of which passes beyond its particular zone of limestone, or clay into the zone below it, or into that above it." In the presence of such facts it was not possible to avoid the question:—Have these forms, showing, though in broken stages and with many irregularities, this unmistakable general advance, been subjected to no continuous law of growth or variation? Had our education been purely scientific, or had it been sufficiently detached from influences which, however ennobling in another domain, have always proved hindrances and delusions when introduced as factors into the domain of physics, the scientific mind never could have swerved from the search for a law of growth, or allowed itself to accept the anthropomorphism which regarded each successive stratum as a kind of mechanic's bench for the manufacture of new species out of all relation to the old.

Biassed, however, by their previous education, the great majority of naturalists invoked a special creative act to account for the appearance of each new group of organisms. Doubtless there were numbers who were clear-headed enough to see that this was no explanation at all, that in

* Only to some; for there are dignitaries who even now speak of the earth's rocky crust as so much building material prepared for man at the Creation. Surely it is time that this loose language should cease.

point of fact it was an attempt, by the introduction of a greater difficulty, to account for a less. But having nothing to offer in the way of explanation, they for the most part held their peace. Still the thoughts of reflecting men naturally and necessarily simmered round the question. De Maillet, a contemporary of Newton, has been brought into notice by Professor Huxley as one who "had a notion of the modifiability of living forms." In my frequent conversations with him, the late Sir Benjamin Brodie, a man of highly philosophic mind, often drew my attention to the fact that, as early as 1794, Charles Darwin's grandfather was the pioneer of Charles Darwin. In 1801, and in subsequent years, the celebrated Lamarck, who produced so profound an impression on the public mind through the vigorous exposition of his views by the author of the 'Vestiges of Creation,' endeavoured to show the development of species out of changes of habit and external condition. In 1813 Dr. Wells, the founder of our present theory of Dew, read before the Royal Society a paper in which, to use the words of Mr. Darwin, "he distinctly recognizes the principle of natural selection; and this is the first recognition that has been indicated." The thoroughness and skill with which Wells pursued his work, and the obvious independence of his character, rendered him long ago a favourite with me; and it gave me the liveliest pleasure to alight upon this additional testimony to his penetration. Professor Grant, Mr. Patrick Matthew, Von Buch, the author of the 'Vestiges,' D'Halloy, and others,* by the enunciation of views more or less clear and correct, showed that the question had been fermenting long prior to the year 1858, when Mr. Darwin and Mr. Wallace simultaneously but independently placed their closely concurrent views upon the subject before the Linnean Society.

These papers were followed in 1859 by the publication of the first edition of 'The Origin of Species.' All great things come slowly to the birth. Copernicus, as I informed you, pondered his great work for thirty-three years. Newton for nearly twenty years kept the idea of Gravitation before his mind; for twenty years also he dwelt upon his discovery of Fluxions, and doubtless would have continued to make it the object of his private thought had he not found that Leibnitz was upon his track. Darwin for two-and-twenty-years pondered the problem of the origin of species, and doubtless he would have continued to do so had he not found Wallace upon his track.† A concentrated, but full and powerful epitome of his labours was the consequence. The book was by no means an easy one; and probably not one in every score of those who then attacked it had read its pages through, or were competent to grasp their significance if they had. I do not say this merely to discredit them; for there were in those days some really eminent scientific men entirely raised above the heat of popular prejudice, willing to accept any conclusion that science had to offer, provided it was duly backed by fact and argument, and who entirely mistook Mr. Darwin's views. In fact the work needed an expounder; and it found one in Mr. Huxley. I know nothing more admirable in the way of scientific exposition than those early articles of his on the origin of species. He swept the curve of discussion through the really significant points of the subject, enriched his exposition with profound original remarks and reflections, often summing up in a single pithy sentence an argument which a less compact mind would have spread over pages. But there is one impression made by the book itself which no exposition of it, however luminous, can convey; and that is the impression of the vast amount of labour, both of observation and of thought, implied in its production. Let us glance at its principles.

It is conceded on all hands that what are called varieties are continually produced. The rule is probably without exception. No chick and no child is in all respects and particulars the counterpart of its brother or sister; and in such differences we have "variety" incipient. No naturalist could tell how far this variation could be carried; but the great mass of them held that never by any amount of internal or external change, nor by the mixture of both, could the offspring of the same progenitor so far deviate from each other as to constitute different species. The function of the experimental philosopher is to combine the conditions of nature and to produce her results; and this was the method of Darwin.* He made himself acquainted with what could, without any manner of doubt, be done in the way of producing variation. He associated himself with pigeon-fanciers—bought, begged, kept, and observed every breed that he could obtain. Though derived from a common stock, the diversities of these pigeons were such that "a score of them might be chosen which, if shown to an ornithologist, and he were told that they were wild birds, would certainly be ranked by him as well-defined species." The simple principle which guides the pigeon-fancier, as it does the cattle-breeder, is the selection of some variety that strikes his fancy, and the propagation of this variety by inheritance. With his eye still upon the particular appearance which he wishes to exaggerate, he selects it as it reappears in successive broods, and thus adds increment to increment until an astonishing amount of divergence from the parent type is effected. Man in this case does not produce the *elements* of the variation. He simply observes them, and by selection adds them together until the required result has been obtained. "No man," says Mr. Darwin, "would ever try to make a fantail till he saw a pigeon with a tail developed in some slight degree in an unusual manner, or a pouter until he saw a pigeon with a crop of unusual size." Thus Nature gives the hint, man acts upon it, and by the law of inheritance exaggerates the deviation.

Having thus satisfied himself by indubitable facts that the organization of an animal or of a plant (for precisely the same treatment applies to plants) is to some extent plastic, he passes from variation under domestication to variation under nature. Hitherto we have dealt with the adding together of small changes by the conscious selection of man. Can Nature thus select? Mr. Darwin's answer is, "Assuredly she can." The number of living things produced is far in excess of the number that can be supported; hence at some period or other of their lives there must be a struggle for existence; and what is the infallible result? If one organism were a perfect copy of the other in regard to strength, skill, and agility, external conditions would decide. But this is not the case. Here we have the fact of variety offering itself to nature, as in the former instance it offered itself to man; and those varieties which are least competent to cope with surrounding conditions will infallibly give way to those that are most competent. To use a familiar proverb, the weakest comes to the wall. But the triumphant fraction again breeds to over-production, transmitting the qualities which secured its maintenance, but transmitting them in different degrees. The struggle for food again supervenes, and those to whom the favourable quality has been transmitted in excess will assuredly triumph. It is easy to see that we have here the addition of increments favourable to the individual still more rigorously carried out than in the case of domestication; for not only are unfavourable specimens not selected by nature, but they are destroyed. This is what Mr. Darwin calls "natural selection," which "acts by the preserva-

* In 1855 Mr. Herbert Spencer ('Principles of Psychology,' 2nd edit. vol. i., p. 465) expressed "the belief that life under all its forms has arisen by an unbroken evolution, and through the instrumentality of what are called natural causes."

† The behaviour of Mr. Wallace in relation to this subject has been dignified in the highest degree.

* The first step only towards experimental demonstration has been taken. Experiments now begun might, a couple of centuries hence, furnish data of incalculable value, which ought to be supplied to the science of the future.

tion and accumulation of small inherited modifications, each profitable to the preserved being." With this idea he interpenetrates and leavens the vast store of facts that he and others have collected. We cannot, without shutting our eyes through fear or prejudice, fail to see that Darwin is here dealing, not with imaginary, but with true causes; nor can we fail to discern what vast modifications may be produced by natural selection in periods sufficiently long. Each individual increment may resemble what mathematicians call a "differential" (a quantity indefinitely small); but definite and great changes may obviously be produced by the integration of these infinitesimal quantities through practically infinite time.

If Darwin, like Bruno, rejects the notion of creative power acting after human fashion, it certainly is not because he is unacquainted with the numberless exquisite adaptations on which this notion of a supernatural artificer has been founded. His book is a repository of the most startling facts of this description. Take the marvellous observation which he cites from Dr. Crüger, where a bucket, with an aperture serving as a spout, is formed in an orchid. Bees visit the flower; in eager search of material for their combs they push each other into the bucket, the drenched ones escaping from their involuntary bath by the spout. Here they rub their backs against the viscid stigma of the flower and obtain glue; then against the pollen masses, which are thus stuck to the back of the bee and carried away. "When the bee, thus provided, flies to another flower, or to the same flower a second time, and is pushed by its comrades into the bucket, and then crawls out by the passage, the pollen-mass upon its back necessarily comes first into contact with the viscid stigma," which takes up the pollen; and this is how that orchid is fertilized. Or take this other case of the *Catasetum*. "Bees visit these flowers in order to gnaw the labellum; on doing this they inevitably touch a long, tapering, sensitive projection. This, when touched, transmits a sensation or vibration to a certain membrane, which is instantly ruptured, setting free a spring, by which the pollen-mass is shot forth like an arrow in the right direction, and adheres by its viscid extremity to the back of the bee." In this way the fertilizing pollen is spread abroad.

It is the mind thus stored with the choicest materials of the teleologists that rejects teleology, seeking to refer these wonders to natural causes. They illustrate, according to him, the method of nature, not the "technic" of a man-like Artificer. The beauty of flowers is due to natural selection. Those that distinguish themselves by vividly contrasting colours from the surrounding green leaves are most readily seen, most frequently visited by insects, most often fertilized, and hence most favoured by natural selection. Coloured berries also readily attract the attention of birds and beasts, which feed upon them, spread their manured seeds abroad, thus giving trees and shrubs possessing such berries a greater chance in the struggle for existence.

With profound analytic and synthetic skill, Mr. Darwin investigates the cell-making instinct of the hive-bee. His method of dealing with it is representative. He falls back from the more perfectly to the less perfectly developed instinct—from the hive-bee to the humble bee, which uses its own cocoon as a comb, and to classes of bees of intermediate skill, endeavouring to show how the passage might be gradually made from the lowest to the highest. The saving of wax is the most important point in the economy of bees. Twelve to fifteen pounds of dry sugar are said to be needed for the secretion of a single pound of wax. The quantities of nectar necessary for the wax must therefore be vast; and every improvement of constructive instinct which results in the saving of wax is a direct profit to the insect's life. The time that would otherwise be devoted to the making of wax is now devoted to the gathering and storing of honey for winter food. He passes from the humble bee with its rude cells, through the Melipona with its more artistic cells, to the hive-bee with its astonishing architecture. The bees place themselves at equal distances apart upon the wax, sweep and excavate equal spheres round the selected points. The spheres intersect, and the planes of intersection are built up with thin laminæ. Hexagonal cells are thus formed. This mode of treating such questions is, as I have said, representative. He habitually retires from the more perfect and complex, to the less perfect and simple, and carries you with him through stages of *perfecting*, adds increment to increment of infinitesimal change, and in this way gradually breaks down your reluctance to admit that the exquisite climax of the whole could be a result of natural selection.

Mr. Darwin shirks no difficulty; and, saturated as the subject was with his own thought, he must have known, better than his critics, the weakness as well as the strength of his theory. This of course would be of little avail were his object a temporary dialectic victory instead of the establishment of a truth which he means to be everlasting. But he takes no pains to disguise the weakness he has discerned; nay, he takes every pains to bring it into the strongest light. His vast resources enable him to cope with objections started by himself and others, so as to leave the final impression upon the reader's mind that, if they be not completely answered, they certainly are not fatal. Their negative force being thus destroyed, you are free to be influenced by the vast positive mass of evidence he is able to bring before you. This largeness of knowledge and readiness of resource render Mr. Darwin the most terrible of antagonists. Accomplished naturalists have levelled heavy and sustained criticisms against him—not always with the view of fairly weighing his theory, but with the express intention of exposing its weak points only. This does not irritate him. He treats every objection with a soberness and thoroughness which even Bishop Butler might be proud to imitate, surrounding each fact with its appropriate detail, placing it in its proper relations, and usually giving it a significance which, as long as it was kept isolated, failed to appear. This is done without a trace of ill-temper. He moves over the subject with the passionless strength of a glacier; and the grinding of the rocks is not always without a counterpart in the logical pulverization of the objector. But though in handling this mighty theme all passion has been stilled, there is an emotion of the intellect incident to the discernment of new truth which often colours and warms the pages of Mr. Darwin. His success has been great; and this implies not only the solidity of his work, but the preparedness of the public mind for such a revelation. On this head a remark of Agassiz impressed me more than anything else. Sprung from a race of theologians, this celebrated man combated to the last the theory of natural selection. One of the many times I had the pleasure of meeting him in the United States was at Mr. Winthrop's beautiful residence at Brookline, near Boston. Rising from luncheon, we all halted as if by a common impulse in front of a window, and continued there a discussion which had been started at table. The maple was in its autumn glory; and the exquisite beauty of the scene outside seemed, in my case, to interpenetrate without disturbance the intellectual action. Earnestly, almost sadly, Agassiz turned, and said to the gentlemen standing round, "I confess that I was not prepared to see this theory received as it has been by the best intellects of our time. Its success is greater than I could have thought possible."

In our day great generalizations have been reached. The theory of the origin of species is but one of them. Another, of still wider grasp and more radical significance, is the doctrine of the Conservation of Energy, the ultimate philosophical issues of which are as yet but dimly seen—that doctrine which "binds nature fast in fate" to an extent not hitherto recognized, exacting from every antecedent its equivalent consequent, from every consequent its equivalent antecedent, and bringing vital as well as physical phenomena under the dominion of that law of causal connection which, as far as the human understanding has yet pierced, asserts itself everywhere in nature. Long in advance of all definite experiment upon the subject, the constancy and indestructibility of matter had been affirmed; and all subsequent experience justified the affirmation. Later researches extended the attribute of indestructibility to force. This idea, applied in the first instance to inorganic, rapidly embraced organic nature. The vegetable world, though drawing almost all its nutriment from invisible sources, was proved incompetent to generate anew either matter or force. Its matter is for the most part transmuted air; its force transformed solar force. The animal world was proved to be equally uncreative, all its motive energies being referred to the combustion of its food. The activity of each animal as a whole was proved to be the transferred activities of its molecules. The muscles were shown to be stores of mechanical force, potential until unlocked by the nerves, and then resulting in muscular contractions. The speed at which messages fly to and fro along the nerves was determined, and found to be, not as had been previously supposed, equal to that of light or electricity, but less than the speed of a flying eagle.

This was the work of the physicist: then came the conquests of the comparative anatomist and physiologist, revealing the structure of every animal, and the function of every organ in the whole biological series, from the lowest zoophyte up to man. The nervous system had been the object of profound and continued study, the wonderful and, at bottom, entirely mysterious, controlling power which it exercises over the whole organism, physical and mental, being recognized more and more. Thought could not be kept back from a subject so profoundly suggestive. Besides the physical life dealt with by Mr. Darwin, there is a psychical life presenting similar gradations, and asking equally for a solution. How are the different grades and orders of Mind to be accounted for? What is the principle of growth of that mysterious power which on our planet culminates in Reason? These are questions which, though not thrusting themselves so forcibly upon the attention of the general public, had not only occupied many reflecting minds, but had been formally broached by one of them before the 'Origin of Species' appeared.

With the mass of materials furnished by the physicist and physiologist in his hands, Mr. Herbert Spencer, twenty years ago, sought to graft upon this basis a system of psychology: and two years ago a second and greatly amplified edition of his work appeared. Those who have occupied themselves with the beautiful experiments of Plateau will remember that when two spherules of olive oil suspended in a mixture of alcohol and water of the same density as the oil, are brought together, they do not immediately unite. Something like a pellicle appears to be formed around the drops, the rupture of which is immediately followed by the coalescence of the globules into one. There are organisms whose vital actions are almost as purely physical as that of these drops of oil. They come into contact and fuse themselves thus together. From such organisms to others a shade higher, and from these to others a shade higher still, and on through an ever-ascending series, Mr. Spencer conducts his argument. There are two obvious factors to be here taken into account—the creature and the medium in which it lives, or, as it is often expressed, the organism and its environment. Mr. Spencer's fundamental principle is, that between these two factors there is incessant interaction. The organism is played upon by the environment, and is modified to meet the requirements of the environment. Life he defines to be "a continuous adjustment of internal relations to external relations."

In the lowest organisms we have a kind of tactual sense diffused over the entire body; then, through impressions from without and their corresponding adjustments, special portions of the surface become more responsive to stimuli than others. The senses are nascent, the basis of all of them being that simple tactual sense which the sage Democritus recognized 2300 years ago as their common progenitor. The action of light, in the first instance, appears to be a mere disturbance of the chemical processes in the animal organism, similar to that which occurs in the leaves of plants. By degrees the action becomes localized in a few pigment cells, more sensitive to light than the surrounding tissue. The eye is here incipient. At first it is merely capable of revealing differences of light and shade produced by bodies close at hand. Followed as the interception of the light is in almost all cases by the contact of the closely adjacent opaque body, sight in this condition becomes a kind of "anticipatory touch." The adjustment continues; a slight bulging out of the epidermis over the pigment-granules supervenes. A lens is incipient, and, through the operation of infinite adjustments, at length reaches the perfection that it displays in the hawk and eagle. So of the other senses; they are special differentiations of a tissue which was originally vaguely sensitive all over.

With the development of the senses the adjustments between the organism and its environment gradually extend in *space*, a multiplication of experiences and a corresponding modification of conduct being the result. The adjustments also extend in *time*, covering continually greater intervals. Along with this extension in space and time the adjustments also increase in speciality and complexity, passing through the various grades of brute life, and prolonging themselves into the domain of reason. Very striking are Mr. Spencer's remarks regarding the influence of the sense of touch upon the development of intelligence. This is, so to say, the mother-tongue of all the senses, into which they must be translated to be of service to the organism. Hence its importance. The parrot is the most intelligent of birds, and its tactual power is also greatest. From this sense it gets knowledge unattainable by birds which cannot employ their feet as hands. The elephant is the most sagacious of quadrupeds—its tactual range and skill, and the consequent multiplication of experiences, which it owes to its wonderfully adaptable trunk, being the basis of its sagacity. Feline animals, for a similar cause, are more sagacious than hoofed animals,—atonement being to some extent made, in the case of the horse, by the possession of sensitive prehensile lips. In the *Primates* the evolution of intellect and the evolution of tactual appendages go hand in hand. In the most intelligent anthropoid apes we find the tactual range and delicacy greatly augmented, new avenues of knowledge being thus opened to the animal. Man crowns the edifice here, not only in virtue of his own manipulatory power, but through the enormous extension of his range of experience, by the invention of instruments of precision, which serve as supplemental senses and supplemental limbs. The reciprocal action of these is finely described and illustrated. That chastened intellectual emotion to which I have referred in connexion with Mr. Darwin is, I should say, not absent in Mr. Spencer. His illustrations possess at times exceeding vividness and force; and from his style on such occasions it is to be inferred that the ganglia of this Apostle of the Understanding are sometimes the seat of a nascent poetic thrill.

It is a fact of supreme importance that actions the performance of which at first requires even painful effort and deliberation, may by habit be rendered automatic. Witness the slow learning of its letters by a child, and the subsequent facility of reading in a man, when each group of letters which forms a word is instantly, and without effort, fused to a single perception. Instance the billiard-player, whose muscles of hand and eye, when he reaches the perfection of his art, are unconsciously co-ordinated. Instance the musician, who, by practice, is enabled to fuse a multitude of arrangements, auditory, tactual and muscular, into a process of automatic manipulation. Combining such facts with the doctrine of hereditary transmission, we reach a theory of Instinct. A chick, after coming out of the egg, balances itself correctly, runs about, picks up food, thus showing that it possesses a power of directing its movements to definite ends. How did the chick learn this very complex co-ordination of eye, muscles, and beak? It has not been individually taught; its personal experience is *nil;* but it has the benefit of ancestral experience. In its inherited organization are registered all the powers which it displays at birth. So also as regards the instinct of the hive-bee, already referred to. The distance at which the insects stand apart when they sweep their hemispheres and build their cells is "organically remembered." Man also carries with him the physical texture of his ancestry, as well as the inherited intellect bound up with it. The defects of intelligence during infancy and youth are probably less due to a lack of individual experience than to the fact that in early life the cerebral organization is still incomplete. The period necessary for completion varies with the race and with the individual. As a round shot outstrips a rifled one on quitting the muzzle of the gun, so the lower race in childhood may outstrip the higher. But the higher eventually overtakes the lower, and surpasses it in range. As regards individuals, we do not always find the precocity of youth prolonged to mental power in maturity; while the dulness of boyhood is sometimes strikingly contrasted with the intellectual energy of after-years. Newton, when a boy, was weakly, and he showed no particular aptitude at school; but in his eighteenth year he went to Cambridge, and soon afterwards astonished his teachers by his power of dealing with geometrical problems. During his quiet youth his brain was slowly preparing itself to be the organ of those energies which he subsequently displayed.

By myriad blows (to use a Lucretian phrase) the image and superscription of the external world are stamped as states of consciousness upon the organism, the depth of the impression depending upon the number of the blows. When two or more phenomena occur in the environment invariably together, they are stamped to the same depth or to the same relief, and indissolubly connected. And here we come to the threshold of a great question. Seeing that he could in no way rid himself of the consciousness of Space and Time, Kant assumed them to be necessary "forms of thought," the moulds and shapes into which our intuitions are thrown, belonging to ourselves solely and without objective existence. With unexpected power and success Mr. Spencer brings the hereditary experience theory, as he holds it, to bear upon this question. "If there exist certain external relations which are experienced by all organisms at all instants of their waking lives—relations which are absolutely constant and universal—there will be established answering internal relations that are absolutely constant and universal. Such relations we have in those of Space and Time. As the substratum of all other relations of the Non-Ego, they must be responded to by conceptions that are the substrata of all other relations in the Ego. Being the constant and infinitely repeated elements of thought, they must become the automatic elements of thought—the elements of thought which it is impossible to get rid of—the 'forms of intuition.'"

Throughout this application and extension of the "Law of Inseparable Association," Mr. Spencer stands on totally different ground from Mr. John Stuart Mill, invoking the registered experiences of the race instead of the experiences of the individual. His overthrow of Mr. Mill's restriction of experience is, I think, complete. That restriction ignores the power of organizing experience furnished at the outset to each individual; it ignores the different degrees of this power possessed by different races and by different individuals of the same race. Were there not in the human brain a potency antecedent to all experience, a dog or cat ought to be as capable of education as a man. These predetermined internal relations are independent of the experiences of the individual. The human brain is the "organized register of infinitely numerous experiences received during the evolution of life, or rather during the evolution of that series of organisms through which the human organism has been reached. The effects of the most uniform and frequent of these experiences have been successively bequeathed, principal and interest, and have slowly mounted to that high intelligence which lies latent in the brain of the infant. Thus it happens that the European inherits from twenty to thirty cubic inches more of brain than the Papuan. Thus it happens that faculties, as of music, which scarcely exist in some inferior races, become congenital in superior ones. Thus it happens that out of savages unable to count up to the number of their fingers, and speaking a language containing only nouns and verbs, arise at length our Newtons and Shakespeares."

At the outset of this Address it was stated that physical theories which lie beyond experience are derived by a process of abstraction from experience. It is instructive to note from this point of view the successive introduction of new conceptions. The idea of the attraction of gravitation was preceded by the observation of the attraction of iron by a magnet, and of light bodies by rubbed amber. The polarity of magnetism and electricity appealed to the senses; and thus became the substratum of the conception that atoms and molecules are endowed with definite, attractive and repellent poles, by the play of which definite forms of crystalline architecture are produced. Thus molecular force becomes *structural.* It required no great boldness of thought to extend its play into organic nature, and to recognize in molecular force the agency by which both plants and animals are built up. In this way out of experience arise conceptions which are wholly ultra-experimental.

The *origination* of life is a point lightly touched upon, if at all, by Mr. Darwin and Mr. Spencer. Diminishing gradually the number of progenitors, Mr. Darwin comes at length to one "primordial form;" but he does not say, as far as I remember, how he supposes this form to have been introduced. He quotes with satisfaction the words of a celebrated author and divine who had "gradually learned to see that it is just as noble a conception of the Deity to believe He created a few original forms, capable of self-development into other and needful forms, as to believe that He required a fresh act of creation to supply the voids caused by the action of His laws." What Mr. Darwin thinks of this view of the introduction of life I do not know. Whether he does or does not introduce his "primordial form" by a creative act I do not know. But the question will inevitably be asked, "How came the form there?" With regard to the diminution of the number of created forms, one does not see that much advantage is gained by it. The anthropomorphism, which it seemed the object of Mr. Darwin to set aside, is as firmly associated with the creation of a few forms as with the creation of a multitude. We need clearness and thoroughness here. Two courses and two only are possible. Either let us open our doors freely to the conception of creative acts, or abandoning them let us radically change our notions of Matter. If we look at matter as pictured by Democritus, and as defined for generations in our scientific text-books, the absolute impossibility of any form of life coming out of it would be sufficient to render any other hypothesis preferable; but the definitions of matter given in our text-books were intended to cover its purely physical and mechanical properties. And taught as we have been to regard these definitions as complete, we naturally and rightly reject the monstrous notion that out of *such* matter any form of life could possibly arise. But are the definitions complete? Everything depends on the answer to be given to this question. Trace the line of life backwards, and see it approaching more and more to what we call the purely physical condition. We reach at length those organisms which I have compared to drops of oil suspended in a mixture of alcohol and water. We reach the *protogenes* of Haeckel, in which we have "a type distinguishable from a fragment of albumen only by its finely granular character." Can we pause here? We break a magnet and find two poles in each of its fragments. We continue the process of breaking, but however small the parts, each carries with it, though enfeebled, the polarity of the whole. And when we can break no longer, we prolong the intellectual vision to the polar molecules. Are we not urged to do *something* similar in the case of life? Is there not a temptation to close to some extent with Lucretius, when he affirms that "Nature is seen to do all things spontaneously of herself without the meddling of the gods"? or with Bruno, when he declares that Matter is not "that mere empty *capacity* which philosophers have pictured her to be, but the universal mother who brings forth all things as the fruit of her own womb"? The questions here raised are inevitable. They are approaching us with accelerated speed, and it is not a matter of indifference whether they are introduced with reverence or with irreverence. Abandoning all disguise, the confession that I feel bound to make before you is that I prolong the vision backward across the boundary of the experimental evidence, and discern in that Matter, which we in our ignorance, and notwithstanding our professed reverence for its Creator, have hitherto covered with opprobrium, the promise and potency of every form and quality of Life.

The "materialism" here enunciated may be different from what you suppose, and I therefore crave your gracious patience to the end. "The question of an external world," says Mr. J. S. Mill, "is the great battle-ground of metaphysics."* Mr. Mill himself reduces external phenomena to "possibilities of sensation." Kant, as we have seen, made time and space "forms" of our own intuitions. Fichte, having first by the inexorable logic of his understanding proved himself to be a mere link in that chain of eternal causation which holds so rigidly in nature, violently broke the chain by making nature, and all that it inherits, an apparition of his own mind.† And it is by no means easy to combat such notions. For when I say I see you, and that I have not the least doubt about it, the reply is, that what I am really conscious of is an affection of my own retina. And if I urge that I can check my sight of you by touching you, the retort would be that I am equally transgressing the limits of fact; for what I am really conscious of is, not that you are there, but that the nerves of my hand have undergone a change. All we hear, and see, and touch, and taste, and smell, are, it would be urged, mere variations of our own condition, beyond which, even to the extent of a hair's breadth, we cannot go. That anything answering to our impressions exists outside of ourselves is not a *fact*, but an *inference*, to which all validity would be denied by an idealist like Berkeley, or by a sceptic like Hume. Mr. Spencer takes another line. With him, as with the uneducated man, there is no doubt or question as to the existence of an external world. But he differs from the uneducated, who think that the world really *is* what consciousness represents it to be. Our states of consciousness are mere *symbols* of an outside entity which produces them and determines the order of their succession, but the real nature of which we can never know.‡ In fact, the whole process of evolution is the manifestation of a Power absolutely inscrutable to the intellect of man. As little in our day as in the days of Job can man by searching find this Power out. Considered fundamentally, it is by the operation of an insoluble mystery that life is evolved, species differentiated, and mind unfolded from their prepotent elements in the immeasurable past. There is, you will observe, no very rank materialism here.

The strength of the doctrine of evolution consists, not in an experimental demonstration (for the subject is hardly accessible to this mode of proof), but in its general harmony with the method of nature as hitherto known. From contrast, moreover, it derives enormous relative strength. On the one side we have a theory (if it could with any propriety be so called) derived, as were the theories referred to at the beginning of this Address, not from the study of nature, but from the observation of men—a theory which converts the Power whose garment is seen in the visible universe into an Artificer, fashioned after the human model, and acting by broken efforts, as man is seen to act. On the other side we have the conception that all we see around us, and all we feel within us—the phenomena of physical nature as well as those of the human mind—have their unsearchable roots in a cosmical life, if I dare apply the term, an infinitesimal span of which only is offered to the investigation of man. And even this span is only knowable in part. We can trace the development of a nervous system, and correlate with it the parallel phenomena of sensation and thought. We see with undoubting certainty that they go hand in hand. But we try to soar in a vacuum the moment we seek to comprehend the connexion between them. An Archimedean fulcrum is here required which the human mind cannot command; and the effort to solve the problem, to borrow an illustration from an illustrious friend of mine, is like the effort of a man trying to lift himself by his own waistband. All that has been here said is to be taken in connexion with this fundamental truth. When "nascent senses" are spoken of, when "the differentiation of a tissue at first vaguely sensitive all over" is spoken of, and when these processes are associated with "the modification of an organism by its environment," the same parallelism, without contact, or even approach to contact, is implied. There is no fusion possible between the two classes of facts—no motor energy in the intellect of man to carry it without logical rupture from the one to the other.

Further, the doctrine of evolution derives man, in his totality, from the interaction of organism and environment through countless ages past. The Human Understanding, for example—that faculty which Mr. Spencer has turned so skilfully round upon its own antecedents—is itself a result of the play between organism and environment through cosmic ranges of time. Never surely did prescription plead so irresistible a claim. But then it comes to pass that, over and above his understanding, there are many other things appertaining to man whose prescriptive rights are quite as strong as that of the understanding itself. It is a result, for example, of the play of organism and environment that sugar is sweet and that aloes are bitter, that the smell of henbane differs from the perfume of a rose. Such facts of consciousness (for which, by the way, no adequate reason has ever yet been rendered) are quite as old as the understanding itself; and many other things can boast an equally ancient origin. Mr. Spencer at one place refers to that most powerful of passions—the amatory passion—as one which, when it first occurs, is antecedent to all relative expe-

* 'Examination of Hamilton,' p. 154.

† 'Bestimmung des Menschen.'

‡ In a paper, at once popular and profound, entitled 'Recent Progress in the Theory of Vision,' contained in the volume of Lectures by Helmholtz, published by Longmans, this symbolism of our states of consciousness is also dwelt upon. The impressions of sense are the mere *signs* of external things. In this paper Helmholtz contends strongly against the view that the consciousness of space is inborn; and he evidently doubts the power of the chick to pick up grains of corn without some preliminary lessons. On this point, he says, further experiments are needed. Such experiments have been since made by Mr. Spalding, aided, I believe, in some of his observations by the accomplished and deeply lamented Lady Amberley; and they seem to prove conclusively that the chick does not need a single moment's tuition to teach it to stand, run, govern the muscles of its eyes, and peck. Helmholtz, however, is contending against the notion of pre-established harmony; and I am not aware of his views as to the organization of experiences of race or breed.

rience whatever; and we may pass its claim as being at least as ancient and as valid as that of the understanding itself. Then there are such things woven into the texture of man as the feeling of awe, reverence, wonder, and not alone the sexual love just referred to, but the love of the beautiful, physical and moral, in Nature, Poetry, and Art. There is also that deep-set feeling which, since the earliest dawn of history, and probably for ages prior to all history, incorporated itself in the religions of the world. You who have escaped from these religions into the high and-dry light of the understanding may deride them; but in so doing you deride accidents of form merely, and fail to touch the immovable basis of the religious sentiment in the emotional nature of man. To yield this sentiment reasonable satisfaction is the problem of problems at the present hour. And grotesque in relation to scientific culture as many of the religions of the world have been and are—dangerous, nay, destructive, to the dearest privileges of freemen as some of them undoubtedly have been, and would, if they could, be again—it will be wise to recognize them as the forms of a force, mischievous, if permitted to intrude on the region of *knowledge*, over which it holds no command, but capable of being guided by liberal thought to noble issues in the region of *emotion*, which is its proper sphere. It is vain to oppose this force with a view to its extirpation. What we should oppose, to the death if necessary, is every attempt to found upon this elemental bias of man's nature a system which should exercise despotic sway over his intellect. I do not fear any such consummation. Science has already to some extent leavened the world, and it will leaven it more and more. I should look upon the mild light of science breaking in upon the minds of the youth of Ireland, and strengthening gradually to the perfect day, as a surer check to any intellectual or spiritual tyranny which might threaten this island, than the laws of princes or the swords of emperors. Where is the cause of fear? We fought and won our battle even in the Middle Ages: why should we doubt the issue of a conflict now?

The impregnable position of science may be described in a few words. All religious theories, schemes, and systems which embrace notions of cosmogony, or which otherwise reach into its domain, must, in so far as they do this, submit to the control of science, and relinquish all thought of controlling it. Acting otherwise proved disastrous in the past, and it is simply fatuous to-day. Every system which would escape the fate of an organism too rigid to adjust itself to its environment, must be plastic to the extent that the growth of knowledge demands. When this truth has been thoroughly taken in, rigidity will be relaxed, exclusiveness diminished, things now deemed essential will be dropped, and elements now rejected will be assimilated. The lifting of the life is the essential point; and as long as dogmatism, fanaticism, and intolerance are kept out, various modes of leverage may be employed to raise life to a higher level. Science itself not unfrequently derives motive power from an ultra-scientific source. Whewell speaks of enthusiasm of temper as a hindrance to science; but he means the enthusiasm of weak heads. There is a strong and resolute enthusiasm in which science finds an ally; and it is to the lowering of this fire, rather than to a diminution of intellectual insight, that the lessening productiveness of men of science in their mature years is to be ascribed. Mr. Buckle sought to detach intellectual achievement from moral force. He gravely erred; for without moral force to whip it into action, the achievements of the intellect would be poor indeed.

It has been said that science divorces itself from literature: the statement, like so many others, arises from lack of knowledge. A glance at the less technical writings of its leaders—of its Helmholtz, its Huxley, and its Du Bois-Reymond—would show what breadth of literary culture they command. Where among modern writers can you find their superiors in clearness and vigour of literary style? Science desires not isolation, but freely combines with every effort towards the bettering of man's estate. Single-handed, and supported not by outward sympathy, but by inward force, it has built at least one great wing of the many-mansioned home which man in his totality demands. And if rough walls and protruding rafter-ends indicate that on one side the edifice is still incomplete, it is only by wise combination of the parts required with those already irrevocably built that we can hope for completeness. There is no necessary incongruity between what has been accomplished, and what remains to be done. The moral glow of Socrates, which we all feel by ignition, has in it nothing incompatible with the physics of Anaxagoras, which he so much scorned, but which he would hardly scorn to-day. And here I am reminded of one amongst us, hoary, but still strong, whose prophet-voice some thirty years ago, far more than any other of this age, unlocked whatever of life and nobleness lay latent in its most gifted minds—one fit to stand beside Socrates or the Maccabean Eleazar, and to dare and suffer all that they suffered and dared—fit, as he once said of Fichte, "to have been the teacher of Stoa, and to have discoursed of Beauty and Virtue in the groves of Academe." With a capacity to grasp physical principles which his friend Goethe did not possess, and which even total lack of exercise has not been able to reduce to atrophy, it is the world's loss that he, in the vigour of his years, did not open his mind and sympathies to science, and make its conclusions a portion of his message to mankind. Marvellously endowed as he was—equally equipped on the side of the Heart and of the Understanding—he might have done much towards teaching us how to reconcile the claims of both, and to enable them in coming times to dwell together in unity of spirit and in the bond of peace.

And now the end is come. With more time, or greater strength and knowledge, what has been here said might have been better said, while worthy matters here omitted might have received fit expression. But there would have been no material deviation from the views set forth. As regards myself, they are not the growth of a day; and as regards you, I thought you ought to know the environment which, with or without your consent, is rapidly surrounding you, and in relation to which some adjustment on your part may be necessary. A hint of Hamlet's, however, teaches us all how the troubles of common life may be ended; and it is perfectly possible for you and me to purchase intellectual peace at the price of intellectual death. The world is not without refuges of this description; nor is it wanting in persons who seek their shelter and try to persuade others to do the same. I would exhort you to refuse such shelter, and to scorn such base repose—to accept, if the choice be forced upon you, commotion before stagnation, the leap of the torrent before the stillness of the swamp. In the one there is at all events life and, therefore, hope; in the other none. I have touched on debatable questions, and led you over dangerous ground—and this partly with the view of telling you, and through you the world, that as regards these questions science claims unrestricted right of search. It is not to the point to say that the views of Lucretius and Bruno, of Darwin and Spencer, may be wrong. Here I should agree with you, deeming it indeed certain that these views will undergo modification. But the point is, that, whether right or wrong, we claim the freedom to discuss them. The ground which they cover is scientific ground; and the right claimed is one made good through tribulation and anguish, inflicted and endured in darker times than ours, but resulting in the immortal victories which science has won for the human race. I would set forth equally the inexorable advance of man's understanding in the path of knowledge, and the unquenchable claims of his emotional nature which the understanding can never satisfy. The world embraces not only a Newton, but a Shakespeare—not only a Boyle, but a Raphael—not only a Kant, but a Beethoven—not only a Darwin, but a Carlyle. Not in each of these, but in all, is human nature whole. They are not opposed, but supplementary—not mutually exclusive, but reconcilable. And if, still unsatisfied, the human mind with the yearning of a pilgrim for his distant home, will turn to the Mystery from which it has emerged, seeking so to fashion it as to give unity to thought and faith, so long as this is done, not only without intolerance or bigotry of any kind, but with the enlightened recognition that ultimate fixity of conception is here unattainable, and that each succeeding age must be held free to fashion the mystery in accordance with its own needs—then, in opposition to all the restrictions of Materialism, I would affirm this to be a field for the noblest exercise of what, in contrast with the *knowing* faculties, may be called the *creative* faculties of man. Here, however, I must quit a theme too great for me to handle, but which will be handled by the loftiest minds ages after you and I, like streaks of morning cloud, shall have melted into the infinite azure of the past.

Parliamentary and Law Proceedings.

Conviction under the Pharmacy Act, 1868.

Mr. George Day, of No. 3, Farringdon Road, Clerkenwell, was summoned before Mr. Arnold, at the Clerkenwell Police Court, for an offence under the 17th section of the Pharmacy Act, 1868, by having sold oxalic acid without affixing the name of the article, and the name and address of the seller, to it.

The case was first brought before the magistrate on Wednesday, the 5th inst.; but, as the accused was not present, the summons was adjourned until the 12th, when Mr. Flux appeared for the prosecution. The accused was undefended.

Mr. Flux opened the case, explaining the circumstances to the magistrate, and commenting upon the section of the Act infringed, and said, as he did not wish to occupy the time of the Court, he would at once call William West.

The accused here interposed, and protested against his own servant being called against him, but the magistrate said, as he was called, he must give evidence or he would be committed.

William West was then sworn. He deposed that he was the manager of the shop, at No. 3, Farringdon Road—that the business belonged to Mr. Day, that he (Mr. Day) resided at the Clerkenwell public-house, three doors from the shop, and that he remembered selling the poison on the 4th of this month. Cross-examined by the accused, said that he had been thirty years in the profession, and considered he was perfectly qualified to manage the shop. Re-examined, said that he was not on the Register of Chemists and Druggists.

Mr. Ward, clerk to Messrs. Flux and Co., deposed to having, on the 4th August, purchased at the shop, at No. 3, Farringdon Road, a packet of oxalic acid which he produced; it bore the name of a Mr. Howse, and the address, 29, Exmouth street, Clerkenwell.

Dr. Redwood, Professor of Chemistry to the Pharmaceutical Society and public analyst for Clerkenwell, proved the analysis of the packet, and that it was oxalic acid.

Mr. Flux then addressed the magistrate, saying that the prosecution was instituted solely for the protection of the public, and to restrain unqualified persons from carrying on the business of a chemist and druggist, and without any vindictive feelings at all.

The accused then said that he admitted that the shop belonged to him. He was a contractor, and had a large property there, and he had taken the shop from the previous occupier to save himself from loss, and in the agreement was a clause authorizing him to use the name of Mr. Howse. He had since moved the shop from 29, Exmouth street, to 3, Farringdon Road, three doors off. If he had done wrong it was unwittingly.

Mr. Flux here put in a correspondence which had passed between Mr. Bremridge, the Registrar appointed under the provisions of the Pharmacy Act, 1868, and the accused, showing that, as far back as November last, he had been warned that he was carrying on the business illegally.

In the end the magistrate said that there had evidently been a breach, but he thought it was not a fraudulent one, and, therefore, he should bind the accused over in his own recognizances to come up for judgment when called upon.

BOOKS RECEIVED.

Tea, Coffee, and Cocoa. A Practical Treatise on the Analysis of Tea, Coffee, Cocoa, Chocolate, Maté (Paraguay Tea), etc. By J. Alfred Wanklyn, M.R.C.S., etc. London: Trübner and Co. 1874. From the Author.

Materia Medica and Therapeutics. Vegetable Kingdom. By Charles D. F. Phillips, M.D., F.R.C.S.E. London: J. and A. Churchill. 1874. From the Author.

Nouveau Dictionnaire des Falsifications et des Altérations des Aliments, des Médicaments et de quelques Produits employés dans les Arts, l'Industrie et l'Économie domestique. Par J. Léon Soubeiran. Paris: J. B. Baillière et fils. 1874. From the Author.

Obituary.

Notice has been received of the death of the following:—

On the 30th July, 1874, Mr. Henry Brooke Muriel, Pharmaceutical Chemist, of Wentworth Street, Brighton. Mr. Muriel was one of the founders of the Pharmaceutical Society.

On the 2nd March, 1874, Mr. William Goodess, Chemist and Druggist, of Leicester.

On the 4th July, 1874, Mr. W. H. J. Ford, Chemist and Druggist, of Shiffnal.

On the 11th July, 1874, Mr. Walter T. W. Elkington, Chemist and Druggist, of Leicester.

On the 11th July, 1874, Mr. Robert Durden, Chemist and Druggist, of Fulham Road, London.

On the 17th July, 1874, Mr. John P. Cadby, Chemist and Druggist, of Margate.

On the 28th July, 1874, Mr. Joseph James Harrison, Chemist and Druggist, of Market Harborough. Mr. Harrison had been an Associate of the Society since 1869.

On the 29th July, 1874, Mr. Sedgwick Hodgkinson Cooper, Chemist and Druggist, of West Hartlepool.

On the 1st August, 1874, Mr. Joseph Steele Smith, Chemist and Druggist, of Westminster.

On the 5th August, 1874, Mr. B. L. Burrows, Chemist and Druggist, of Norwich.

On the 5th August, Mr. Thomas Dunlop, Chemist and Druggist, of Newcastle-on-Tyne. Mr. Dunlop was recently elected an Associate of the Pharmaceutical Society.

On the 5th of August, 1874, Mr. Thomas Hall Dunlop, Chemist and Druggist, of Newcastle-on-Tyne.

On the 8th August, 1874, Mr. George Noble, Chemist and Druggist, of Hull.

Notes and Queries.

"AUREOLINE."—Will any correspondent kindly furnish me with a formula for a golden hair-dye, so extensively used at the present time?—Querist.

Can any reader oblige by informing me how I can dye brown or auburn hair, a light golden colour.—F. A. B.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SESSIONAL PRIZES.

Sir,—I observed, with not a little surprise, in the last number of your Journal, that the Council in London had awarded the "£2 Prize of Books" to a candidate who also carried off the "Pereira Medal." Now as the Book Prize is intended for those who have passed the "Minor Examination" in honours, while the Medal is attainable only by those taking honours in the "Major," it surely follows that anyone attempting the higher honour should render himself ineligible in the same year to compete for the lesser one, thus depriving many a deserving youth of the prize he had hoped for, and who probably had worked harder for the same end than the student fresh from Bloomsbury Square, after a training of several sessions of college tuition under learned professors.

Further, I think it is scarcely just that the competition is only open to candidates who present themselves in London or Edinburgh, after so many centres have been made for conducting the "Preliminary," and both are written Examinations: thus again throwing a great obstacle in the way of country Associates, who have little encouragement to pursue their studies, and still less opportunity of testing their knowledge, and who, though willing and possibly quite as able as their more advantageously situated friends, are deprived of the trial in so far as no sensible person would risk travelling expenses (which might exceed the value of the prize) on merely a chance of success. Apologizing for occupying so much of your space, I am, etc.,

August 12th, 1874. FAIRPLAY.

THE LADIES' CLOAK-ROOM.

Sir,—Will you allow me to say a few words on behalf of myself and my fellow students in regard to the obstacle which at present bars our entrance to the laboratory of the Pharmaceutical Society at Bloomsbury Square, namely, the absence of a ladies' cloak-room. We quite agree with Mr. Sandford, that the privacy of the porter's bedroom should not be invaded; at the same time we are willing—without a murmur or reproach against the courtesy of the Pharmaceutical Society—to dispense altogether with a cloak room. If obliged to divest ourselves of cloaks and bonnets before entering the laboratory, we will gladly, if allowed, hang them up in the hall, or if that be not permitted, we will bear them on our backs and heads. In the present day, fashion does not inconvenience ladies with large and handsome cloaks, and as to bonnets, our aching heads puzzling over the mysteries of tests, precipitates, and crystallization, can scarcely be aware of their presence or absence.

We earnestly trust that a matter of detail so unimportant to the persons interested, will not be allowed to prevent us and other lady students from taking the best means to obtain the education we desire.

August 12th, 1874. ALICE HART.

THE OILS OF CHINESE PHARMACY AND COMMERCE.

Sir,—In reply to Mr. D. Hanbury, I beg to say that the statement that cassia oil is obtained by distillation from the leaves and twigs of the cassia tree is not the result of personal observation, but is based upon a statement of Dr. S. W. Williams, long a resident at Canton. He is now Chinese Secretary at the American Legation, Peking.

The oleum malabathri thus made has beeen so named from the old name of the leaves of the *Cinnamomum tamala*, called folia tamalapathri, shortened and corrupted into folia malabathri.

These folia malabathri were formerly exported from Canton, and, like many Chinese exports (such as "Indian ink," "India paper"), were sent to Western ports as the "Indian leaf." The oil has apparently taken the place of the leaves and been named after them. If Mr. Hanbury will refer to page 196 of Dr. Waring's 'Pharmacopœia of India,' London, 1868, or to page 113 of the fifth edition of the 'Chinese Commercial Guide' of Dr. S. W. Williams, he will find some account of the oil and leaves. Absence from home must be my apology for so late a reply.

Shepton Mallet, August 14th, 1873. F. PORTER SMITH.

W. F. Caunt.—A recipe for a cement for india-rubber was given in the *Pharmaceutical Journal* for January 31st last, p. 628.

W. Bill.—The reason why so many failed in the July examination is obvious. An unusually large number of young men presented themselves, either wholly unprepared, or entirely ignorant of the nature of the examination. They were doubtless induced to appear in consequence of the alteration in the examinations that will come into force in October next.

"*Minor.*"—(1) The works mentioned are among the best for the purpose, but it would be injudicious to confine your reading to one author on each subject. (2) 'Deschanel's Natural Philosophy,' or 'Ganot's Physics.'

W. Adams.—(1) *Aristolochia longa.* (2) *Acacia scandens.*

W. W. W.—You will find the subjects of the examination stated in the Regulations of the Board of Examiners, a copy of which may be obtained from the Secretary. We do not know that the questions have any relation to particular pages in the work mentioned.

W. H.—The Botanical Prize for the present year has been awarded; but one has been announced for 1875, information respecting which will be found in the *Pharmaceutical Journal* for April 25th last, p. 857.

H. Bennett.—No distinction between the sexes is made in the terms of the Arsenic Act.

"*Smilax.*"—There can be no doubt that the label sent would render a stamp necessary, because it recommends a certain preparation as a remedy for the cure or relief of disease, and also represents it to be a secret preparation.

F. W. H.—For full particulars you are referred to the Pharmacy Act, 1868.

M. G.—Apply to Mr. Gerrard, University College Hospital, Gower Street, W.C.

Frank Long, Murree, Punjab.—Mix the ingredients well together, avoiding the use of spirit in powdering the camphor, and add six grains of light calcined magnesia. On mixing well again, the mass will be found sufficiently hard and plastic to be rolled out easily into pills, which will retain their shape and take the silver readily. Avoid the use of more magnesia or the pills will be insoluble. The hard kind of assafœtida, should, of course, be selected for such a pill mass.

T. G. T.—The reaction would consist mainly in the reduction of the sulphuric acid, and the production of sulphurous and carbonic acids.

W. Bartholomew.—The mixture will have a precipitate and require shaking.

G. C. Druce.—We thank you for the account of the botanical ramble of the Northampton Pharmaceutical Association on the 15th May last, but are unable to avail ourselves of your kindness in consequence of the pressure of more recent matters.

H. G. R.—Probably Cooley's 'Cyclopædia of Practical Receipts,' the fifth edition of which, edited by Professor Tuson, was published in 1872, by J. and A. Churchill.

"*A Reader.*"—The particulars respecting the Library are published weekly among the official notices on the cover of the Journal.

J. Tomlinson.—Such a person not being an Associate of the Pharmaceutical Society would not be allowed to call himself one.

"*Student.*"—No certificate is given.

Exhibition of Objects relating to Pharmacy.—We have received a letter from Messrs. Roberts and Co., of New Bond Street, stating that the articles shown under their name in the above exhibition were sent from their London house, and that their Paris house was not represented. Merely from the note-heading and envelope used in this communication we should have thought the firms were identical, and that any correction of our report was unnecessary.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Allen, Mr. Hoffmann, Mr. Attenburrow, Mr. W. H. Symons, Mr. R. J. Shields, Mr. Roberts, Mr. Ireland, H. C., H. G. R., W. W., "Echo," "Ignoramus."

AUSTRALIAN JOTTINGS.

BY T. H. HUSTWICK.

It is a remark frequently made by fresh arrivals that, at first sight, the city of Melbourne presents very much of an English appearance; this impression, however, is gradually removed as the acquaintance becomes extended, and many details are brought to view which cannot fail to remind a "new chum" that though in a city of the British empire, he is not in Great Britain. A walk through the streets of Melbourne shows us, for instance, shops of all kinds and sizes, as thoroughly English in appearance as any in London or Liverpool, public buildings as extensive and imposing, and municipal institutions in full operation. Extend the walk beyond the line of shops, note the one-storied houses, with the lavish growth of passion-flower or jasmine clothing the verandah, and even the roof with their wealth of bloom and cool green foliage; perfumes unusual to English senses salute us as we pass, from myrtle, orange, and others of like fragrance; in the garden fences the prickly pear is conspicuous by its eccentric growth and forbidding spines; rising from the lawn of the trim villa is the Norfolk Island pine, most perfect and symmetrical of its species; elsewhere a beautiful palm raises its head of dark green above the surrounding shrubs, and here and there, in favoured spots, one comes across a lovely tree fern, characteristic of this southern land. Soon—perhaps too soon—the eye becomes accustomed to these new sights, and we turn to sights and occupations more in accord with our home feelings and experience. Among other trades and professions carried on here, that of the chemist and druggist occupies, as at home, a prominent position; to enter a druggist's shop is to an old hand to feel at home; all seems exactly similar to that which he has but lately left, even to the well-known diploma of the Pharmaceutical Society of Great Britain, and it is no exaggeration to say that the better shops of this kind in Melbourne can hold their own against many well-known London houses, either for excellence of appointments, amount and variety of stock, or skill and reputation of the proprietor. With much to commend, there is also that which should be contemned. Late into the night many red lamps and illuminated interiors show that the druggist competes with the tobacconist and others of that class for the last possible shilling of the day's trade, and on Sundays the shop-door kept half open throughout the day reveals the fact that the English institution of late hours and Sunday trade is in a flourishing state. In the country the case is not so bad; there the druggist can afford to dispense with these accessories; often he has no competitor for miles, perhaps within half a day's ride; as a consequence, a mutual understanding between him and his customers is in existence. As it was "up the country" where the writer first made acquaintance with Australian pharmacy, while on a visit to a relative engaged in the trade, perhaps a few words in regard to that aspect of it may not be out of place. Prior to this, a journey of 150 miles had to be accomplished, chiefly by coach. Of the incidents connected therewith this is not exactly the place to speak, save that to witness a sunrise in the bush, with its concomitant awakening of animal life, and to inhale the delicious odours exhaled by countless eucalyptus trees under the influence of the early sun, together with the novel and varied scenery gradually unfolded to our view, was more than sufficient compensation for a night spent inside a stage-coach. The establishment required by a country druggist need not be either elaborate or extensive. Provided he has a fair amount of room for his "fixings," he requires no display, for it is not by such that he will succeed; his reputation, for good or evil will spread rapidly enough from within. He must be steady, competent, handy at other acquirements than those of his own business, good at prescribing, dentistry, and minor surgery, able to perform such an operation as Halford's ammonia-injection for snake bite, and competent, on a pinch, to act as *locum tenens* to the doctor during illness or temporary absence. For the exercise of these faculties he is rewarded with a liberality unknown to many a practitioner at home, and with a cheerfulness surprising to a stranger. In dispensing too, he does well, seldom taking less than double the home prices, and often exceeding that. He need not be particular as to the style in which he sends out his medicines; any kind of a bottle, wine or beer, will do if clean, as medicine bottles are scarce and dear in the bush, costing much in carriage. White demy is not often used, except to fold powders in; an old newspaper will hide the shape and contents of the bottle as well as any other kind, neither is a boy requisite to carry out the physic in a neat basket; if the customers cannot come or send at the time, why, they just wait till they can. On the whole the life of an "up country" druggist is not an unpleasant one; business is generally prosperous; he is not eternally tied down to his counter; can shut up at dark; with a little management can get a day's shooting, fishing, or kangarooing, now and then, without business suffering, for if his intention be made known beforehand, customers are compliant, and do not grudge a holiday now and then. From his generally superior education, he is able to take a leading position amongst those around him, while, if steady in habits and clever in business, he commands a reputation over a wide extent of country. In the larger towns, the chemist's experience is much the same as at home, but though hampered by long hours and Sunday trade, competition is not so ruinously keen; though rents and expenses are high, he obtains good prices for his goods and services; purchases, too, are made for larger amounts than at home, the shilling usually being the unit of purchase-money. Altogether, I think the position of the chemist and druggist here superior to that at home. It is his own fault that he keeps unreasonable hours; he is better remunerated in every way, while the trade and payments have not, and I think are not likely to assume the contemptible proportions they so often present in many English towns; diligence and sobriety find a speedy reward, and to men of a scientific turn of mind, a congenial opening is often presented by the demands of mining pursuits, and the opening out of new industries where a knowledge of chemistry is desirable. When the Colonial Pharmacy Act becomes law its benefits will be as much appreciated as those of the English Act were; chief of them will be that clause confining the sale of poisons, which is something enormous, to its proper channels. Did time and space permit, I could give instances of the imperative necessity for such legislation. The remuneration of assistants is on a corresponding liberal scale, averaging quite double the home rate,—an ordinary hand receiving about £2 per week, indoors, occasionally rising to £3. I am informed that there is a steady demand for the services of English assistants, and my own observation is in favour of the assertion; indeed, no "new chum" in search of employment in our trade need be idle long if he can produce satisfactory evidence as to his capabilities and character; he will also find the possession of one or both of the certificates of the Pharmaceutical Society will be considerably to his benefit. The well-educated assistant, if scientifically inclined, will find much to engage his attention. If chemistry be his *forte*, the many compounds of the inorganic kingdom, in the way of mineral ores, will doubtless interest him; if a lover of botany, he will find an entirely new and gorgeous page of nature's book opened out to him; the study of zoology and entomology may abundantly occupy his leisure out of doors, while the microscope will afford the like solace for indoor leisure. What change could be more desirable for one wishful to enlarge his experience, or one weary of the anxieties of business at home, with its small and uncertain results, and the constant strain on the mind from the daily endeavours to make both ends meet, than to come to one of these antipodean colonies, where with a fresh start past anxieties may be forgotten, and where all the surroundings are conducive to health of body and strength of mind?

The character of the drug trade in the colony is, of course, much the same as at home, and as I before remarked, in the larger towns shops are found as elegantly fitted and as well supplied as there. Judging from the quantity of patent medicines sold, I imagine the consumption per head of the population to be very much greater than in England, and they form a considerable portion of the stock of nearly every country storekeeper, who, besides these and many domestic remedies, deals in such things as arsenic and strychnia, which are often purchased in large quantities by squatters for checking the ravages of the "dingo," or native dog, among their flocks. In addition to the well-known English cure-alls the colony is flooded with American nostrums, many of which are perhaps hardly known at home; these have an immense sale, and, considering their high prices, must be very remunerative to their proprietors. Another peculiarity of colonial pharmacy is the large trade in American herbs. Here at Sandhurst we keep in stock over a hundred varieties. They are prepared chiefly at Boston, and are sent out in a compressed state, roots, barks, and herbs, and are patterns of preservation, the colour and aroma of each parcel, even after the lapse of many months, being all that can be desired. The principal demand for these is from the "Spiritists" and Coffinites; of the former class, there is one practising as a physician in Melbourne, whose advice is sought far and wide, and who enjoys a degree of fame attained by but few of the legitimate profession; his manner of proceeding, I am told, is as follows:—All communications must be in writing, and contain, besides a lock of the patient's hair, a statement of his or her age, sex, and occupation—no symptoms need to be detailed, as the spirits supply all necessary information to their medium, the physician, who, in due time, forwards to the sufferer a paper containing a full description of the malady and the organs implicated therein. As pretty nearly every function of the body is mentioned in each case as being disordered, the probability is that the right one is included. Then follow the prescriptions, usually two, for herbal infusions and decoctions, concluding with a few directions as to diet, living, etc., the latter seemingly the most sensible part of the lot. Many of these prescriptions have come under my notice, and there is a very suspicious sameness throughout. It is by no means essential to be a believer in Spiritualism to enjoy these benefits, but it must require a large amount of gullibility and a capacity for swallowing any amount of nauseous physic not usually met with among enlightened people. Still, I am informed that many wonderful cures have been effected under the system, even after the treatment of the "schools," as Dr. Coffin says, has failed to produce benefit. For those who are curious in such matters, I enclose copies of some of these prescriptions; perhaps some of your readers who suffer from the symptoms here detailed may take a hint.

"Imperfect action of liver, stomach, and excretory functions, unhealthy condition of blood, derangement of reproductive organs, and want of nervous tone.

Remedy No. 1.

Infuse ½ oz. each—Agrimony, balmony, and bayberry in 1½ pints of boiling water.

Dose—a wine-glassful twice a day on an empty stomach.

No. 2.

Infuse—

Goldenseal	¼ oz.
Bittersweet	¼ "
Blue Cohoch	¼ "
Senna	1 dr.
Pennyroyal	3 drs.

in a pint of boiling water.

Dose—a large wine-glassful at bed-time.

Diet—Light and easy of digestion. As little slop as possible."

"Weakness of the lungs and pleura, spleen torpid, imperfect action of the liver, digestive and excretory functions, weakness in reproductive organs and lumbar-region, debility of blood, and want of nervous tone.

Remedy No. 1.

Put ¾ oz. of sassafras, ¼ oz. composition in 1½ pints of water, boil fifteen minutes and strain.

Dose—a large wine-glassful in warm milk early in the morning.

No. 2.

Infuse ¾ oz. red centaury in ¾ pint of boiling water; when cool, add a glass of good rum.

Dose—a wine-glassful at mid-day.

No. 3.

Infuse—

Blue Cohoch	¼ oz.
Dittany	¼ "
Elecampane	¼ "
Blood Root	¼ "
Mandrake	1 dr.

in a pint of boiling water.

Dose—A large wine-glassful at bed-time.

Take a warm sitz bath twice a week.

Diet—Light and easy of digestion—not much tea or other hot slop."

"The singing in the head cannot be cured except by a long course of mesmeric treatment, but the symptoms may be modified. The action of the liver, digestive and excretory functions are imperfect and the circulation bad. I annex prescription:—

Remedy No. 1.

Put 1¼ oz. sassafras into 1½ pints of water, and boil fifteen minutes.

Dose—a large wine-glassful twice a day on an empty stomach.

No. 2.

Infuse ¼ oz. of each—Mandrake, bittersweet, black root. and chamomile in a pint of boiling water.

Dose—a large wine-glassful at bed-time.

Well rub the right side with oil of eucalyptus and olives for about ten minutes daily. Eat plenty of fresh grapes, avoid stimulants, and take as little hot slops as possible."

In conclusion, I would observe to those who think they may improve their position by emigration, that many British Colonies have attained the limits of their development, and are well supplied with various trades and professions. Australian colonization, wonderful in its past, will probably be yet more so in its future; new settlements and townships are continually springing up, railways rapidly opening out the resources of the country, and already the telegraph spans the continent from ocean to ocean. Besides all this, there is an extent of country practically unlimited yet to be peopled. Here are advantages possessed by no other colony of the same age, and many generations yet to come will bear witness to the fufilment of the sentiment embodied in the motto of this land, "Advance Australia!"

SYRUP OF BROMIDE OF IRON.

BY M. H. STILES, M.P.S.

I noticed in a recent number of the Journal a formula for syrup of bromide of iron, taken from a French paper on the subject. About six weeks ago I had occasion to prepare some of the syrup for a prescription. This was made to contain three grains of bromide of iron in each fl. ʒj., which, from inquiries I have since made, is the strength usually recommended in this country.

The syrup made by M. Prince is only about one-seventh this strength, and is scarcely in accordance with English ideas of what such a preparation should be. The following is the process I adopted :—

Take of—

Thin Iron Wire, free from rust . . .	½ oz.
Bromine	320 grs.
Distilled Water	1 oz.

Put the wire and water in an 8-oz. flask, the lower portion of which is placed in a vessel of cold water, add the bromine gradually, corking the flask after each addition, and taking care that one portion is nearly neutralized before another is poured in. When all the bromine has been added, heat the flask gently until the brown colour disappears, and filter the solution, whilst hot, through paper; wash the wire with a little distilled water, filter the washings, add them to the filtrate, and make the resulting liquid measure fl. ℥ij. Mix this with fl. ℥xvj. of syrup. One fluid-drachm contains three grains of $FeBr_2$.

If the flask be not kept cool, and the process controlled in the manner directed, the action becomes so violent that a considerable portion of the bromine is lost.

Bromide of iron is also given in combination with bromide of quinine or bromide of strychnia, or with both, the amount of these in fl. ʒj of the syrup being one grain and $\frac{1}{32}$ grain respectively.

Hull, July 27th, 1874.

CHEMICAL CONSTITUTION.*

BY A. CRUM BROWN, M.D., F.R.S.E., ETC.

One hundred years have elapsed since the discovery of oxygen by Priestley. Perhaps we should say re-discovery, for there is no doubt that about one hundred years earlier Mayow prepared from nitre nearly pure oxygen, and observed and recorded some of its most marked properties. Mayow's discovery, however, led to nothing; while Priestley's was the most important step in that reconstruction of speculative chemistry which was commenced by Black and carried on with surprising energy and thoroughness by Lavoisier and his associates. I shall not detain you by enumerating the ways in which this discovery has affected chemistry, both practical and speculative. The pre-eminent position to which oxygen was at once elevated, and which it so long retained, makes this altogether unnecessary. I wish, however, to point out one character of the phlogistic controversy, which sharply distinguishes it from many others. The truth represented by the theory of Phlogiston was not recognized with sufficient distinctness by the supporters of that theory to give them any chance of success in opposition to a band of devoted adherents of a view which was clearly understood by all. The Phlogistists were completely defeated, and the theory ceased to exist. It has been left for chemical antiquaries to pick out, with difficulty and uncertainty, a meaning from the ruins.

I have mentioned this character because I wish to draw your attention to another, more recent, controversy, the result of which was very different.

The questions as to chemical constitution, raised about forty years ago by Dumas and the new French school in opposition to Berzelius, may now be said to be practically settled. The great majority of chemists are agreed as to what is to be understood by chemical constitution, and also as to the nature and amount of evidence required in order to determine the constitution of a substance. How has this agreement been produced? Some historical writers seem to wish us to believe that it is the result of the triumph of the ideas of Dumas, Gerhardt, and Laurent, and the defeat of the dualistic radical theory of Berzelius; that the arguments of Berzelius and his followers were only useful as giving occasion for a more full and convincing proof of the unitary substitution theory than would otherwise have been called for; that, in fact, the adherents of dualism played the part (not unfrequently supposed to be that of the Conservative party in politics) of checking and criticizing the successive developments of truth, and thus allowing them time to ripen.

In opposition to the view thus broadly stated, I would place another, and, for the sake of contrast, shall state it also in perhaps too broad a form. That the two theories—the dualistic radical theory and the unitary substitution theory—were both true and both imperfect; that they underwent gradual development, scarcely influenced by each other, until they have come to be almost identical in reference to points where they at one time seemed most opposed.

I have said that the development of the one theory was scarcely influenced by that of the other. Of course, the *facts* discovered by both parties were common property, and the development of both theories depended upon the discovery of these facts; but the explanation of facts, and the reasoning from them given by each party, seemed to the other scarcely worthy of serious consideration, and were treated as matter of ridicule. And the habit of mind created by this mode of viewing the opposed theory has rendered it difficult for those who were engaged in the controversy on either side to see how nearly the two theories have now come to coincidence. Their language still remains different; but, as the facts are the same for both, it is not difficult for a neutral critic to translate from

* Presidential Address delivered before the Chemical Section of the British Association, at Belfast, August 19 1874.

the one to the other, and if we do so we shall see that there is much real ageeement between the two modes of representing chemical ideas, historically derived, the one from Berzelius, the other from Dumas, Laurent, and Gerhardt.

In both, chemical constitution is regarded as *the order in which the constituents are united in the compounds*, and the same fundamental notion is indicated in the one by reference to proximate constituents, in the other by the concatenation of atoms. To show that this is so, and that the fundamental notion can be arrived at from the dualistic, as well as from the unitary starting-point, I shall cite an illustrative case. Every student of chemical history will remember the view of the constitution of trichloracetic acid propounded by Berzelius, and afterwards supplemented by a similar view of the constitution of acetic acid, and an explanation of the likeness of some of the properties of these two substances. This has sometimes been spoken of as a subterfuge of a not very creditable kind, by means of which Berzelius apparently saved his consistency while really yielding to the arguments of his opponents. But if, instead of looking at it in the light of the substitution controversy, we consider it in itself as a contribution to speculative chemistry, we at once recognize in it a statement, in Berzelian language, of the views we now hold as to the constitution of these acids. The view was that acetic acid is a compound of oxalic acid and methyl, trichloracetic acid a compound of oxalic acid and the sesquichloride of carbon. They differ considerably from each other, because the "copulæ" (methyl and sesquichloride of carbon respectively) are different, but their resemblance is strongly marked, because they contain the same active constituent, oxalic acid, and most of the prominent characters of the substances depend upon it, and not upon the copula. Let us first free this statement from what we may call archaisms of language. It will then assume something like the following form:—The carbon in acetic acid is equally divided between two proximate constituents, one of which is an oxide, the other a hydride of carbon; trichloracetic acid similarly contains an oxide and a chloride of carbon, between which the carbon is equally divided. The oxide is the same in both acids, and is that oxide which occurs in oxalic acid. The hydride and the chloride have the composition of the substances the formulæ of which are C_2H_6 and C_2Cl_6 respectively. Oxalic acid undergoes chemical change much more readily than the corresponding hydride or chloride, and therefore the chemical character of acetic and of trichloracetic acids depends much more on the oxidized than on the other constituent, and they thus have a marked resemblance. The oxidized constituent is united to the other in a manner different from that in which oxalic acid is united to bases in the oxalates, inasmuch as, while the basic water of hydrated oxalic acid is displaced when oxalic acid unites with a base, in hydrated acetic and trichloracetic acids there is the same proportion between the basic water and the oxidized carbon as there is in oxalic acid.

Now, has not this a great resemblance to the view entertained by most modern chemists, that acetic acid is a compound of the radical carboxyl (half a molecule of oxalic acid) and the radical methyl (half a molecule of methyl gas), that trichloracetic acid similarly contains the same radical carboxyl and the radical CCl_3, and that the prominent chemical properties of these bodies depend upon their containing carboxyl, and that they therefore resemble each other?

The modern view contains nothing inconsistent with that of Berzelius, but it no doubt contains something more,—it contains an explanation of the difference between the manner in which carboxyl is united to methyl in acetic acid, and the manner in which oxalic acid is united to bases in the oxalates; but it will surely be admitted that Berzelius was here far ahead of his opponents, —so far ahead that they altogether failed to see his meaning, and looked upon his argument as a clumsy device.

The treatment by Berzelius of the constitution of the sulpho-acids furnishes a precisely similar case. These are now considered as compounds of the radical SO_2OH (which we may call sulphoxyl). This radical is half a molecule of hyposulphuric acid, Berzelius considered them as coupled compounds of hyposulphuric acid, adopting at once the view first brought forward by Kolbe, in his classical memoir on the sulphite of perchloride of carbon, and the acids derived from it.

I might pursue the history of the carbon- and sulpho-acids further, and trace the development of the theory of their constitution through the discoveries of Kolbe and his beautiful application to the cases of carbon and sulphur of Frankland's far-sighted speculations on the constitution of the organo-metallic bodies,—pointing out the relation of Kolbe's views of the constitution of acids, alcohols, aldehydes, and ketones, to the Berzelian theory on the one hand, and to the opinions of modern chemists on the other; but the greater part of such a historical sketch has been given very recently by Kolbe himself, in the *Journal für praktische Chemie*, and I may therefore omit it.

It would be easy to bring forward cases to show that our present views can be directly derived from the substitution theory and the types of Dumas and Gerhardt, through the complications of multiple and mixed types and the labyrinthine formulæ to which these gave rise, to the wonderfully simple and comprehensive system of Kekulé; but that is unnecessary, as this development has been fully and ably described by more than one thoroughly competent writer.

We have been discussing a case in which Berzelius was right in considering a compound of carbon, oxygen, and chlorine as composed of two parts—an oxide and a chloride of carbon. It is only just that we should take some notice of cases, at first sight similar, in which modern chemists would be inclined to think that he was wrong. This is the more necessary as an examination of these cases will enable us to see what was the really valuable contribution made to speculative chemistry by the substitution theory.

Compounds containing three elements were formulated in two different ways by Berzelius:—1. One of the elements was represented as combined with a radical composed of the other two,—as hydrocyanic acid, $H_2.C_2N_2$; ether, $C_4H_{10}.O$. 2. The ternary compound was represented as composed of two binary compounds having one element common,—as caustic potash, $KO.H_2O$; chromochloric acid, $2\ CrO_3.CrCl_6$.

Phosgene gas was at first formulated in the former of these ways as $CO.Cl_2$; but latterly he was forced in consistency to give up all radicals containing oxygen or other strongly electro-negative element,* and to write the formula of phosgene gas $CO_2.CCl_4$. Similarly, in every case where a positive element or radical is combined with two negative elements or radicals, he represented the compound as composed of two binary compounds. Thus —chloride or acetyl, $2\ C_4H_6O_3.C_4H_6Cl_6$, as a compound of acetic acid and the corresponding terchloride.

This was in perfect consistency with the mode in which ternary compounds containing one negative and two positive elements or radicals were formulated,—as caustic potash, $KO.H_2O$; sulphate of copper, $CuO.SO_3$, etc., but it lacks the practical justification which can be given, for the formula $C_2H_6.C_2O_3$ for acetic acid. For phosgene acts readily on water, forming carbonic and hydrochloric acids, an action which does not take place with perchloride of carbon, and it is not easy to see why the latter substance should be more readily attacked by water when combined with carbonic acid than when free. This difference did not escape the attention of Berzelius, and led him to distinguish two modes of chemical union:—

* In 1838 Berzelius was inclined to regard C_2O_2, to which he gave the name "oxatyl," as the radical of oxalic acid and oxamide.

1. Where the constituents were held together by the electro-chemical force, and wholly or partially neutralized each other, as in the oxygen and sulphur salts; and 2. Where a so-called "copula" was attached by an unknown force to a substance without greatly modifying its chemical activity. The distinction seems arbitrary; but it was not, as is usually supposed, a mere artificial bulwark to protect the electro-chemical theory; it has a real and very important meaning—a meaning which the development of the substitution theory enables us to explain.

The phenomena of electrolysis, upon which the Berzelian system is based, bring forward into great prominence *one* of the chemical units, viz., the *equivalent*, and the pre-eminent position of oxygen as the most electro-negative element made it most natural to select the atom of oxygen as the standard of equivalence, so that an equivalent of any element or radical was defined as that quantity of it which was equivalent to one atom of oxygen. Gay Lussac's law of gaseous volumes, which was adopted by Berzelius, and which, by a curious accident, happens to be true for all elements gaseous at ordinary temperatures, led to the formulæ H_2 and Cl_2 for the equivalents of hydrogen and chlorine; but although these formulæ explicitly indicate the divisibility of the equivalents of these elements this divisibility was not recognized, and integral numbers of equivalents were alone tolerated. Thus hydrochloric acid was written H_2Cl_2, ammonia N_2H_6, etc., and the etymological meaning of the word "atom" was soon lost. The use of barred letters, to indicate two atoms, or one equivalent of such elements as hydrogen and chlorine, further contributed to hide the important fact of their divisibility.

The first great result of the substitution theory was to change the unit of equivalence, and to take as the standard the atom of hydrogen or of chlorine, instead of that of oxygen; and although it would be most unjust to forget the services of Dumas, Gerhardt, and Laurent, in this matter, the credit of removing the bars from H, Cl, and their comrades, and allowing the hitherto chained partners to walk at liberty, undoubtedly belongs mainly to our distinguished colleague and master, Professor Williamson.

The establishment of the water-type, or, to put it in another form, the proof that the atom of oxygen contains two units of oxygen, inseparably united but capable of separate action, led the way to the explanation of all the difficulties which beset the theory of radicals and copulæ. It at once explained how two oxides or two sulphides unite together,* and the idea of "polybasic," or as we should now say, polyad, atoms and radicals was soon used to explain the existence of polybasic acids, double salts, acichlorides, and many other kinds of ternary compounds.

But a fact does not cease to exist because it is explained. Quick-lime and water unite together, although we can now explain how they do so, and a useful purpose may still be served by the enumeration, as in the old dualistic formulæ, of the pairs of united equivalents. Although some of these equivalents belong to the same atoms, it is nevertheless true that they are united in pairs. Caustic potash might, then, be formulated $KO\frac{1}{2}, HO\frac{1}{2}$, or, $\frac{1}{2}(K_2O,H_2O)$; phosgene gas, $\frac{1}{2}(CO_2,CCl_4)$; and chlorochromic acid, $\frac{1}{3}(2CrO_3,CrCl_6)$. These formulæ are not so well suited for general use as those now current, but the consideration of them as accurate representations of facts may enable us to see that the copulæ of Berzelius had a real and valuable meaning. Take, for instance, the formula of acetic acid—

$$H_3C-CO-OH,$$

or $\frac{3}{4}CH_4,\frac{3}{4}CO_2,\frac{1}{2}H_2O,\frac{1}{4}C_2$. It is this last term which indicates the coupled character of the compound. If we look upon acetic acid as a compound of carbon, it is a coupled compound, because all the equivalents of carbon in it do not belong to the same atom, and the two atoms of carbon are directly united together, and replacement of the equivalents united to one of these atoms does not very greatly affect the function or chemical character of the equivalents united to the other.

I have, perhaps, spent too much of your time upon these historical questions. Let us now shortly consider what is the present state of our knowledge as to chemical constitution. This I have already defined as the order in which the constituents are united in the compound. We may indeed use metaphorical language, and speak of the relative position of atoms, perhaps deluding ourselves into the notion that such language is more than metaphorical, but the phenomena of combination and decomposition, although we cannot doubt that they depend solely upon the relative position and dynamical relations of the atoms, are not alone sufficient to prove even that atoms exist. Our knowledge of the intimate structure of matter comes from another source, from the study of the properties, rather than of the changes of substances, and of the transformations of energy which accompany the transformations of matter. This is strictly a branch of chemistry: the aim of chemistry is to connect the properties of substances and the changes they undergo with their composition, taking this word in its widest sense; and we must not allow our friends in Section A to cut our science in two, and appropriate the half of it. We all frankly admit that chemistry is a branch of physics, but it is so as a whole—no section of it is more purely physical than all the rest. To accept a narrower definition of chemistry is to reduce ourselves to the position which the collector occupies among naturalists; it is to admit that it is our business to provide part of the materials out of which a science in which we have no share may be constructed by others. But we need not fear that this so-called physical side of chemistry will ever be divorced from the study of chemical change. The names of Faraday and Graham among those who have left us, of Andrews among those who are still at work, are sufficient proof of this, and a study of their researches will conclusively show that great results can be looked for in this direction only from a physicist who is also a chemist.

There are three special directions in which such investigations have already influenced chemical theory:—

1. *Electrolysis*, which has confirmed the equivalent as a chemical unit, has proved that equivalents unite in pairs—thus forming the basis of the electro-chemical theory, and has shown us how to estimate the amount of energy involved in the union of a given pair of equivalents.

2. *Vapour Density*, from which Avogadro inferred the law of molecular volumes (since proved by Clerk Maxwell), which has given us the molecule as a chemical unit, and formed the basis of the unitary theory.

3. *Specific Heat*, from which Dulong and Petit inferred their empirical law, which gives us the most satisfactory physical definition of the atom as a chemical unit.

We naturally turn to the future, and try to guess whence the next great revolution will come. For although periods of quiet have their use, as affording time for filling up the blank schedules furnished by the last speculative change, such periods have seldom been long, and each has been shorter than its predecessor.

But it is impossible to make a certain forecast. Looking back, we see a logical sequence in the history of chemical speculation, and no doubt the next step will appear, after it has been taken, to follow as naturally from the present position. One thing we can distinctly see—we are struggling towards a theory of Chemistry. Such a theory we do not possess. What we are sometimes pleased to dignify with that name is a collection of generalizations of various degrees of imperfection. We cannot attain to a real theory of chemistry until we are able to connect the science by some hypothesis with the general theory of dynamics. No attempt of this kind has hitherto been made, and it is difficult to see how any such attempt can be made until we know something in reference to the absolute size, mass, and shape of molecules and of atoms.

* It does not explain the existence of double chlorides, bromides, etc. These compounds, apparently so similar to the double oxides and sulphides, are still unexplained.

the position of the atoms in the molecule, and the nature of the forces acting upon them. Whence can we look for such knowledge?

The phenomena of gaseous diffusion, of gaseous friction, and of the propagation of heat through gases, have already given us an approximation to the size and mass of the molecules of gases. It is not unreasonable to suppose that a comparative study of the specific heat of gases and vapours may lead to some approximate knowledge as to the shapes of their molecules, and a comparison of such approximate results, with the chemical constitution of the substances, may lead to a hypothesis which will lay the foundation of a real theory of chemistry.

Chemistry will then become a branch of applied mathematics, but it will not cease to be an experimental science. Mathematics may enable us retrospectively to justify results obtained by experiment, may point out useful lines of research, and even sometimes predict entirely novel discoveries, but will not revolutionize our laboratories; mathematical will not replace chemical analysis.

We do not know when the change will take place, or whether it will be gradual or sudden, but no one who believes in the progress of human knowledge, and in the consistency of Nature, can doubt that ultimately the theory of chemistry, and of all other physical sciences, will be absorbed into the one theory of dynamics.

THE CARBIDES OF HYDROGEN PRODUCED BY THE ACTION OF ACIDS UPON CAST-IRON OR STEEL.

In the course of a recent discussion in the French Academy* on the phenomena occurring during the conversion of iron into steel, M. Dumas remarked that some experiments of M. Cloez would appear to indicate to chemists the most natural process for the accomplishment of organic syntheses. In fact, when a metal is combined with a non-metallic body, and the compound is subjected to the action of a hydrogenated or aqueous acid, the metal seizes the negative element of the acid or the oxygen of the water, whilst the non-metallic body and the hydrogen unite conformably to the proportions set free. Thus, if a sulphide or a polysulphide be acted upon, in the first case sulphuretted hydrogen, and in the second a hydride of sulphur, is produced.

According, therefore, to the nature of the hydrogenated compound formed, the metallic combination from which it is derived can, with some degree of probability, be characterized. As the compounds of which M. Cloez has recognized the formation, belong to the series designated by the formula C_nH_n, it may be concluded that they are derived from a carbide of iron, FeC, which under the influence of water and an acid produces $FeO + CH$, the latter condensing more or less, and thus yielding various polymers of the series C_nH_n.

It would seem natural, consequently, to consider white cast-iron and tempered steel as iron holding in solution more or less of this carbide, FeC. The grey cast-iron and untempered steel would contain less of this carbide than their respective analogues, and present the greater part of their carbon in the free state under the form of graphite.

The question arises whether other carbides of hydrogen are formed than those of the series C_nH_n, when steel or cast-iron is dissolved by an aqueous acid.

The affirmative would lead to the conclusion that several carbides of iron are in solution in cast-iron and steel. However this may be, the formation of one or of many definite carbides of hydrogen by the action of aqueous acids upon steel or cast-iron, connects that reaction with those which are observed when those acids are brought into contact with the ordinary binary compounds, sulphides for example.

The simple contact of carbon and hydrogen in the nascent state under such circumstances, being thus sufficient to produce definite organic compounds, from which may be derived, by known processes of transformation, all the definite combinations of organic nature, M. Dumas considers that we are more than ever justified in uniting the chemistry of organic compounds with mineral chemistry, properly so called.

* *Comptes Rendus*, vol. lxxviii., p. 1514.

JAPANESE VEGETABLE WAX.

The *Japanese Mail* contains an account of the manner in which this article of commerce is obtained. The trees from which wax is made are the *urushi*, or lacquer tree, the *yama-urushi*, the *hage-urushi*, better known as the *ronoki*, and the *koganoki.* The wax is made from the rind of the fruit. In places where the wax is manufactured to any great extent, the *urushi* is not availed of for its lacquer. As the trees are not cut for several years, they may be seen in the wax-producing districts growing to a height of 35 or 40 feet. In districts where the trees are used for their lacquer or varnish, they are cut every seven or ten years. The mode of obtaining the wax from the *urushi*, or lacquer tree, is as follows:—

Late in the autumn the branches, heavy with fruit, are lopped off and taken into the house. The fruit is pounded with a pestle, and then shaken in a basket-sieve, so as to separate seed from rind. From this rind the wax is made. The mode of expressing it differs here and there, but in no very important particulars. The following brief description is taken from the mode as followed out in Sendai and Aidzu: Boiling water is got ready in an iron cauldron, over which a lattice-work of sticks is placed, and on these some matting. The sifted rinds of the fruit are then laid out on the matting and steamed, after which they are placed in hempen bags and again steamed. The bag, with its contents, is then put in a wooden trough, wedges or blocks are inserted in the trough, and driven home into the bag with heavy blows from a mallet. An aperture at the bottom of the trough provides for the egress of the wax. The trough and wedges are made of *kiaki* wood, and the mallets and blocks of wild mulberry—a very hard wood, and well suited for the purpose. A small quantity of oil, in the proportion of about one-tenth, is added to the wax, to allow of its being expressed more easily. It then goes through another steaming process, and is again pounded in the trough.

Wax from the *yama urushi*, or wild lacquer tree, is obtained thus:—The fruit is collected at the latter end of summer, and is at once steamed, without being pounded with a pestle, as is the case with the *urushi* wax. The wax is purified by melting. A large tub of cold water is taken and placed under a wooden tank having a small aperture close to the bottom. The melted wax is then poured into this tank, and escapes through the aperture into the tub beneath; while doing so it is stirred rapidly with the hand, after which it is placed either in matting or shallow boxes, and dried in the open air for about fifteen days.

The *hage-urushi*, from which wax is largely obtained, grows in the south-western part of Japan. This tree was first brought from the Loochoo Island to Sakurajima, an island near Satsuma. Its production has so increased that there are now no less than seven different species. The *hage-urushi* tree is raised from seed or from slips. *Koga* wax is made from the fruit of the *koga* tree, which differs from the *urushi* and *hage-urushi* trees. It is an evergreen, and is largely grown in Ossugori, in the northern part of Nagato. It flowers in the middle of summer, the fruit ripening in autumn, when it is plucked and soaked in water for four or five days, after which it is trodden out with the feet, thus separating the outer rind. The *koga* wax contains a large proportion of natural oil, which in a measure restricts its use to cold and temperate districts. Candles made of it show a very bright light, and if some contrivance could be hit upon for extracting the oil, the consumption of this wax would be increased, as it is very cheap, compared with the other kinds. Refuse wax is used for manuring purposes.—*Journ. Soc. Arts.*

The Pharmaceutical Journal.

SATURDAY, AUGUST 29, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

"ADVICE" BY CHEMISTS.

THE address of the President of the Pharmaceutical Conference this year will probably attract more than ordinary consideration, since it dealt almost entirely with subjects of a political nature. Although this is holiday season now with so many, and even the papers of the metropolis show signs of dulness, there have already been some indications that the opinions and statements put forward in the address have been criticized.

The first instance of the kind was in the *British Medical Journal*, where objection was taken to a remark in reference to co-operative drug stores, to the effect that advice could not be got from the stores. Our contemporary, with somewhat of an excess of zeal for the protection of his professional brethren, forthwith runs away with the notion that this "advice" signified "counter practice," lamenting that in an address to a pharmaceutical meeting such a thing should be mentioned as a special privilege enjoyed by druggists over co-operative drug salesmen, and not as a thing to be sternly repudiated and repressed.

Now, although the use of the word "advice" may have been unfortunate, no person who is accustomed to the routine of a chemist and druggist's business in a provincial town would have been likely to have construed it in the sense adopted by our contemporary. It was therefore without surprise that we read in the next issue of our contemporary a letter from Mr. GROVES, expressing his regret that his remarks had been susceptible of such a misunderstanding, and explaining the sense in which he used the word "advice."

The "advice" that is solicited from a chemist nd druggist, as Mr. GROVES points out, ranges through a great variety of subjects. A person will bring to a chemist and druggist a bundle of prescriptions, and, on the plea that his medical adviser is not accessible, ask him to select one written for a special purpose, or perhaps to point out how the dose should be altered for differences of age or circumstances. Another person inquires respecting disinfectants for the house, or deodorants for the drains, or it may be wishes to discuss the quality of the water supply or even some abnormal appearance in his secretions. These are some of the illustrations quoted by Mr. GROVES, which will be familiar to most of our readers. Therefore, when he is able to say from experience, "I might repeat fifty such queries that have been addressed to me, the customer eventually sailing away under cover of some trifling purchase and getting his more expensive materials at the store," it is evident he may fairly claim that he was justified in saying also that chemists are particularly liable to be injured by "gratuitous brain-sucking," and in cautioning his brethren accordingly.

Of course to expect that the time will ever come when the race of seekers for "advice gratis" will be extinct would be a Utopian idea, and none probably are more painfully convinced of this than the medical profession. Questions are and will continue to be put to the chemist and druggist, and a considerable amount of tact and ingenuity is continually required to enable him, while giving information on subjects within his domain, also to shelve a tabooed subject without giving offence to the customer.

We are glad, therefore, that our contemporary considers Mr. GROVES'S letter to be "a satisfactory reply" to the strictures drawn forth by the passage in his Presidential Address. We entirely sympathize with our contemporary in its aim, and heartily desire to see the cessation of the so-called "counter prescribing" of the chemist and druggist, as well as of the no less reprehensible custom of medical men keeping open shops for the retailing of drugs and chemicals.

INSECT-DEVOURING PLANTS.

IN two of our recent numbers (PHARM. JOURN., vol. iv., pp. 999 and 1035) we gave a summary of the facts at present known with respect to the anomalous power possessed by certain plants of catching and digesting insects by means of a viscid secretion from their leaves, the most striking instances being presented by the genera *Sarracenia* and *Drosera*. A most interesting and important addition to our knowledge of this subject has just been made by Mr. DARWIN, in a communication to the Scientific Committee of the Royal Horticultural Society. He has discovered that a similar property is possessed by the leaves of the common butterwort, *Pinguicula vulgaris*. In this bog-plant—as in *Drosera*—albumen, fibrin, meat, and cartilage, induce a secretion from the glands of the upper surface of the leaf, which is feebly acid, though not so decidedly as in the case of *Drosera*. This secretion is again absorbed, and causes an aggregation of the protoplasm in the cells of the glands, such as had been observed in other similar cases. When an insect or seed is placed near the leaf, or a number of them near its margin, either the nearest point of the leaf to the seed or insect, or the whole margin as the case may be, becomes curled considerably over in the course of two or three hours; but the apex of the leaf does not turn over towards the base. Small fragments of glass cause a similar movement, though to a less extent. The inflexed point or margin pours forth a secretion which envelopes the insects or seeds, but the pieces of glass caused very little, if any, increase of the secretion. It is difficult, however, to understand the use of this inflexion; since, in the course of less than twenty-four hours, the margin of the leaf turns back again to its original position, whether the substances which appear to supply it with food be removed or not. Every one interested in the physiology of vegetation will look with the greatest eagerness for the new work promised by Mr. Darwin, in which all these remarkable phenomena will be described, and their purpose discussed. It is not impossible that some new and unexpected light may be thrown on the mode in which plants obtain their food.

The subject was also last week brought before the Biological Section of the British Association in a most interesting address by Dr. Hooker, which formed one of the principal events of the recent meeting.

THE REBUILDING OF THE PARIS SCHOOL OF PHARMACY.

Notwithstanding the promise on behalf of the French Government that provision should be made for the expense of rebuilding the Paris School of Pharmacy, the budget did not contain any allusion to it. When that portion of the budget which related to education was under discussion, M. Bert challenged the Minister on the subject; he was met with much sympathy and a shifting of the responsibility upon the Minister of Public Works. That individual, however, escaped questioning through the necessity for the rapid discussion of the budget when the estimates for his department were reached. If M. Bert's statements, however, may be taken literally, the necessity of the case may soon be enforced by the fall of the building.

We notice that in another medical journal—written, we presume, by students for students—exception is taken in high-flown and exaggerated terms to the "chemistry of disease" being included in the scientific work of the pharmacist. Perhaps when the writer's studies have been further extended he will be able to appreciate the fact that some of the most important and valuable work in this department of research has been performed by pharmacists.

Dr. J.-Léon Soubeiran, Assistant-Professor in the Paris School of Pharmacy, Honorary Member of the Pharmaceutical Society of Great Britain, to whose courtesy these pages have frequently been indebted, has recently been nominated Professor of Pharmacy in the École Supérieure at Montpellier.

Mademoiselle Andréine Doumergue, having passed the necessary examinations, has recently been admitted as a pharmacienne at Montpellier.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The half-yearly meeting of the members of the above Association was held at the rooms, Halford Street, on Tuesday, August 4th; Mr. Wright, President, in the chair.

The Committee in submitting their report of the proceedings of the Society for the half-year, congratulated the members upon the fact, that during the past session the number of persons who have joined the Society has been greater than in any previous one. The Committee, however, expressed their regret that the attendance has been below the average. This they consider has been due, partly to the attractions consequent upon the season, and more especially to the almost general opinion that a student can obtain sufficient knowledge to enable him to pass the examinations by a very short course of study in London. The Committee are firmly persuaded that this plan is quite inadequate to attain the end in view, and that this has been shown by the recent large per-centage of failures in the examinations. They wished to impress upon the members the necessity of systematic study previous to presenting themselves before the Board of Examiners. The library, which now contains the text-books necessary for students, and many of the leading works in connection with the trade, has met with an increased circulation. The laboratory is in constant use, and fully justifies the outlay expended on it. The materia medica and chemical cabinet is now nearly complete. The Committee congratulated the Society upon the possession of such a well-selected and extensive museum. One member has passed the Major, three the Minor and Modified, and two the Preliminary Examinations, during the past session. The total number of members has been forty-one. The Treasurer's report showed an income during the half-year of £7 11*s.* 4*d.*, and an expenditure of £14 6*s.* 4*d.*, leaving a balance in hand of £1 14*s.* 3*d.* The report was unanimously adopted.

A ballot was then taken for the new Committee, and the officers were elected as follows:—Mr. W. B. Clark, President; Mr. T. Wright, Vice-President; Mr. J. A. Basker, Treasurer; Mr. A. W. Shakespeare, Hon. Secretary; Mr. E. H. Butler, Mr. S. H. Cadoux, Mr. E. J. Bishop.

A programme of lectures, classes, etc., extending to February 2, 1875, has been issued.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE

(*Continued from page* 146.)

Report on the Chemistry of the Aconitines.

I. Preparation of the Alkaloids.

BY T. B. GROVES.

The sum of £10, voted for the above purpose and derived from the Hill's fund, was intended to be expended mainly on the preparation of sufficient crystalline nitrate of aconitine, to justify Dr. C. R. A. Wright in undertaking an exhaustive inquiry as to its true chemical constitution. Enough of the pseudaconitine had already been prepared by me and exhibited at the Bradford meeting of this Conference.

Messrs. Hopkins and Williams having kindly offered to perform the preliminary operations, one cwt. of a fine sample of roots of *Aconitum Napellus* was purchased and entrusted to them for that purpose.

On February 20th, I received from them the acid washings of the crude ethereal solution of the whole alkaloidal matters of the roots soluble in that menstruum. The process adopted was a modification of that of Stas.

The bulk of this fluid having been reduced from one gallon to 1½ pints, it was digested with animal charcoal, alkalized with ammonia, and thoroughly washed with ether. The ethereal solution so obtained, shaken with half a fluid-ounce of nitric acid diluted with eight ounces of water, gave an aqueous solution of the alkaloids of acid reaction, which was allowed to evaporate spontaneously to a thin syrup. It showing no disposition to crystallize, a few crystals of nitrate of aconitine, reserved from the sample I made several years before, were sprinkled on its surface. Crystallization soon commenced, and was allowed to proceed until the mother-liquor became densely syrupy. A second crop was obtained, but the whole not amounting in the crude state to one ounce, it was thought advisable to commence operations on a second cwt. of roots. No sooner was the order given than Messrs. Hopkin and Williams set to work with most praiseworthy promptitude, and I found that when I wrote in haste, two days afterwards, to countermand the order, I was too late. The reason of my doing so was this—my residual mother-liquor had suddenly thrown down a mass of crystals that made what was previously liquid semi-solid.

These crystals were mostly needle-shaped, and of microscopic dimensions. Under thin glass, they appeared, after a time, to undergo change of form, and assume the rhombohedral shape characteristic of the aconitines.

These crystalline cakes were now set aside to be worked up with the proceeds of the second cwt., and the mother liquors were bottled for the same purpose, a little ether being previously added as a preservative.

On February 28th, I commenced the treatment of the second batch, which arrived in the state in which it left the still, after recovery of the spirit—an acid liquid measuring two gallons, with an oleo-resinous stratum measuring three pints floating on its surface. This latter was removed and washed. Ammonia having been added to the clear liquid, it was well washed with ether, and proceeded with as previously described.

The alkaloid so obtained required five fluid drachms of nitric acid for neutralization, and when set aside began to crystallize at once. I attribute this improvement to greater expedition in treating the liquid, and the avoiding of undue dilution.

Two considerable crops of crystals were obtained, and, by moderate washing and careful application of the press, were rendered nearly white.

Before proceeding to recrystallize these cakes, it was thought advisable to purify the last cake obtained from the first cwt. These fine silky crystals had entangled so much of their mother-liquor that the cake had become superficially brown. The yield was but small, about one-third of what I expected.

The recrystallization of the whole yielded 13 drachms of presumably pure nitrate of aconitine. That it was unfortunately not so will appear hereafter.

Treatment of the Mother-Liquors.—The whole of the mother-liquors were now mixed, well diluted, and rendered slightly alkaline with ammonia, so that it could be perceived by its smell. The dark-coloured alkaloid thrown down was separated by filter and dried in air. It weighed about four drachms, and was when dry perfectly black.

The filtrate containing an abundance of alkaloids precipitable by larger doses of ammonia, was now neutralized with hydrochloric acid, and evaporated to a small bulk. When approaching the volume of 10 oz., it appeared turbid, and when allowed to cool it deposited a stratum of a transparent, syrupy substance or varnish, measuring about two ounces. This matter was soluble in water, but not in its mother-liquor, except by the aid of an excess of hydrochloric acid. On heating the solution it immediately became turbid, and re-deposited the varnish which, when the liquid cooled, was again taken into solution.

After a good deal of experiment, which I need not repeat, I found that the precipitation of the varnish was determined by the presence of muriate of ammonia in sufficient quantity to form a dense solution, in which, when hot, this hydrochlorate was insoluble.

The varnish thus obtained was, as far as possible, freed from contamination by muriate of ammonia, diluted with water, in which it dissolved, and set aside for the night. In the morning it was found to be full of well-defined, colourless crystals, which, separated from the mother-liquor, washed, pressed, and recrystallized, were obtained pure. They evidently formed the crystalline portion of the varnish, the residue being for the most part, in all probability, an amorphous modification of it. These crystals weighed between two and three drachms. They were not very soluble in cold water. Their *dilute* solution was not precipitated by either ammonia, liquor potassæ, or carbonate of potash, except on the application of heat, when the alkaloid separated as a thick coagulum, fusible in boiling water. It was precipitated by iodo-mercurate, by tannin and by acid nitrate of silver. The alkaloid was soluble in ether and chloroform. The muriate crystallized readily from hot solutions in fine needles, which were but feeble polarizers, except in the case of a few larger crystals that formed at the edge of the slide.

Their taste was purely bitter and devoid of acridity. Colour reactions with sulphuric acid, do. plus nitric acid, nitric acid, and chromic acid could not be obtained with them.

A moderately strong solution, warmed with powdered muriate of ammonia, became turbid, and the heat being continued, deposited the whole of the alkaloid in well-defined crystals. This test seems to be of some value. It answers also when applied to the nitrate.

I have no doubt that this substance constituted the greater portion of the third crop of crystals from the first cwt. of roots.

The varnish, after several solutions and precipitations, became denser and darker in colour.

The supernatant liquor on each occasion showed signs of containing alkaloid, but considerably less in the last than in the first.

They were all mixed, and a rather strong dose of ammonia being added, an alkaloid was thrown down, that when dried seemed to be possessed of very considerable acridity—at least so I judge from involuntary experiments made upon my eyes and nose.

The remaining alkaloids were washed out with ether, which, when evaporated, left a fusible transparent alkaloidal substance similar to that obtained from *Aconitum ferox* under the same circumstances, and which has been incorrectly termed Napellin.

Examination of the Nitrate of Aconitine.

It will be remembered that one of the characters of pure crystallizable aconitine was this, that when its ammoniacal solution was heated to boiling point (care must be taken that it does not actually boil), it deposits well-formed crystals of the alkaloid.

Presuming that my new product would do the same, the experiment was tried on 30 gr. The result was *nil.* Tried again on a much smaller scale, there still was no result. Examined microscopically, it was evident that there were two sorts of crystals present, one resembling true nitrate of aconitine, the other composed of radiating needles. Seen by help of polarized light, the former polarized splendidly, the latter scarcely perceptibly. Compared with the nitrate of aconitine prepared by the iodo-mercurate process, its colours were decidedly more brilliant.

There was a similar difference observable between the pseudaconitines. That made by the iodo-mercurate process crystallized in rhomboidal plates, which were fairly good polarizers. That made by Stas' process, of which I have one and a half ounces for experiment, showed few of these rhomboidal shapes. It crystallized with difficulty in groups of very long needles, that measured at least one-third of the width of the slide, and it polarized much more beautifully than its twin brother, though I afterwards observed that lapse of time seemed to make them approximate.

After consultation with Dr. Wright, it was thought advisable to attempt their purification by converting them into iodo-mercurates and regenerating the alkaloids.

This was done, in the usual way, with 100 grains of each substance. As soon as the nitrate of aconitine so obtained was set aside to crystallize, a considerable number of colourless, stout, transparent needles, arranged in stars, made their appearance and increased in number and size till the next day, when crystals of another character beginning to show themselves, they were removed and purified by recrystallization. They weighed nearly 20 grains, and proved, on examination, to be the nitrate of the unknown alkaloid of which the muriate has already been described.

Its crystals, viewed as they were obtained, showed here and there only a trace of colour, when examined by polarized light; but when a strong solution was allowed to crystallize under thin glass, both their shape and character entirely changed. They closely resembled those of aconitine, and were brilliant polarizers. Although apparently inert, they form, I have no doubt, one of the aconitine series—perhaps are the active principle found in *Aconitum heterophyllum*, by Mr. J. Broughton, the quinologist, and named by him atisine.

The roots from which my alkaloid was obtained were imported from Germany, and from inquiries kindly made by Mr. Holmes, I learn that there is no reason for suspecting that the Indian *A. heterophyllum* was mixed with it.

Aconitum heterophyllum, called in India "atees," is sold everywhere in the bazaars as a popular bitter tonic. It possesses no acridity whatever.

From experiments I have made with the uncrystallizable alkaloids of *Aconitum ferox*, I believe that this bitter alkaloid is present there also in small quantity.

The nitrate of aconitine now crystallized out in hard but small crystals, attached to the sides and bottom of the vessel. Microscopic examination, however, showed that they were not quite pure, and on trying their degree of solubility in ammonia water, it was found that, instead of 520, they required only 460 parts for solution, and again that, on heating this to boiling point, no crystals were obtainable. It was decided, therefore, not to be sufficiently pure for chemical purposes.

The regenerated pseudaconitine, when its ethereal solution was set aside, commenced to crystallize in about an hour, by depositing on the sides of the beaker brilliant rhombohedra. As the liquid became more concentrated these increased in number, but at the same time a crystalline crust crept up the sides, and had from time to time to be scraped down into the liquid. Its crystallizing tendency had, as in the case of the nitrate of aconitine, been very much improved by the process. Crystallized from spirit of wine, under thin glass, it showed no tendency to form the long needles I have mentioned as characteristic of its original condition, but, on the other hand, there were present some very suspicious tufts that evidently were not pseudaconitine. The rest of the substance crystallized very nicely and polarized splendidly. Its solubility in ammonia water was tried, and found very much less than it should be. Its employment had, therefore, also to be given up.

These processes had consumed a great deal of time, and the meeting of Conference was rapidly approaching. Feeling that it would be impossible to purify the alkaloids sufficiently for Dr. Wright's examination prior to the meeting, I determined on sacrificing my old specimens of aconitine and pseudaconitine, made originally by the iodo-mercurate process, and presumably pure. I had just sufficient for two combustions of each alkaloid.

Dr. Wright, at considerable inconvenience to himself, undertook the work, and, after a short time, sent me his results, which were, indeed, surprising.

All three alkaloids, aconitine, pseudaconitine, and the bitter alkaloid, furnish identical or very closely corresponding centesimal numbers. It would be premature to publish these numbers before Dr. Wright has had opportunities of repeating and varying his experiments, but, so far as he has gone, he has obtained good evidence that these substances, so widely differing, both chemically and physiologically, are either isomers or polymers, most probably the latter.

The researches of Dr. Wright on the polymerides of morphia and codeia reveal many examples of complete change of physiological character caused by polymerization, but I doubt whether the drop from aconitine to a substance apparently inert will ever be exceeded, equalled. Mr. Broughton has this day informed me that he is quite certain that his alkaloid does not give the same centesimal numbers as aconitine. My alkaloid in that case must be quite distinct from atisine.

Since our last meeting, Dr. T. R. Frazer has published some results on the physiological action of crystalline aconitia and pseudaconitine. He found that a very remarkable and exceptional difference of toxicity for different species of animals existed; for whilst aconitia was for frogs about five times more powerful as a toxic agent than pseudaconitine, the latter substance was for rabbits about twice as powerful as the former. It was ascertained that this difference depended on aconitia possessing a more energetic action on the heart, and a less energetic action on the respiratory movements, than pseudaconitine.

Professor Bentley: It is my pleasing duty as Vice-President to move a cordial vote of thanks to our President for the further admirable report which he has just read, for those who are familiar with the meetings of the Conference in former years know very well that this is only one of a series. I cannot of course speak as a chemist, but all who have had an opportunity of discussing this subject will agree with me as to the great accuracy and originality of those papers. We have been told to-day that it would be the work of a lifetime to investigate opium, cinchona, or digitalis, and I am sure all here will hope with me that our President may long live, and will give us many further reports of his investigations into the aconite bases.

The vote of thanks was passed unanimously.

Mr. Hanbury: I much regret that Mr. Broughton is not in the room, for I had hoped he would have been here, and have told us something about the alkaloid he has obtained from the root *Aconitum heterophyllum*,—which is called "*Atis*" in India—and which he has not yet described in print. I think the name "*Atisine*" provisionally placed on Mr. Groves's phials, is rather doubtful, inasmuch as we are not at all sure that the substance is the same as that which has been obtained by Mr. Broughton in India from the true *Atis*.

The President: I am not at all certain about the name, or that this substance is the same, but I showed some slides under the microscope to Mr. Broughton last evening, and he thought they were similar, and, from what he remembered of the chemical reactions, I have a very strong doubt whether mine is really a new thing. I certainly do not want to claim it unless it is, because it would be unpleasant to withdraw such a claim. However, it is very interesting to find that the muriate of aconitine should be so powerful a poison, while this is directly the contrary.

Mr. Hanbury: I should like to ask what evidence you have that it is inactive on animals?

The President: The evidence is that I have taken it myself in half-grain doses, and that it has had no effect whatever; it is simply bitter.

The next paper read was:—

The Official Plasters.—Improved Formulæ for their Preparation.

BY A. W. GERRARD,

Dispenser and Teacher of Pharmacy to University College Hospital.

From a knowledge of the unsatisfactory character of most of the forms given for the preparation of the official plasters, I was induced to undertake a number of experiments with a view to their improvement.

My principal reason for attempting this work is the hope that at some future day the compilers of that book with which our calling is more closely associated than any other, may deem it necessary to give these preparations their attention.

The official plasters are fourteen in number, and will be treated upon in the order of their sequence, with the exception of cantharides plaster, which I hope to make the subject of a future special communication. I may inform you that I have made a number of experiments upon this plaster, but as they are not yet concluded any remarks would be premature.

Emplastrum Ammoniaci cum Hydrargyro.—The ingredients of this plaster are ammoniacum, mercury, olive oil, and sulphur. The first part of the process for its preparation is to dissolve the sulphur in the oil. This forms what is known as balsam of sulphur, and is then used for the extinction of the mercury. When this is accomplished, it is added to the liquefied ammoniacum, and mixed well.

In the Pharmacopœia instructions, too much is left to the judgment of the manipulator, the means for the liquefaction of the ammoniacum, and the necessary provision of straining, being omitted.

Solution of the ammoniacum may be effected by heat, water, or alcohol. Water is the most economical, one pound requiring twelve ounces of water, heating in a water bath, straining through muslin, and finally evaporating to a plaster consistence. This plaster, as supplied by wholesale druggists, is sometimes so soft that when spread upon calico it cannot be rolled for fear of sticking together; at other times so hard that when rolled and unrolled it cracks into a multitude of minute fragments, which at once separate from the calico. Two causes may be ascribed for this, one the amount of evaporation the strained ammoniacum has received; the other and most important, the kind of gum resin used in its preparation.

There are two varieties of ammoniacum in the market; one in hard brittle distinct tears, the other in softish masses of agglomerated tears, containing a large amount of impurity. In my experience, the best plaster is made from the tears. I find, after evaporating the whole of the water from the softer kind, it is then too sticky to make a good plaster.

Doubling the quantities of sulphur and oil for reducing the mercury would be an advantage, as saving time. I also find the addition of some yellow wax is an improvement, rendering the plaster more pliable.

The following is the form I would recommend:—

Take of—

Ammoniacum, in tears . . .	10 ounces.
Water	8 „
Yellow Wax	2 „
Mercury	3 „
Olive Oil	4 drachms.
Sulphur	16 grains.

Heat the oil and sulphur together, stirring until they unite; with this mixture triturate the mercury until globules are no longer visible; dissolve the ammoniacum in the water by means of a steam bath, strain, and evaporate the strained product to the proper consistence for a plaster; add the wax, and, when melted, stir in the prepared mercury and mix thoroughly.

Emplastrum Belladonnæ.—This is one of the most important and best of this class of preparations, and I believe the most frequently prescribed; when correctly prepared, it is a valuable topical application. In the last London Pharmacopœia it was ordered to be made by mixing together equal parts of extract of belladonna and soap plaster—a proceeding not easy to accomplish, unless by the addition of water; on evaporating this water a large portion of the extract, probably the chlorophyll and albumen, separated to the bottom of the vessel, changed to a brown colour. Perhaps, from a knowledge of these defects, the authors of the B. P. deemed it advisable to alter the formula to the following:—

"Take of

Extract of Belladonna } Resin Plaster . . }	of each 3 ounces.
Rectified Spirit . .	6 fluid ounces.

Rub the extract and spirit together in a mortar, and when the insoluble matter has subsided, decant the clear solution, remove the spirit by distillation or evaporation, and mix the alcoholic extract thus obtained with the resin plaster, melted by the heat of a water bath."

The originator of the above no doubt intended it to be of the same strength as the P. L. plaster; if the spirit accomplished a thorough exhaustion of the active principles of the extract—which it does not by a long way—it really would be stronger, as the London Pharmacopœia extract contained the albumen, but the B. P. extract does not.

The present form was badly devised and cannot be commended, either as an economical or a pharmaceutical achievement; it was a little advance in the right direction, but still not what it might have been. Is it not waste of labour and material to prepare one extract from another, and that inefficiently, when the materials are at hand for its direct preparation?

Following are some experiments I made upon the dried root and leaf of belladonna, exhausting them with rectified and proof spirits; also upon extract of belladonna, exhausting it with rectified spirit; the object of this was to determine which yielded the best and most economical plaster.

Twenty-five drachms of dried belladonna leaf were coarsely powdered and macerated in half-a-pint of proof spirit for twenty-four hours, then transferred to a percolator, and treated with a pint of proof spirit, and displaced with water; the product was evaporated, and yielded six and a-half drachms of softish extract = to 26 per cent. This extract did not mix well with lead plaster.

Three samples of dried root, treated as above, yielded respectively 25·5, 26·3, and 28· per cent. of extract, being a mean of 26·6 per cent. This extract mixed better than the above with the lead plaster, but required a good deal of stirring to accomplish it.

The same quantities of each of the above roots and leaf were treated with rectified spirit; the leaf gave $7\frac{1}{2}$ per cent. of extract, and the aggregate yield of the root was 5 per cent.

250 grains of extract of belladonna gave, with 500 minims of rectified spirit, $42\frac{1}{2}$ grains of extract = to 18 per cent.

Most of the above results have been verified by a note to me on the subject by Mr. Umney.

The greatest yield of extracts, as would be expected, was obtained from the proof-spirit exhaustions, but, as I have before stated, they do not mix well with lead plaster, and must be passed over as unsuited for my purpose. It therefore remains to decide between the alcoholic extracts of the leaf, root, and watery extract. The last-named gives the greatest apparent result, but a little consideration of the subject will demonstrate that it is otherwise. 700 parts of fresh plant yield an average of 32 parts of official extract, and this official extract yields, with rectified spirit, 6 per cent. of extract of uncertain alcoholic strength. Now, 700 parts of fresh plant equal 100 of dried, and this yields, with rectified spirit, $7\frac{1}{2}$ per cent. true resinous extract; so that in one case, where the extract is used, the plant yields 6 per cent. of extract, of a strength somewhere between proof and rectified, and in the other, when the dried leaf is used, we obtain $7\frac{1}{2}$ per cent. It is, therefore, obvious that the dried leaf is to be preferred to the watery extract. It now remains to decide between the merits of root and leaf. Economically, the leaf is the best, it giving

7½ per cent. of resinous extract against 5 from the root, but the more important consideration is their respective therapeutic value. To decide this question, I shall quote from a paper of M. Lefort, "On the Distribution of Atropine in the Leaves and Roots of Belladonna," which was copied in the *Pharmaceutical Journal* of June the 2nd, 1872. He thus speaks on the subject :—

"Except in atropine, the composition of the leaf was far from resembling the root of the belladonna ; and this is a fact important to be remembered when it is sought to compare their physiological and therapeutic properties. In former experiments, the dried leaf was found to contain three per cent. of a fatty matter coloured by chlorophyll, giving off strongly the odour peculiar to the poisonous Solanaceæ. The dried root does not contain more than one per cent. of this matter. The nature of this poisonous principle, and the part that it plays in the preparations that contain it, is a subject worthy of investigation.

"Without doubt plants produce upon the animal economy physiological effects as much more decisive as their chemical composition is more pronounced, but it must not be forgotten that their special therapeutic properties are often as much due to the combined action of the constituent principles as to the predominance of one, so that, considering the difference existing in the composition of the belladonna leaf and the root, it is difficult to make a comparison between them as to their therapeutic action, and they should rather be looked upon as relatively than absolutely similar.

"The principal conclusions of the author as affecting this subject are (1), that in general composition the root differs notably from the leaf ; (2), that though the root is frequently richer in atropine than the leaf, the proportion is much more variable, and therefore the leaf would have more uniform therapeutic properties."

These results, with my own experiments, I consider justify me in deciding that a resinous extract of the dried leaf of belladonna is a more correct and uniform representative of the plant than the root, and therefore would be the best to use in preparing this plaster. The form I propose is the following :—

Take of—

Dried Belladonna Leaf	50 parts.
Rectified Spirit	a sufficiency.
Lead Plaster	a sufficiency.

Macerate the belladonna leaf with fifty parts of spirit for twenty-four hours, pack in a percolator, and exhaust with more spirit ; distil or evaporate the spirit until of a proper extract consistence. To every part of this extract add eleven parts of lead plaster, and dissolve by the heat of a steam bath, and mix well.

I have mentioned rectified spirit for the exhaustion of the belladonna, but this is an instance in which there can be no reasonable objection to the use of methylated spirit. I have compared the extracts prepared both ways, and cannot distinguish them.

We have a belladonna plaster in the University College Hospital Pharmacopœia, introduced by Mr. Martindale, and prepared with a resinous extract of the root, as suggested by the late Mr. Balmer, from which excellent results are obtained ; the proportions are one of extract to nine of lead plaster. This is, I think, rather too strong, as it frequently produces an unpleasant eruption upon the patient. The same effect, even to a more marked extent, has been produced from a plaster of the same strength, prepared from the leaf, so that I considered it advisable to reduce the proportions as above.

The United States Pharmacopœia orders its belladonna plaster to be prepared by exhausting one pound of root with spirit, and adding the resulting extract to make one pound with lead plaster: this does not give uniform results, the yield of extract varying from three to eight per cent.

Emplastrum Calefaciens.—This plaster was originally in some of the older editions of the London Pharmacopœia, but was omitted from the latter, probably on account of the small particles of Spanish-fly it contained causing too much irritation, it being made with powdered cantharides and Burgundy pitch. For this reason, on its introduction to the B. P., the method and materials of its preparation were wisely changed. It is now made by exhausting cantharides with boiling water, evaporating and mixing the result with expressed oil of nutmeg, yellow wax, resin, soap plaster, and resin plaster. The expressed oil of nutmeg is an elegant addition, but it and the wax together weaken the adhesiveness of the plaster. To remedy this, the soap plaster present might be substituted by resin plaster, as it is the most adhesive. I have found this an improvement. The formula would then be as follows :—

Take of—

Cantharides, in coarse powder	of each 4 ounces.
Expressed Oil of Nutmeg .	
Yellow Wax	
Resin	
Resin Plaster	5¼ pounds.
Boiling Water	1 pint.

It is matter for regret that no better means have yet been adopted for the exhaustion of cantharides in the preparation of plasters than the wasteful processes at our disposal. Acetic ether would be an improvement upon anything in present use, and probably for this purpose it is now official.

Emplastrum Cerati Saponis.—This plaster is made by boiling together vinegar and oxide of lead until they have combined, then add soap, and boil again until most of the moisture has evaporated ; finally add wax and olive oil melted together, stir well and continue the heat until, by the evaporation of the remaining moisture, the product is of the proper consistence for a plaster.

This was originally in the L. P. as soap cerate, and was first classed among the plasters in the B. P. 1864, to which preparations it more correctly belongs. It is a curious combination of ingredients involving several chemical changes for its preparation. In the first place boiling the vinegar and oxide of lead together yields subacetate of lead ; to this is added the hard soap or oleate of soda, which decomposes a portion of the lead salt, forming oleate of lead, and acetate of soda, then is added olive oil and wax, the olive oil decomposing another portion of subacetate of lead, forming oleate of lead, glycerine, and free acetic acid.

This plaster contains a larger proportion of lead than any other in the Pharmacopœia, and essentially consists of oleate and acetate of lead. The method I adopt for its preparation differs from the B. P., in that I use eighteen ounces of acetic acid instead of the gallon of vinegar. Practically I find this the correct quantity to dissolve the oxide of lead; it also yields a more uniform plaster, and saves about two hours in the process.

The spread plaster of this preparation is a great favourite with some surgeons, and, when spread upon a special material, is the principal ingredient of what is known as dreadnought plaster.

Emplastrum Ferri is prepared by mixing hydrated peroxide of iron with melted Burgundy pitch and lead plaster. This is used as a strengthening plaster, but its value may more correctly be attributed to the protection and mechanical support it affords, than to any tonic effect of the iron.

Prepared as above, and spread during the hot weather, it takes some days to dry, the surface loses its gloss, and is covered with a greyish film. I find the omission of the Burgundy pitch obviates this, and improves the plaster.

If a good coloured plaster is desired, a dark coloured oxide of iron must be used. That which has been subjected to a strong heat is the best, and pale coloured oxides may be thus changed ; it should be passed through a fine sieve before mixing with the other ingredients.

Some plaster makers have used the resin of dragon's blood for improving its colour; this practice is now, I believe, abandoned.

Emplastrum Galbani.—This is seldom used, and samples I have prepared of it are satisfactory; all I have to suggest is that the same instructions be given for dissolving the gum resins as I have pointed out for ammoniacum and mercury plaster.

Emplastrum Hydrargyri.—In this plaster the proportions of olive oil and sulphur might be doubled with advantage; otherwise it is satisfactory.

Emplastrum Opii.—Prepared by mixing one part of opium in fine powder with nine parts of resin plaster. The above is the form of the last Dublin Pharmacopœia; in the L.P. it was made from extract of opium, lead plaster, and frankincense. The substitution of resin plaster for lead plaster and frankincense is an improvement, but I should have preferred the continuation of extract of opium. The powder of opium, on mixing with the resin plaster, has a tendency to agglomerate into particles which are difficult to separate, and when spreading, it cannot be kept equally diffused through the plaster; the particles are also likely to irritate. The mixing of a watery extract of opium with resin plaster is, however, not to be accomplished unless some intervening agency be employed, and I find glycerine to answer the purpose; each ounce of extract requires half an ounce each of glycerine and water. When thus prepared, it mixes readily with the resin plaster, and yields a smooth, uniform, and comparatively elegant preparation.

Calculating opium to yield half its weight of extract, the form would stand thus:—

Take of—

Extract of Opium	1 ounce.
Glycerine, Water } of each	$\frac{1}{2}$ "
Resin Plaster	18 ounces.

Dissolve the extract in the glycerine and water by a gentle heat, mix this with a small portion of melted resin plaster, gradually add the remainder, and stir well.

I have no doubt that a resinous extract of opium would be most compatible with resin plaster, but, in choosing the watery extract, I have borne in mind that it more nearly represents the combined constituents of opium than the former.

Emplastrum Picis.—Pitch plaster is seldom or never used as a strapping, but generally spread upon leather for local application. The water in the present form serves no purpose, so that it might be omitted.

Emplastrum Plumbi.—This is the most extensively used plaster of the Pharmacopœia, forming the principal basis of nine of the fourteen. It is prepared from oxide of lead, olive oil, and water. On mixing these ingredients and applying the necessary heat, the fatty acids, assisted by the steam generated from the water, decompose the oxide of lead with the formation of oleate of lead, glycerine is set free and partly carried off by the steam. If the whole of the water be evaporated, the plaster becomes opaque, assuming a velvety appearance; the source of heat should then be removed. as when it arrives at this point it is in the best condition for spreading.

In the London, Dublin, and Edinburgh Pharmacopœias, the proportions of its ingredients were very approximate; the United States Pharmacopœia orders one-fifth more oxide of lead. In the first B.P., the proportions were altered by reducing the oxide of lead about one-fifth. The reason for this is said to be its previous deficiency in adhesiveness. It certainly was hard and brittle, and required some alteration, but as it now stands it errs in the opposite direction, by being too soft and sticky. I will allow that the present plaster can be made harder by adding more water and continued boiling, but this is at the cost of labour, time and fuel, which the addition of a little more oxide of lead would economize, and yield a superior product.

From a large number of experiments I have decided that the following proportions give the best plaster, and, in deciding upon these, I have borne in mind that its principal requirements are adhesiveness and flexibility:—

Take of—

Oxide of Lead, in fine powder . .	6 pounds.
Olive Oil	10 pints.
Water	4 "

Boil these ingredients together gently by the heat of a steam bath, stirring constantly until they unite and acquire the proper consistence for a plaster; more water may be added during the process if necessary.

The B. P. instructions are to simmer four or five hours, made as above, in a proper steam pan; one hundredweight can be completed in an hour and a half.

Good fresh Italian oil only should be used, as it produces a superior and more pliable plaster than any other kind.

A very good lead plaster can be made from nut oil, which I believe is used by some makers; a sample I prepared from it appeared equally as good as that made from olive oil. As to its adhesive and keeping properties I have no experience, but believe, considering nut oil is less prone to rancidity than olive oil, it would be found quite equal, if not superior, in these respects.

Emplastrum Plumbi Iodidi.—The form for this plaster is the worst in the series, and reflects no credit upon its author; had it been submitted to a practical pharmacist for preparation before it was made official, it never would have disgraced the Pharmacopœia.

Though made with iodide of lead, it contains scarcely any, it being nearly all decomposed by the soap present in the soap and resin plasters with which it is mixed; the fatty acid of the soap combining with the lead to form lead plaster, and the soda of the soap with the iodine to form iodide and iodate of soda. The resulting plaster, instead of being bright yellow, is of a whitey-brown colour.

To improve this formula, all that is necessary is to omit the soap and prepare as follows:—

Take of—

Iodide of Lead, in fine powder . .	2 ounces.
Resin	$1\frac{1}{2}$ "
Lead Plaster	1 pound.

Melt the resin and lead plaster, then stir in the iodide of lead.

Emplastrum Resinæ.—This is the best and most adhesive strapping plaster in the Pharmacopœia, forming, when spread upon good stout linen or calico, an excellent preparation for the surgeon's use.

The B. P. proportions do not give a good plaster all the year round; spread during the cold winter weather it is satisfactory, but in the hot summer weather it is so sticky that it cannot be rolled without spoiling. To overcome this difficulty it is necessary that the plaster spreader should use his judgment in apportioning the resin according to the season of the year. My experience in this matter—and I have spread some thousands of yards of the plaster—is to use the B. P. form in winter, in the spring use half, in the summer and autumn one-fourth the quantities of soap and resin ordered in the official form. I have always found this give the greatest satisfaction.

Next to a good plaster, the material upon which it is spread is of importance. A stout linen sheeting that has been partly worn so as to deprive it of its stiffness and dress, is from long experience found to be the very best material for the surgeon's and operator's use. From its pliability it has the property of adapting itself to the irregularities of a limb without the formation of folds or creases to irritate and annoy the patient.

Mr. T. Bryant in his work on "Surgery," in speaking of the value of a good strapping for the treatment of indolent ulcers, says, "It should be spread upon good stout linen instead of the sleazy material usually sold." Next to linen a very good material is calico of a kind called the Croydon finish. This is very good and cheap, but is not quite so strong and adhesive as the linen.

A very good plaster for ordinary use may also be spread upon what is called pillow calico. This has a linen finish, and would be scarcely known from linen.

Emplastrum Saponis.—This plaster is generally used for the same purposes as the foregoing. It differs from it in containing more soap and less resin, and is therefore less adhesive. Its special uses as compared to resin plaster I am not acquainted with, and as far as my experience extends, there seems no necessity for alteration.

Now that I have finished my review, before I leave you I feel desirous of introducing to your notice the existing apparatus (so far as my knowledge extends) used for plaster-spreading. Here is a machine invented by Mr. Martindale. I will not enter into a minute description of its parts, but for the information of those who require it, they will find it in the *Pharmaceutical Journal*, vol. ii., page 33. To any one who understands the principles of its construction, with a little practice they may soon learn to spread plasters, but let them not attempt it unless they make up their minds to spoil the first 50 yards.

Here is another machine for making what I define as hand-spread plasters. It is composed of two trestles, the top rails, which are eighteen inches wide, being studded with tenter hooks at intervals of 1¼ inches. These trestles are placed at a distance apart equal to the length of plaster to be spread; the ends of the linen or calico are then fixed on the tenter hooks and strained tight by pulling a trestle ; a portion of melted plaster is then poured upon the linen at one end, and drawn along its surface by the edge of a thick spatula ; this operation is repeated a second and third time, when the plaster may be trimmed and removed from its frame. That is a pharmaceutical operation which, perhaps, you have never before witnessed; it has, however, been practised in a large metropolitan hospital, viz., Guy's, for upwards of a century, and is still in use. This method of spreading requires even more practice and certainly more skill and dexterity than the former ; it nevertheless might be found useful to some, as the cost of the apparatus is trifling.

Besides what I have shown and told you, there is a large amount of technical knowledge required for the successful practice of plaster-making and spreading. This is only to be acquired by frequent practice, such as the general pharmacist cannot be expected to obtain. For these reasons this branch of pharmacy must remain to a large extent a speciality.

There is one more subject I desire to touch upon. It is that of shaped marginal plasters upon leather. Most of us know how well those of some makers are spread, but how this is accomplished we, or at least I am at present in the dark.

I have often thought what a great convenience it would be in a pharmacy if, instead of the unsatisfactory plaster spatula we now use, some cheap and simple apparatus could be devised for spreading shaped plasters in a neat and workmanlike manner. I therefore suggest that the Executive of our Conference could not better dispose of any surplus funds than by offering a portion as a premium for such an invention.

In conclusion, the results I have arrived at, and the suggestions I have made with reference to plasters, were obtained in each case from several experiments, varying the proportions of material. I do not wish to force upon you that they yield the very best results, for I am but a novice, and know that my experience in the subject is limited as compared with others. There may be those here to-day who have something to contribute to what I have stated, or whose experience differs with mine. If these expressions succeed in withdrawing their knowledge from its solitude and conservation, it will be the means of lending a helping hand to the progress of pharmacy.

The PRESIDENT: We are highly indebted to Mr. Gerrard for the very conscientious way in which he has worked out his subject, and I am sure Mr. Hills would be greatly pleased, were he here, to see what the result of spending his money has been. To properly discuss this question would take a long time, but I think it would be better, if we attempt to do anything of the sort, to do it methodically, and to take each plaster separately; but I will first ask you to pass Mr. Gerrard a vote of thanks.

The vote of thanks was passed unanimously.

The PRESIDENT : The Emplastrum belladonnæ will probably offer more scope for discussion than the first one on the list. The great objection to the present emplastrum is its messiness; it is such a dark green colour that if it at all flows beyond the margin of the leather, it soils the clothes of the patient. I should have been glad to have heard that the root could be properly used instead of the leaf, so as to avoid the green colour produced by the chlorophyll, though I do not much believe in any plaster myself, except the Emplastrum cantharides.

Mr. MARTINDALE : I have had a little experience in making this plaster according to the formula which I introduced into the University College Hospital, altered from that of the B. P., on account of the disadvantages Mr. Gerrard has pointed out. Making an extract of an extract is a very wasteful mode of making a plaster. I took the Hospital formula from Mr. Balmer, who published a paper in the *Pharmaceutical Journal* some years ago for making it with an extract prepared from the root of the belladonna. Remembering the good effects of the liniment so made introduced by Mr. Squire, Mr. Balmer thought this would be a better preparation than anything made from the leaf or from the crude extract. He, himself, told me that he had derived great relief from the application of such plasters. I accordingly adopted it, and I used the strength he gave for some time at the University College Hospital, I think it was one part of the alcoholic extract of the root to two or three of lead plaster ; but it was complained of, that it produced an eruption almost similar to that of scarlet fever. The physiological action it produced—that of dilating the pupil of the eye—when applied externally being so powerful, in many cases I desisted from making it so strong, and, with the sanction of the Dispensary Committee, reduced it to one part to nine. Mr. Gerrard now says that even this has been found in some cases too strong, and raises an eruption when persons are at all subject to any erysipelatous tendency. It may therefore be necessary in some cases to make it more dilute. Lead plaster, which makes it sufficiently adhesive, is to be preferred to resin plaster, as the resin may assist in producing the eruption sometimes complained of. With regard to the merits of the two kinds of plasters made with alcoholic extract from the leaf, and that made from the root, I think one great objection to that prepared from the leaf is that it is a deeply-coloured plaster. In the Pharmacopœia process the alcohol naturally absorbs the colouring matter of the extract ; and although I believe that chemists prefer it with the bright green colour, it is very disagreeable to the patient who has to wear it. I therefore prefer it made from the root, and seeing the good effect of liniments so produced, I cannot see any advantage in the preparation from the leaf. I believe, as a sedative plaster in allaying pain of various kinds, especially in affections of the heart, it is very valuable.

Mr. HAMPSON : I entirely agree with what Mr. Martindale has said, and having had some experience in making belladonna plasters from the root and from the leaf, I am inclined to think—in fact I am sure—that that prepared from the root is better in every respect.

Mr. MARTINDALE : I should like to ask Mr. Gerrard if it is quite correct where he says that when the oxide of lead is dissolved in vinegar in making Emplastrum cerati saponis, a solution of subacetate of lead is produced ?

Mr. GERRARD : The calculated proportions of lead and acid would leave a subacetate.

The President: With regard to the Emplastrum opii, perhaps some gentleman can offer an opinion as to the relative merits of the powder and the extract.

Mr. Martindale: There is a great advantage in using the extract if it can be mixed in the way Mr. Gerrard has suggested. I have not tried the experiment of dissolving it in glycerine, and getting the solution to mix with the basis; but if it does mix it will be a decided improvement over the use of powdered opium, because, as Mr. Gerrard has pointed out, in spreading such a plaster you are apt to get the powder agglomerated together in particles.

Mr. Gerrard: There is a sample of each of the plasters on the table.

Mr. Giles: From my experience I prefer the plaster in the form in which we now have it, by reverting to the old Pharmacopœia process, using the powder instead of the extract, as being much more convenient to make. I cannot say that operating in the small quantities one requires for one's own use, I have found any difficulty in mixing in the powdered opium, though it may be a difficult matter in making a large quantity. But you have a considerable difficulty in mixing the extract, and I must therefore say I was very glad to find that we had reverted to the old method.

The President: If you use the extract, it is important to have it well diluted, because, if you try to mix it up too stiff, you cannot do it.

Mr. Umney: With regard to the Emplastrum plumbi, I look upon the present proportions given in the Pharmacopœia as a mistake. The proportions given in the London Pharmacopœia, as far as I can remember, would be about five parts of litharge to nine by weight of olive oil; but in the B. P., the litharge has been decreased to four parts, and herein I think is a very serious error. In fact, almost all the plasters of the B. P. on this account are too sticky, and I think a much better plaster can be prepared by using the formula of the London Pharmacopœia; it is too, in my opinion, a better basis for other plasters.

Mr. Martindale: With regard to this plaster, as I have said before in this room, the Pharmacopœia directions are somewhat vague, and I should like to hear the best mode of getting rid of the aqueous moisture, and also of the glycerine contained in it. Makers generally like to send it out opaque, white and free from discolouration; though, in my opinion, it should never be white, but of a somewhat translucent appearance, something like ordinary fresh yellow resin; it is only when we get it evaporated to that consistency that it is in a fit state for spreading by a machine. Mr. Gerrard can corroborate me that it is impossible to try to spread a plaster such as is generally sent out by wholesale druggists by a machine; it contains too large a quantity of water and some portion of glycerine, and unless they are evaporated out by continued stirring and heat, it is impossible to get the plaster when passed through the machine, or even when spread by hand, to take the cloth; it will not "bite," and you often get a large piece in the centre which is not coated at all. I should like to know if it would be well to pour the plaster, when nearly finished, into a large quantity of water, and knead it so as to wash out the glycerine.

Mr. Gerrard: My own experience is that the heat can be continued after the union has taken place between the oil and the lead until the whole of the moisture is evaporated. The plaster then assumes a semi-opaque appearance; it retains a little glycerine, but that is not at all a disadvantage. The larger portion passes off with the steam, and the small portion which remains is, according to my experience, an advantage, because it renders the plaster more flexible; too much, however, retards its adhesion. In the plaster sent out by some wholesale houses, the object seems to be to retain as much water as possible.

Professor Redwood: I should like to make one observation with respect to the subject now before us, the Emplastrum plumbi, mainly arising from what has fallen from Mr. Umney, who has referred to the alteration made some years ago in the proportion of oxide of lead and olive oil. That alteration was made after a very considerable investigation of the subject mainly amongst those practically engaged in making plasters upon a large scale. One remark of Mr. Umney's tends rather to confirm the propriety of the conclusion then come to, for he stated that the plaster is rendered more sticky in consequence of the alteration in the proportions. Now, that is the very object that was contemplated. You are probably aware that many years ago there was a plaster much used in London, known by the name of Dr. Scott's plaster; it was, in fact, a plaster used by a medical man celebrated in wound cases at that period. It was much sought after by many persons, and for a considerable time there was a good deal of mystery as to the way in which it was prepared. It was sufficiently adhesive, but was entirely devoid of the ordinary source of stickiness in adhesive plaster. The object contemplated in the alteration referred to was to give to the plaster a certain amount of adhesiveness without the addition of resin. That has been accomplished by the alteration in the proportion of the ingredients, and it certainly is more sticky. Mr. Squire has just reminded me that I omitted to notice one element in the new plasters, namely, long boiling. That, together with the increased proportion of oil, are the means by which the Emplastrum plumbi is, as we conceive, now produced, which possesses adhesive properties.

Mr. Giles: I think what has been said is a very sufficient answer to the remarks made with regard to Emplastrum plumbi as a plaster standing by itself, but it leaves us in the same embarrassment with reference to the production of this plaster as a basis for other plasters. Undoubtedly the consequence of the change has been to make the other plasters of the Pharmacopœia inconveniently sticky; and, as a matter of fact, I believe wholesale houses have modified the form, and that we do not now get them strictly according to the B.P. I do not know that there is any harm in that, but in a future edition it might be advisable to introduce an Emplastrum adhesivum where a sticky plaster is required, and the old Emplastrum plumbi as a basis for other plasters. I recollect a great many years ago noticing a peculiar plaster which is used in France under the name of adhesive plaster; it is much softer than our own and excessively sticky, and it has this great advantage, that you can apply it with facility to a sore, and can take it off again. It is a very useful plaster in many cases in surgery.

The President: Does that French plaster contain much resin, because that would be rather an irritant constituent?

Mr. Giles: I do not know.

The President: The next plaster on the list is the Emplastrum plumbi iodidi. In one of the plasters exhibited on the table, undoubtedly the ordinary iodide of lead is not present, but it may be more efficient than the other.

Mr. Martindale: I think the explanation given with regard to the iodide of lead plaster is scarcely that which either Mr. Gerrard now states or Dr. Redwood gave some time ago in this room. I believe the lead plaster dissolves the iodide of lead without decomposition, and that the decolorization is not so much due to the soap which it contains as it is to the lead plaster. If a little more heat had been applied, I think Mr. Gerrard's yellow plaster here would become quite colourless. I once tried the experiment, and though I should like to repeat it before speaking positively, I found I got the iodide of lead dissolved by the lead plaster, and that it became decolorized just as much as the Pharmacopœia plaster.

Mr. Gerrard: My experience of that plaster is, that if the lead plaster is made according to the B.P., an excess of oil being used, the iodide of lead is really decomposed with the addition of soap or resin, and more especially so with the Pharmacopœia lead plaster than with one made with a large proportion of litharge. It is very curious that in the combination which takes place no iodine is evolved.

Professor REDWOOD: There is no doubt that the present formula for preparing iodide of lead plaster is a mistake. I believe, of course, that the iodine is present, and it may be in as active a condition as if it remained iodide of lead, but the very fact that the plaster changes its colour is an objection. The reason why the other plaster was ordered in that formulary was, that it makes a plaster which retains its flexibility better. The one made smooth with lead cracks very easily, whilst one made with soap retains its flexibility.

Mr. MARTINDALE: I believe it was first intended to be an iodine plaster, but it was found, in making it, an iodide of lead plaster was formed, and that it became like like the ordinary lead plaster in colour. In giving directions for another iodide of lead plaster, I think clear instructions should be given, so as to get the iodide of lead, if soluble, dissolved in the lead plaster, and not to have that uncertain, changeable yellow colour. With regard to the Emplastrum resini and Emplastrum saponis, I do not see why they should both be retained, as they contain the same ingredients, only in rather different proportions. It is inconvenient to have to keep stocks of so many different kinds of plasters which are seldom used.

The PRESIDENT: I think the Emplastrum saponis is a redundancy. It is generally kept about until it will no longer stick to the calico, and then it is thrown away.

(*To be continued.*)

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of the above Society was held on Wednesday, July 1st, under the presidency of M. Planchon. The chairman announced that M. Chatin had been elected a member of the Academy of Sciences in the place of the late M. Gay, and he remarked that this nomination was an honour to the Society of Pharmacy, M. Chatin being one of its honorary members. Amongst the papers which had been received were the following:—

A note from M. Stanislas Martin upon the textiles furnished by the residues of the manufacture of cane sugar, accompanied by specimens of the crude filaments of the cane trash, and of the paper pulp obtained from that substance.

A letter from M. Demetrius Phollides, of Bucharest, thanking the Society for its reception of a former note on emulsions, and containing some practical observations upon the preparation of compound suppositories. The process he prefers is to triturate the fat body in a mortar with the active substance previously pulverized, and to add a few drops of oil of sweet almonds so as to obtain a homogeneous paste, which is divided and afterwards shaped by the hand into the proper suppository form.

A memoir by M. Carles, of Bordeaux, upon iron reduced by hydrogen, and the use of a titrated solution of iron as a means of ascertaining its purity. In reference to this subject, M. Bussy remarked that the sulphide which exists in nearly all the reduced iron of commerce presents more inconvenience than the oxide of iron which had specially occupied the attention of M. Carles. M. Bussy added that formerly, for ascertaining the quantity of metallic iron contained in reduced iron, he employed a solution of sulphuric acid, and measured the volume of hydrogen produced.

M. Adrian presented, on behalf of M. Nativelle, a note on a new method of preparing crystallized digitalin. This it is proposed to publish in a future number.

M. Lefort presented a note by M. Brètet, of Cusset, on Dragon's-blood and its adulterations.

M. Méhu communicated to the Society an investigation which he had undertaken upon the density of cholesterin.

M. Ferdinand Vigier presented a memoir entitled "The Preparation of Cinchona Wine and the Estimation of the Alkaloids that it contains."

THE INTERNATIONAL PHARMACOPŒIA.

M. Boudet then read a report which he had drawn up, and which it was suggested might be used for a preface to the projected International Codex. The text of this report has not at present been published, but its tenour is indicated somewhat by the discussion that follows:—

M. Bussy thought it was not necessary to speak of secret remedies or to omit from the international formulary certain preparations which were perhaps a little empirical, but much used. He considered it would be best to leave to each country its usages. He insisted upon the importance of the definitions and tests of the primary substances which should be indicated in the work.

Dr. Poggiale disagreed with M. Bussy as to the passage respecting secret remedies. He had heard that part of the report with lively satisfaction; he wished the Society to oppose strongly not only secret remedies, but also the special remedies which are not contained in the Codex, and which do such grave injury to the interests and reputation of pharmacists. He was of opinion that the report of M. Boudet should not be modified, and that their delegate should be empowered to defend the principles of the Society at the St. Petersburg International Congress.

M. Boudet informed M. Bussy that the commission had not modified the formulæ—sometimes not very scientific—which it had taken from the pharmacopœias of different nations; it had sought, however, as much as possible, to produce a work which should be abreast of the progress of science. As to secret remedies, he had thought it his duty to speak of them, in order that foreign pharmacists, who were very hostile to them, might see that the Paris Society of Pharmacy shared their views upon the subject.

M. Hoffmann thought that France was wrong in retaining in her Codex certain old formulæ which might be replaced by more rational preparations.

To the explanations already given, M. Mayet added that the commission had selected, and not modified, formulæ, and that the International Commission would be at liberty to introduce new ones, since the work which is to be presented at St Petersburg will be entirely provisional. He said further that the weights employed in England and America had created some difficulties in the expression of the quantities, and that the commission had proposed by the side of the true formulæ others which were very slightly modified, but more simple.

M. Boudet announced that the Pharmaceutical Society of Great Britain had appointed two delegates to represent it at the Congress at St. Petersburg.

The subject was then discussed in committee, and M. Méhu was selected to represent the Société de Pharmacie de Paris at the International Congress.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

On Thursday morning, August 20th, the meetings of the sections commenced. In section A (Mathematical and Physical Science), which met in the Queen's College, the President, the Rev. Professor J. H. Jellett, delivered an address in which he discussed the tendency of scientific progress to a reduction of all physical science under the power of mathematical analysis, in the gradual development of connexions between the different members of that great group to which we give the name of physical science. Among the instances of such growing relationship, he alluded in the following words especially to the—

CONNEXION BETWEEN OPTICS AND CHEMISTRY.

"In speaking of the connexion between Optics and Chemistry, the topic which will occur first to every one is the spectroscope; but on this part of the subject it is not necessary that I should dwell. It has so largely occupied the attention of physicists, and has been so fully treated by those who have made it their special study, that I could not hope to add anything to what they have said.

I would only observe that the spectroscope has enabled chemistry to overleap a barrier which Comte pronounced to be insurmountable, and which would have excluded from the objects of chemical research anything lying without the limits of our earth. Comte warned us that our knowledge of the planetary worlds was necessarily limited to their geometrical and mechanical properties—to the nature of their movements, and the forces by which they are produced—and that all inquiry into the constituent elements of the planets or their atmospheres was for ever, and by the necessities of the case, interdicted to us. But the spectroscope has told quite another story.

"But there is another point of contact between optics and chemistry,—another spot on the border-land between these two sciences which, I think, promises also to be fertile in discovery—I mean the use of polarized light as an instrument of chemical analysis. It is true that the application of this instrument is limited in its extent. The physical property on which this application depends, namely, the power possessed by certain liquids to change the plane of polarization of a transmitted ray, or, as it is commonly called, the rotatory power, is altogether confined to the organic world, and it is not universal even there. Still, within this limited range, the application of polarized light is capable of solving, or aiding to solve, chemical problems which chemistry proper would probably find very difficult. Let me give you two examples.

"1. Is it true that an acid salt is decomposed by solution? Or, taking the question in another form: If to a solution of a neutral salt there be added, atom for atom, a quantity of its own acid, does that additional atom of acid enter into combination, or does it remain free? It has been usually inferred from the thermic researches of Dr. Andrews, followed up by Favre, Silbermann, Berthelot, and others, that the second alternative is the true one, the solvent being water. Now, if the problem be varied a little by making spirit the solvent, the application of polarized light gives us this important information:—

"If to an alcoholic solution of the ordinary nitrate of quinia there be added an additional equivalent of acid, this additional equivalent *does* enter into combination with the nitrate.

"This information leaves to us the alternative of supposing that the ordinary nitrate, sulphate, etc., of quinia are not neutral but basic salts, or of admitting that an acid salt is not always decomposed by solution, at least in spirit.

"2. When an acid is added to a solution containing two bases, the salts formed being also soluble, does the acid divide itself between the bases? and if so, what is the law which governs the division?

"The application of polarized light enables us to solve this question for some of the organic bases, proving that there is a continuous partition of the acid, and enabling us in one case, and probably in many others, to assign the law according to which the partition is made.

"One more instance may suffice to exemplify the advantage which chemistry proper has already derived from its union with optics. I take this instance from the general problem of saccharometry.

"We have long known how to analyse, both optically and chemically, a solution containing two kinds of sugar, one of which is sucrose. But, as each of these methods gives but two equations, it is plain that neither is sufficient where the unknown quantities are more than two. If, then, as is very commonly the case, there are present in the solution three kinds of sugar, we cannot obtain a complete analysis, either from optics or from chemistry. But, as Dr. Apjohn has recently shown, this problem, insoluble by either method taken alone, is readily solved by a combination of both methods. An important step is thus made in the application of optics to chemistry. Instead of merely giving to chemistry a new solution of a problem which chemistry could solve without any assistance, optics has aided chemistry to solve a problem which chemistry unaided might have found very difficult."

B. Chemical Section.

In this section the proceedings were opened by an Address from the President, Professor A. Crum Brown, on Chemical Constitution. The Address will be found printed at page 163.

Amongst the papers set down for reading before this section were the following:—

Thursday, August 20th.

Professor G. C. Foster—On Siemens' Pyrometer.
Professors Roscoe and Williamson—Report of Committee for superintending the monthly reports of the Progress of Chemistry.
W. Chandler Roberts—Report of Committee on Essential Oils.
Professor Hodges—The Chemical Composition of Jute Fibre.
Professor Brown and Dr. E. A. Letts—Methyl-thetine.
Dr. C. R. Wright—On some Opium derivatives.

Friday, August 21st.

Professor Corfield—Report of the Committee for the Utilization of Sewage.
Dr. Carpenter, F.R.S.—On the replacement of Organic Matter by Silicious Deposits in the process of Fossilization.
Professor Hodges—On the Silicified Rock of Lough Neagh.
Professor Roscoe, F.R.S.—On a self-registering Apparatus for measuring the Chemical Action of Light.
Professor Roscoe, F.R.S.—On certain abnormal Chlorides.
Professor Thorpe—On the Specific Volumes of certain Liquids.
Messrs. Braham and Gatehouse—On the Dissociation of Nitric Acid.

Monday, August 24th.

Professor Andrews, F.R.S.—Experiments at High Pressures.
Dr. Dewar—On the Latent Heat of Liquefied Gases.
Dr. Dewar—Report of the Committee on the Estimation of High Temperatures.
Professor Debus—On Spontaneous Generation, from a Chemical point of view.
Mr. Ogilvie—On the Estimation of Phosphoric Acid as Pyrophosphate of Magnesia.
W. Jesse Lovett—On an improved form of Filter Pump.
Professor Emerson Reynolds—Notes on the preparation of the Sulphur-Urea.
Professor Emerson Reynolds—On the action of the Sulphur-Urea in Metallic Solutions.
Lowthian Bell, F.R.S.—On the joint action of Carbonic Acid and Cyanogen on Oxide of Iron and on Metallic Iron.
Professor Gladstone, F.R.S., and Mr. Tribe—Electrolytic experiments on Metallic Chlorides.
Chandler Roberts—Gold Assays.
Professor Hodges—Analyses of Indian Teas.
W. J. Cooper—Composition of certain kinds of Food.

Tuesday, August 25th.

Professor Maxwell Simpson, F.R.S.—On the Chlor-Bromides and Brom-Iodides of the Olefines.
Professor Andrews, F.R.S.—On an Aspirator.
Professor Delffs—On an Aspirator.
Mr. Fairley—New reactions of Oxygen, Chlorine, Peroxide of Hydrogen, Hypochlorous Acid, and Ozone.
Mr. Fairley—Hypochlorous Acid and Ozone. Synthesis of Perchloric Acid.
Professor Clifford, F.R.S.—On the General Equations of Chemical Decomposition.
Dr. T. L. Phipson—On the presence of Cyanogen in Commercial Bromine, and a means of detecting it.

Dr. T. L. Phipson—On a Sesqui-sulphide of Iron.
Professor Armstrong—Report on Isomeric Cresols.
W. Charley J.P.—On the injurious effects of "dew-rotting" Flax.

D. Biology.

In the department of Zoology and Botany of this section, on Friday, the President, Dr. Hooker, delivered before a crowded audience an Address on the Carnivorous Habits of some Plants. In moving a vote of thanks, Professor Huxley expressed a hope that the Address would be published; and in a future number we shall probably be able to reproduce it.

E. Economic Section.

The Metric System.—In the Economic Section, on Saturday, the Report of the Metric Committee was read, in which they "reiterate their firm conviction that the uniformity of the weights, measures, and coins will tend to the economy of time in the ordinary transactions of life, the extension of education and science, and the general advance of commerce and international intercourse."

Reform in the Work of the Medical Profession.—On Monday, in this section, Miss Mary E. Theedy, M.A., read a paper so entitled, in which she said:—

"The work of the medical profession at the present time seemed to be remedial rather than preventive, and physicians attained fortune and reputation for the most part not by preventing the occurrence of diseases, but by effecting remarkable cures from protracted or severe cases. As medical practice was at present conducted, a strong temptation was unavoidably offered to physicians to promote rather than prevent ill-health. It would be better for the morality of the profession, as well as the health of society, that the physician should assume such a relation to those under his care that his reputation and income should depend upon his success. Such a relation towards society would give the practitioner the keenest stimulus to acquaint himself with all the conditions that affected the health and physical development, and also the strongest inducement to enforce correct physical habits upon those under his care. She suggested a new system for the education of physicians, and the employment of male physicians for men and woman physicians for women."

A short discussion followed, in which a general opinion was expressed that ladies should be admitted to the practice of medicine, especially among women and children, but that no ground whatever existed for making any change as to medical men, who were well known to have written and laboured in the most disinterested manner for the prevention of disease.

Sir John Lubbock's Lecture.

On Friday evening, Aug. 21, a lecture was delivered in the Ulster Hall, by Sir John Lubbock, on "Common Wild Flowers considered in Relation to Insects." We hope to print the lecture in a future number.

Professor Odling's Lecture.

On Saturday Professor Odling delivered a lecture in the Workmen's Institute, before a crowded audience, on the "History of the Discovery of Oxygen"

The Next Meeting of the Association.

On Tuesday a meeting of the General Committee was held at 3 o'clock p.m. Sir John Hawkshaw was unanimously appointed President for the meeting in 1875 which is to be held at Bristol, on the 25th August. A deputation from Glasgow invited the Association to visit that city in 1876, and it was unanimously resolved to accept the invitation. A deputation from Plymouth urged the claims of that town for a visit in 1877.

Concluding Meeting.

The concluding general meeting was held in the Ulster Hall, on Wednesday. Mr. Griffiths, the assistant secretary, read a list of the papers which had been discussed in the different sections, and mentioned that the number of tickets issued amounted to 1950.

Various votes of thanks were passed to the local authorities to whom the Association was indebted for accommodation during its meeting, and a vote of thanks to the Preisdent brought the business to an end.

It is stated that no less than nine different excursions have been arranged, one being to the Giant's Causeway, to which numerous invitations have been issued by the Mayor of Belfast.

Parliamentary and Law Proceedings.

Prosecution under the Adulteration Act.—Alleged Adulteration of Red Precipitate.

At the Hyde (Cheshire) Petty Sessions, on Monday, Mr. Samuel Booth, chemist and druggist, was summoned at the instance of Captain Arrowsmith for selling to him, on the 9th July, as unadulterated, half an ounce of red precipitate, which was, to the defendant's knowledge, impure.—Defendant pleaded, Not guilty.—The Clerk informed defendant that the Act of Parliament said he was to prove that the article was pure, and unless he did so he was supposed to have a knowledge of the adulteration. Captain Arrowsmith was not bound to prove that it was adulterated. Defendant was to show that he did not know it was.—Defendant said he did not know it was adulterated. He sold it as he bought it.—The Clerk: Chemists ought to be very careful indeed.—Captain Arrowsmith stated the case. He said that on the 9th of July he purchased from Mr. Booth, who was a chemist and druggist at Broadbottom, an ounce of red precipitate. On the following day he conveyed it to the county analyst, from whom he had received a certificate, which stated that the article had been analysed and found to contain five parts per cent. of oxide of lead. The Captain further observed that red precipitate was used very largely by people as an ointment, and it was very necessary that it should be pure. He had procured other articles from Mr. Booth, among which was some white precipitate, and it was found to be pure. He had no wish to press for a heavy penalty. Probably Mr. Booth had been taken in by the dealer, and he would not say that Mr. Booth was aware of it.—Defendant said he was very sorry. He had been in business above thirty years, and he had never had any complaints before. He should be on his guard in future.—Captain Arrowsmith said it was very necessary that the public should be protected. The Bench said it was possible that the precipitate powder was as defendant received it, but it must be understood that it was the duty of all people who sold drugs and other things which concerned the health of the inhabitants to know beforehand that they were pure.—The case was dismissed on defendant's promising to pay the costs.—*Local Newspaper.*

Suicide of a Chemist and Druggist.

An inquest has been held, at Cardiff, on the body of Mr. David Benjamin Jones, chemist and druggist, late of Adam Street, Newtown.

It appeared from the evidence that on Tuesday morning, August 11, about a quarter to eight, he ran into the house of his next-door neighbour, and exclaimed, "Let me sit down; I shall be dead in two minutes." He immediately began to show symptoms of internal suffering; medical assistance was obtained, and the usual remedies were speedily applied, but without avail.

Dr. Buist said that he was called to see deceased, and found him on the floor, apparently unconscious. Deceased afterwards said he had taken laudanum, but after making an examination witness asked him whether it was not strychnine. Very soon afterwards deceased went into violent convulsions, his whole body becoming rigid, and his teeth clenched; he never really recovered from this, gradually relaxing and dying. Some hours afterwards witness examined the powder found by Sergeant Wallbridge, and felt sure it was strychnine; Mr. Drane, chemist, was of the same opinion. He had no doubt Mr. Jones died from the effects of strychnine, and he thought it right to add that he believed deceased had been of unsound mind for several days previously.

The jury returned a verdict that the deceased had taken the poison from which he died while he was in a condition of unsound mind.—*Hereford Times.*

Suicide by Laudanum.

An inquest was held at the Sunderland Infirmary, on Tuesday, August 11, by Mr. Coroner Maynard, concerning the death of a man who had been found by a police-constable in the street in an insensible condition. Two small bottles had been found upon deceased, which were labelled "Laudanum," one being empty, the other full.

Mr. William Leavenswaite, junior house-surgeon at the Infirmary, said he was present when the deceased was brought to the institution in an insensible state, not being able to give any account of himself. He heard some one remark that deceased had taken laudanum, and he and Mr. Hopgood commenced to apply the different remedies. The face of the deceased was livid, and the pupils of his eyes were contracted. They treated deceased on the assumption that he had poisoned himself. They did not examine the body to see whether there were any wounds to cause the insensibility; they only examined the head. The deceased was brought into the Infirmary at half-past two o'clock, and died at half-past three. He was of opinion that deceased died from opium-poisoning.

Mr. Jeremiah Burton Gilbert, chemist and druggist, trading under the name of Sayers and Gilbert, at Monkwearmouth, said deceased was a stranger to him. On Monday morning, about a quarter past nine, he sold deceased twopenny-worth of laudanum in a bottle which was labelled "Poison." Asked deceased what he wanted it for, and if he knew how to use it, and he said he used it for the tic-doloureux, and he perfectly understood the nature of it. He appeared to be perfectly cool and collected when he purchased it, or witness would not have sold it.

A long discussion here took place as to the meaning conveyed by the label on the bottle, which was to the effect that the contents of the bottle were "soothing and narcotic," and "twelve to twenty drops could be taken, according to the constitution of the patient."

Mr. Sanderson, of whom deceased purchased a bottle of laudanum, said that laudanum was "soothing and narcotic" only to a certain extent.

The Coroner: Now, don't you think that twenty drops is a very large dose for a weak person who has never taken it before?

Mr. Sanderson considered it a strong dose, but not sufficient to do harm.

The Coroner thought that the label was a miserable advertisement from the beginning to the end, and he was only sorry that there was not an Act of Parliament to stop it at once. He really believed that the deceased had died from taking a dose of opium, and that there was no evidence as to what state of mind he was in at the time he took it.

The jury, after a short consultation, identified deceased as James Henry Sinclair, and that he "Died from poison administered by his own hand while in an unsound state of mind."—*From the Sunderland Times.*

Review.

Tea, Coffee, and Cocoa Analysis. By J. Alfred Wanklyn, M.R.C.S., &c. London: Trübner and Co.

This book, we learn by the preface, "is intended to form one of a series of manuals for the use of Public Analysts under the Adulteration Act," for which purpose we certainly consider the book but very imperfectly adapted. After the well-known and deservedly valued works of Mr. Wanklyn on the analysis of water and of milk, it is disappointing to find that his latest contribution to scientific literature bears unmistakable signs of having been hastily compiled from the works of others, and apparently without the author having taken the trouble to verify their results for himself.

How far Mr. Wanklyn is from having succeeded in rendering his work complete, is evident from the fact that we find no allusion throughout the book to facing or colouring of tea, or to adulteration by ferruginous matters or catechu; admixture with other leaves is barely mentioned, and their botanical characters are left quite unnoticed, while the tea-leaf itself is stated to "bear some resemblance to the willow."

On page 3, the author observes that "in the tea trade, the besetting malpractice is the selling of partially exhausted tea, and the main efforts of the tea analyst should be directed to this form of adulteration; therefore Mr. Wanklyn gives special attention to the detection of this admixture, relying for this purpose on the per-centage of soluble ash, the proportion of tannin—Allen's process of titration by means of lead being described at length—and on the per-centage of extractive matter. The last method is founded on the old determinations of insoluble matter by Péligot, the author preferring to evaporate the aqueous solution, rather than to weigh the redried leaves.

Mr. Wanklyn also proposes to apply his well-known ammonia process to the examination of tea extract, based on the assumption of the constancy of composition of natural products like milk and tea. Apparently upon the strength of the examination of a single sample of tea for "albumenoid ammonia," which gave ·70 per cent., Mr. Wanklyn ventures to "confidently recommend this method of investigating the strength of tea-infusion," actually in the face of the only two comparative experiments, by which he obtained ·495 and ·50 per cent. of albumenoid ammonia from gooseberry leaves and Paraguay tea respectively! We are not informed what evidence Mr. Wanklyn has that other samples of tea would not have yielded as little ammonia as the gooseberry leaves, or what possible value there could be in a determination that shows so slight a distinction between tea and other leaves.

Mr. Wanklyn commits a similar error in the chapter on theine, where he says it would be a mistake to regard the varying amounts of theine recorded to have been found as showing that the actual proportion of theine was very variable. Yet it does not appear that Mr. Wanklyn has made any experiments in support of this statement, and he merely gives Péligot's process for the extraction of theine.

The section on coffee contains nothing that is new, and the article on cocoa is chiefly compiled from Mr. Holm's recent lecture before the Society of Arts, which was fully reported in our columns.

Almost the only novel matter in the book is that taken from Mr. Allen's articles on tea and coffee, and we are informed that the absence of all allusion to some very recent papers by Mr. Allen and Mr. Wigner is to be ascribed to the fact that part of the book has been in type since the beginning of May.

Notes and Queries.

CHLORAL HYDRATE SUPPOSITORIES.—The following formula for suppositories containing chloral hydrate is published in the *Journal de Pharmacie* (August, p. 128) by Dr. Constantin Paul :—

Cacao Butter	11	grams.
White Wax	7	„
Chloral Hydrate	6	„

For six suppositories.

[407.] COUGH MIXTURE.—Can any correspondent furnish me with a formula for making Cough Mixture, with honey, that will not ferment.—M.P.S.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Sessional Prizes.

Sir,—I agree with "*Fairplay*," whose letter appears in your last week's issue, that it is unfair that the man who carries off the Pereira Medal should be allowed to take the Prize of Books in the same year. But with the latter part of his letter I do not agree. He considers that any who competed, coming from a distance, must be devoid of sense. Those who did not win, and who risked "travelling expenses on only a chance of success" are doubtless very much obliged to him for the compliment. Happily men do not sit down and calculate the exact money value of prizes of this kind. Doubtless some of them had spent years in patient study, the time of study being drawn from that which should have been spent either in bed or in taking that amount of outdoor exercise which is so essential to health; and it is not likely that these men would be debarred from competing by the cost of a trip to London, especially as these prizes are the only ones open to men who have not spent a session at Bloomsbury Square, although they might feel the circumstances otherwise than encouraging.

All cannot win either the Pereira Medal or the Prize of Books, but unless a countryman does either the one or the other, he is no better off, so far as recognition by the Society is concerned, than the man who just manages to shuffle through his examinations: his name is placed at the head of the month's list, certainly, but the man himself has nothing to show. I think an extra certificate ought to be given, at least, to the men who pass the "Major" in Honours, and surely a second prize and certificates of merit might be awarded to men who were at all deserving in the competitions before mentioned.

It having been decided by the Council that the examinations for the Pereira Medal and Prize of Books should only be held in London and Edinburgh, I think the Council ought to defray the travelling expenses of the competitors.

A Country Pharmacist.

An Easy Method of taking the Specific Gravity of Thick Liquids.

Sir,—Being engaged in a pharmaceutical laboratory, where the preparation of liquid extracts, etc., are frequent operations, and as the specific gravity of many of these has to be taken before an accurate result can be arrived at, I have been much annoyed by the length of time required for properly cleansing the specific gravity bottle and filling the same with a thick liquid.

The necks of specific gravity bottles are usually so small as to necessitate the introduction of a thick liquid into the bottle by mean of a pipette and in the case of some such liquids (e.g., Ext. glycyrrh. liq., B.P.,) this causes the formation of many air-bubbles, which take some time to disperse; I ha e therefore found the following modification of an old and very well known method to be useful. The plan I adopt is this:—

I attach a piece of glass (a glass stopper answers well) by means of very fine platinum wire or horse hair, to one of the limbs of a balance, and find the weight in air is 667·9 grains, its weight in water is 372·6 grains. This shows that a bulk of water equal to that of the glass weighs 295·3 grains. Immersed in a non-official syrup, I find the glass weighs 280·6 grains; this also shows that the weight of a bulk of syrup equal to that of the glass is 387·3 grains, thus showing us the weights of equal bulks of water and syrup.

By a simple division sum we can of course immediately get the specific gravity of the syrup in question,

$$387{\cdot}3 \div 295{\cdot}3 = 1{\cdot}311.$$

For as the loss of weight in water is to the loss of weight in syrup so is 1·000 to the specific gravity of the syrup.

I have tried this method for other liquids with equally good results, but of course for limpid liquids the specific gravity bottle when at hand stands unequalled.

I do not place this before you as by any means a novel method, but I think it is one the usefulness and simplicity of which has been long overlooked, the advantages of the above process being that the specific gravity of any liquid can be accurately ascertained with much less trouble and in much less time than by means of the specific gravity bottle. And if a piece of platinum weighing about 10 grains be used (as was suggested by the original inventor of this method) instead of a piece of glass, the specific gravity can be accurately ascertained with as small a quantity as one fluid drachm of the liquid.

Norwich. W. H. Symons.

J. E. Hoult.—'How Crops Grow,' published by Macmillan, or Liebig's Letters on Agricultural Chemistry, and the papers by Lawes and Gilbert in the Journal of the Royal Agricultural Society of England.

Pharmaceutic.—You are recommended to apply to the Director of the Royal Gardens at Kew.

"*Ignoramus.*"—(1) Read the Preface to the Pharmacopœia. (2) The information would be best obtained by practical lessons in a laborato-y. (3) You do not say whether you want a recipe to produce them or to get rid of them; but in either case consult a bootmaker.

R. and J.—Probably washing with alcohol.

"*Echo.*"—It is usually about the same specific gravity.

X. Y. Z.—We must refer you to the Public Analyst of your district.

"*Smilax.*"—Your letter has been handed to the Secretary, with whom you are recommended to communicate.

G. R. G.—Good descriptions of the process are given in 'Ure's Dictionary of Arts, Manufactures,' etc., vol. i., and 'Muspratt's Chemistry,' vol i.

"*Socius.*"—The formula for Driffield Oils given in Cooley's Druggists' General Receipt Book is—Barbadoes tar, 1 oz., linseed oil, 1 lb., oil of turpentine, 3 oz., oil of vitriol, 1 oz.

"*Ceterach.*"—The medals are awarded by the Council upon the reports of the Professors. If you have any suggestion to make, or wish for information respecting any supposed irregularity, you are recommended to communicate with the Secretary.

A. P. S. and P. B. are referred to the regulation respecting anonymous communications.

W. S. T.—It would be unsafe to express an opinion without an inspection of the mortar. We thank you for your communication, but the rhymes are unsuited for publication in this Journal.

J. E. R.—We think the safest aud most economical plan would be to sacrifice the socks.

H. W. Harris.—A hydrocarbon oil, so called because first obtained from Rangoon petroleum, being the heavy portion of the distillate.

W. S.—The formula you ask for was given in volume i. of the present series, p. 446.

E. M. Smith.—The fault, we think, probably lies with your tartarated iron. Try another sample, dissolve it separately, and mix with the solution of the other salts.

W. Hallawell.—You are not too late to compete. You are recommended to read again the announcement carefully; nothing is said therein about giving notice in May.

C. Hawthorne.—You are recommended to communicate your views to the Secretary.

Communications, Letters, etc., have been received from Mr. Rimmington, Mr. Pollard, Mr. Darby, G. [illegible]

THE PRICE OF MEDICINE IN 1836 AND 1874.

BY CHARLES EVE.

In this slack season of the year when so many of our customers are enjoying a holiday, I have found time to classify several hundred formulæ taken from two of our prescription-books belonging respectively to the years 1836 and 1874. The result will surprise few who have given any thought to the subject, but it will serve to show, in strong relief, the altered character of modern prescribing, and the serious loss it entails on the dispenser. Let me add, that beyond the exclusion of external remedies, there was no selection of the formulæ; they were taken in the order in which they were copied.

	1836.	1874.
Mixtures, dose ℥ij and upwards	5·5 per cent.	1·5 per cent
" " ℥iss "	14·0 "	4·5 "
" " ℥j "	11·5 "	23·5 "
" " ℥ss "	1·0 "	17·5 "
" " ʒij "	2·0 "	2·5 "
Drops, " ʒj or less	5·5 "	10·5 "
Pills	42·0 "	32·0 "
Powders	7·5 "	5·5 "
Draughts	10·0 "	1·0 "
Electuaries	1·0 "	0·5 "
Suppositories	—	1·0 "

In 1836, the price of 50 bottles of mixture and drops, containing 338 doses, was £5 9*s.* 10*d.*, being rather more than 3¼*d.* a dose.

In 1874 the price of an equal number, containing 618 doses, was £5 11*s.* 8*d.* or almost exactly 2*d.* a dose, showing a difference in favour of the purchaser, in 1874, of rather more than 1½*d.* a dose.

Plough Court, E.C., August 28th.

NOTES ON A NEW PREPARATION OF MEAT

BY S. DARBY.

A preparation of meat claiming to possess very considerable renovating powers has lately been introduced to the notice of the medical profession in Germany. As the nature of it appears to have been altogether misunderstood in this country, whilst the name given to it would foster this error, a slight note as to its constituents may probably be of interest.

The preparation referred to is named the "Leube Rosenthal'sche Fleisch solution," and the method given by Dr. Mirus, in the *Chemisches Centrall Blatt* of July 16th, 1873, for its production is as follows:—

"Two hundred and fifty grammes of finely minced meat are put into a half-quart mineral water bottle; this is then filled to three-fourths of its contents with water to which has been added 1 per cent. of hydrochloric acid, and the lumps of meat broken up by well shaking. The bottle and its contents are placed in a steam boiler and heated under pressure for fifteen hours continuously. The bottle is now removed and the mixture rubbed up, so as to obtain it in a uniform state, after which it is again heated as before for fifteen hours. The acid mixture is to be exactly neutralized with carbonate of soda, and evaporated to the consistence of gruel.'

This preparation, as obtained from Dr. Mirus, was a light pinkish coloured emulsion, and the contents of one tin, weighing 52½ drachms, yielded on evaporation to dryness a residue which weighed 12½ drachms. Two hundred and forty grains of this dry solid were thoroughly exhausted by repeated washings with tepid water, the residue dried and the watery solution evaporated to dryness. The dried soluble extractive weighed 79·5 grains, whilst the insoluble portion weighed 157·5 grains.

I then boiled finely chopped lean fresh meat (a portion of which, when dried, gave 26 per cent. of residue) with five times its weight of water, in a Pappin's digester, for thirty hours; filtered, well washed, and dried the residue, and evaporated the solution with the washings also to dryness. From 1000 grains of meat were obtained 82·2 grains dry soluble extract, and 182·0 grains insoluble residue.

BY COMPARISON,

Meat digested with water only in a Pappin's digester gave for 1000 parts:—		The Leube Rosenthal'sche preparation gave for 1000 parts:—	
Soluble Extract	88·2	Soluble Extract	76·0
Insoluble Residue	182·0	Insoluble Residue	153·0
Water	729·8	Water	771·0
	1000·0		1000·0

or, comparing the relative proportion of soluble to insoluble, in the dried matter,

Meat simply digested in a Pappin's digester gave for 100 parts:—		The Leube Rosenthal'sche preparation gave for 100 parts:—	
Soluble	32·7	Soluble	33·2
Insoluble	67·3	Insoluble	66·8
	100·0		100·0

a difference so slight as to warrant a belief that the solution of other matters than those soluble in cold water was altogether due to the stewing under pressure, and in no way affected by the dilute acid used in preparing the Leube Rosenthal product; and that this preparation, as might have been anticipated, is meat, the fibrine of which is merely in a very finely divided condition, and not changed into peptone. The term applied to it of "flesh solution," although convenient, is evidently, therefore, altogether a misnomer.

Von Wittich states that dilute acids alone will convert fibrine into peptone, but according to his experiments, it required a digestion of twenty-four hours' duration, at a temperature from 86° to 104° Fah., to change only 1 per cent. of the fibrine into peptone, and although it remains to be shown that by a prolonged action the whole of the remaining fibrine (99 per cent.) would be converted, and without undergoing further change, yet anyone conversant with the treatment of meat needs not be told that even were it so, and at the rate previously indicated, such a method would be totally inapplicable for any considerable quantity.

It is not, in my opinion, assuming too much to state that at present no other method is known by which the fibrine of flesh can be changed to a soluble condition and the whole meat rendered soluble and acceptable as an article of diet, than that by means of pepsin and dilute acid, as in the case of the preparation known as "fluid meat."

The authors of the Rosenthal'sche Fleisch solution, so far as I am aware, do not claim that they convert the fibrine into peptone, and any mention of "fluid meat" would be uncalled for here, were it not that the two preparations have been mistaken as identical, and that it has been assumed that they both consist of peptones.

It has been clearly shown that the German preparation does not consist of peptone, and that it is principally insoluble material, in no respects possessing the properties of "fluid meat." To this latter substance the late Baron Liebig unconsciously alluded when he wrote:—"Were it possible to furnish the market at a reasonable price with a preparation of meat containing in itself the albuminous (*i.e.*, fibrine and albumen) together with the extractive principles, such a preparation would have to be preferred to the *Extractum carnis*, for it would contain all the nutrient constituents of meat." Contrary to Baron Liebig's doubt that "there is no prospect of this being realized," it has been not only accomplished—by an artificial process closely allied to the natural one—but a long-continued employment of the so changed meat in many difficult and most trying circumstances has proved that it does contribute all the nourishment of ordinary meat, and under conditions where this would not be available. Cases are now recorded of impaired and even suspended power of digestion, both from natural and accidental causes, in which "fluid meat" has not only sustained life during long periods, but enabled a restoration of the digestive functions to become effected.

HERB CULTIVATION AT MITCHAM.*

Mitcham has long been celebrated for its herb fields, from which the London herbalists derive their mint, sage, liquorice, and similar herbs. Of these, as a rule, distillations are made by the growers, and they are disposed of in a semi-refined condition, or the herbs themselves are brought into market as soon as they are harvested.

Chamomile.—To this several acres are devoted, the double-flowered kind being preferred on account of the weight of the produce; but both single and double sorts are grown. In March, old and somewhat "spent" plantations are broken up and the plants divided into good-rooted slips, which are planted in well-prepared ground in rows 2½ feet apart, and 2 feet asunder in the rows. A common practice, however, is to plant as thick again as this, and to thin out the plants afterwards to the distances just named. The plantations are intercropped with lettuces in spring. As soon as the blooms begin to expand, they are fit for gathering, and from that time, as long as they yield sufficiently to pay, the flowers are gathered several times in a season by women, who are either paid a regular day's wage, or a penny, or thereabouts, per pound for picking.

Lavender.—This is extensively cultivated at Mitcham, both farmers and cottagers bestowing special attention on it; and this district presents a lovely sight in the last fortnight in July, when the different fields of it are in full bloom, the air for miles around being loaded with its fragrance. Lavender is increased by means of rooted slips, planted out, in rows about 18 inches apart and half that distance asunder, in March or April. Sometimes the sets are planted as wide in the row as the drills are apart. For the first year the produce amounts to but little; and, therefore, parsley or lettuce is planted between the rows. As soon as the plants have grown sufficiently to become crowded, every alternate row, and also every alternate plant in the rows left, are lifted—say in spring—and transplanted into another field, so as to form a new plantation. Thus the plants stand 3 feet apart each way, or 3 feet one way and 18 inches the other. Coleworts, lettuces, or other early and quickly matured crops are raised amongst the lavender in the early part of the year; but after June, all such catch-crops are removed. The flowers are usually harvested in the first fortnight of August.

Liquorice.—This was once largely grown at Mitcham, but, although it is still grown in considerable quantities, it is not now so extensively cultivated there as formerly, on account of the cost attending its culture. It entirely occupies the ground for three years, and during that time requires great attention in the way of cleaning, besides the ultimate cost of trenching out the roots, or rather, underground stems. The ground being deep, is heavily manured in autumn or winter, when it is trenched and laid up in ridges, in a rough state, till spring. It is then levelled, marked off in drills about 2 or 3 feet apart, and some 3 or 4 inches deep, and in these the sets are planted in March. The sets consist of finger-length pieces of the old root-stems, each containing an eye or two. During the first year the ground is usually intercropped, as is also the case in the earlier portion of the second year; but after the middle of the second summer, and throughout the whole of the third year, the liquorice requires all the room. When the stems are matured in the autumn of each year, they are cut over close to the ground, and if time can then be spared, the soil between the rows is forked over, some well-decayed manure being occasionally worked into it at the same time. The lifting of the crop, which usually takes place in the end of the third season, is a difficult operation, involving much labour. A deep trench is cast out, lengthways, alongside the first row, and by means of forks, pulling-ropes being even sometimes employed, the root-stems are extracted. In this manner the whole of the rows are treated, until all are successively lifted. The roots may then be stored in sand or pits, like beets, carrots, or potatoes. Growers of liquorice do not always harvest the crop; but sometimes sell it as it stands in the field.

Mint.—Both spearmint and peppermint are largely grown at Mitcham, particularly the latter; indeed this crop ranks second in importance only to lavender. It is first planted in rows 13 inches apart each way, and in the end of the next two seasons it is ploughed in. The plantations are kept free from weeds during the summer by means of hoes; and about the end of the first week, or during the second week of August, is the usual time for cutting mint for distillation. In the Fulham fields, and in other districts in which market-gardening is carried on, mint is largely grown for sale in a green state. For this purpose the dampest piece of ground is selected for its culture, if it is to be a permanent plantation, but it will grow in almost any soil. It is planted in rows a foot apart, and the ground is intercropped the first year, but afterwards it runs through the soil in such a way that it becomes a complete mass of under-grown stems and roots. It is cut and bunched for market as required, the greatest demand for it being during the pea season. It is also forced in large quantities. I have seen a range of 43 light frames filled with mint alone. These beds are made up in December or January, when the ground they occupy is excavated to a depth of 20 inches, and filled in with fermenting manure packed firmly. A few inches deep of soil are then added, and in this the mint roots are thickly planted. Linings of manure are placed round the frames, the sashes during the night and in cold days being covered with it.

Poppies.—Of the white kind several acres are grown. They are sown in rows in spring, some 20 or 24 inches apart, and require no further care, beyond a little thinning and cleaning, till August, when their seeds ripen.

Sage.—This forms an important crop, which, under favourable circumstances, is pretty remunerative; the stalks being cut over, bunched, and sent to market at once. New plantations are formed with rooted slips, obtained by dividing the old plants; they are inserted, late in spring, in rows 1 or 2 feet apart, and about a foot asunder in the row. During the first season parsley or lettuces form an inter-crop, which also occupies the ground during the earlier part of the succeeding ones. Except hoeing and cleaning, the plantations need no care so long as they continue in a thriving condition; and, when the lines get broken, and blanks and sickly plants occur, the plantation is broken up. Both the reddish and green-leaved kinds are cultivated.

Squirting Cucumbers.—These are raised in frames, like vegetable marrows, and are planted out, about the end of May, in rows some 4 or 6 feet apart, and 4 feet asunder in the row. They flower and fruit at the same time, and the fruits are gathered before they are ripe, otherwise a mere touch would burst them.

* From *The Garden*, August 22nd, 1874.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 5, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SOCIETY'S EXAMINATIONS.

WE have recently received so many inquiries in reference to the new regulations which are to come into force in future examinations that we think it desirable to regard these inquiries as indicative of a general desire for information on this subject, and to give here a detailed explanation of the changes that will have to be taken into account and provided for by future candidates.

First, as regards the Minor Examination, which still remains the portal to the practice of pharmacy as a principal, there will be no more examinations under exactly the same conditions as heretofore. On and after the first of October next, when the examinations will be resumed, certain alterations will be made, and the chief one among these is the requisition of practical knowledge of the chemical processes by which medicinal agents are produced. It will also be demanded that candidates shall be able practically to determine, by means of tests, the presence of certain substances in solutions given them for that purpose, and to explain the reactions which take place in the tests they apply in each case. In short, they will be required to give evidence of a fair knowledge of qualitative analytical chemistry. That this requirement is consistent with existing conditions will, we think, be obvious from the fact that there is a very general disposition on the part of pharmacists to undertake the duties of public analysts. That the general nature of the pharmacist's avocations are quite in harmony with the performance of such duties will, we think, be admitted without argument, and we have long since urged that there is no class of the community more fitted for holding this office. If that be the case, it is important that some means should be adopted of ensuring competence on the part of pharmacists qualified legally by examination, and the introduction of the new feature of requiring evidence of practical acquaintance with chemical analysis is, we think, to be regarded as a wise step in pursuance of the old policy of the Society, to raise the character of the pharmacist's business, and improve his position.

We are aware that there are some who do not share these opinions, that among those who aspire to the qualification for carrying on business on their own account, there are some who think it a hardship that they are required to prove they possess the knowledge which is essential for the proper performance of their duties, while, on the other hand, there are, among those engaged in business as principals, some who deprecate the introduction of the changes here referred to, on the ground that they render it difficult to obtain assistants.

As regards the objections of the former class, they probably demand no great consideration; but those of the latter class are more serious, and it will be well for all who have the interest of pharmacy at heart to endeavour to counteract this (as we think) mistaken opposition to progress. If we seek to ascertain how it is that increased stringency of the examinations can operate in restricting the supply of assistants and apprentices, we fail altogether to find any justification of the hostility with which the new examination regulations are regarded by some. For it must be remembered that the Minor Examination is not one necessary for the performance of the duties of an assistant. It is in order to commence business on their own account that candidates seek to pass the Minor. How, then, can the stringency of this examination limit the supply of assistants? Is it not more likely that it would augment that supply? Would not young men, desirous of passing the Minor with a view to commencing business for themselves, be the more readily induced by the stringency of that examination to engage themselves as assistants, where they would have opportunities of acquiring the knowledge requisite for passing it with credit?

Besides the main feature of alteration to which we have referred as having been introduced in the Minor Examination, there is also an addition to what has hitherto been demanded in regard to prescriptions. The candidate must now show that he has a general knowledge of Posology, that he is able to detect errors and discover unusual doses, as well as to render, in good Latin, ordinary prescriptions, written in English. He must also possess a practical knowledge of the processes by which the extracts, tinctures, etc., of the Pharmacopœia are made, as well as a knowledge of the principles involved in those processes.

These are the chief features of alteration which will come at once into force as regards the Minor Examination. On and after the 1st of January, 1875, however, there will be a further demand made upon candidates, inasmuch as they will, from that time, have to produce certificates of having attained the full age of twenty-one years. Then, again, on and after the 1st January, 1877, each candidate must, in addition to other requirements, produce certificates to the effect that he has for three years been registered and employed as an apprentice or student, or has otherwise been practically engaged for three years in the translation and dispensing of prescriptions.

From the time when this latter regulation was adopted by the Council up to the time when it is to come into force, three years will have elapsed, so that any one who has failed to comply with this condition cannot have any reason to complain of hardship, except such as may arise from his own negligence.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, September 2nd, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

Present—Messrs. Betty, Greenish, Hampson, Owen, Radley, Rimmington, Robbins, and Sutton.

The minutes of the last meeting were read and confirmed.

Mr. BETTY suggested that the Committee recently appointed to consider the educational arrangements of the School in Bloomsbury Square should have the scope of their inquiry somewhat enlarged, so as to include the question of all pharmaceutical education in any way subsidized by the Society, whether in London or in the provinces.

Mr. HAMPSON thought if the question of the education in London were satisfactorily settled, the rest would arrange itself.

After some conversation it was considered best to make no alteration in the terms appointing the Committee, but the name of Mr. Mackay was added to the list of members.

The name of a former member who had neglected to pay his subscription in due time, was restored on payment of the subscription for the current year and a fine.

ELECTIONS.

MEMBERS.

Chemists and Druggists.

The following registered Chemists and Druggists were elected Members of the Society:—

Blackhurst, William Swarbrick...Kirkham.
Cox, Samuel................................Maidstone.

ASSOCIATES.

The following having passed their respective examinations, and being in business, were elected "Associates in Business" of the Society:—

Minor.

Chesterton, William Peter ......Birmingham.
Churchman, James ....London.
Hindson, James Alfred ....Old Brompton.

Modified.

Hancorn, John Thomas ....Torquay.
Young, John Matthew ....Girvan.

The following having passed the Minor Examination were elected "Associates" of the Society:—

Amery, John ....Taunton.
Broadbent, Sidney ....Greenfield-in-Saddleworth.
Cumine, Rupert Henry ....Kingston-on-Thames.
Cuttle, Arthur Edward ....Scarborough.
Hodgkinson, Peter James ......Congleton.
Kimber, Benjamin Tindall ......Southampton.
Midgley, James Herbert ....Edinburgh.
Newitt, Herbert Henry ....Bicester.
Oakes, Henry.........................Pickering.
Partington, John James ....Macclesfield.
Robbie, William ....Aberdeen.
Stedman, Harry Bernard.........Bayswater.
Stiling, John Edward ....Exeter.
Wells, John ....Sleaford.
Wigginton, Alfred ....Islington.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination were elected "Apprentices or Students" of the Society:—

Batchelor, Alfred Ernest.........Fareham.
Beacock, Joseph Henry ....Barton-on-Humber.
Blyth, William Graves ....Goole.
Cowgill, Benjamin Rangdale ...Bingley.
Dester, Dester .... Warton.
Hayes, Frank ....Gainsborough.
Howe, Oliver George ....Stony Stratford.
Lodge, George Henry ....Rotherham.
McGuffog, Robert ....Dumfries.
McKenzie, Thomas Daniel ......St. Helen's.
Parkinson, Charles ....Preston.
Searle, Samuel ....Newton Abbott.
Thomas, Henry James............Llandilo.
Whittles, John Dencer............Birmingham.

The name of Robert Dixon, of 41, Upper Brook Street, Derby, was restored to the Register of Chemists and Druggists.

FINANCE.

The report of this Committee was received and adopted, and various accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee was read. It recommended the grant of £20 to a former member of the Society who had suffered from a severe accident; £5 to one of the candidates for an annuity; and £15 to a former member at Dover. Several applications were deferred for further inquiries.

The SECRETARY said these applications to the Benevolent Fund were of great importance, and he thought it would be well if special meetings of the Committee were called to consider them.

Mr. GREENISH remarked that wherever possible it was very desirable that the applicant should attend the Committee personally.

Mr. ROBBINS said this was generally done in other benevolent societies in London. It was also desirable that some one should make inquiries into these cases and report to the Committee.

Mr. SUTTON observed that this was always done in country cases.

Mr. HAMPSON said the Committee could not be too particular in their inquiries in all these cases.

The PRESIDENT believed that generally speaking some one of known position recommended the applicants from personal knowledge.

Mr. GREENISH said it was sometimes found on pressing further inquiries that the answers were not so satisfactory as might have been expected from the first communications.

The report was adopted, and the recommendations ordered to be carried out.

HOUSE COMMITTEE.

This Committee reported that in doing some of the repairs which had recently been directed it was found that one of the chimneys was in a very dangerous condition and required to be rebuilt. An estimate had been obtained for the necessary work, which was now submitted. The Surveyor now attended the Council, and after hearing his opinion upon the subject, the report was received, and the necessary work ordered to be done at once.

A PHARMACY ACT FOR IRELAND.

The SECRETARY submitted to the Council communications from the Secretary of the Irish Chemists' and Druggists' Association, on the subject of extending the provisions of the Pharmacy Act to Ireland.

The PRESIDENT said this correspondence referred to a very important question, and he would suggest that its consideration be deferred to the next meeting of Council, particularly as the attendance was so limited on the present occasion. This was unanimously agreed to.

THE ST. PETERSBURGH CONFERENCE.

Mr. GREENISH stated that his colleague, Mr. Sutton, and himself were preparing a full report of the proceedings at this Conference, but it was not quite finished, and they therefore thought it better not to present it incomplete, but to defer it until the next meeting.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page 176.*)

The Application of Oleic Acid in Pharmacy.

BY C. R. C. TICHBORNE, PH.D., F.C.S., ETC.

It is extraordinary to what an extent we are the slaves of habit, and how frequently the obvious royal roads to the goal are deserted to follow a beaten but circuitous tract.

The alkaline salts of oleic acid (soaps) used in pharmacy form a valuable and important class of preparations, and yet they are all procured by circuitous routes, at an extraordinary expenditure of time and money, but with an unsatisfactory result. Once upon a time (and not very long back) oleic acid was a chemical curiosity, valueless in the arts, and very little known, except to the scientific chemist. Now this is all past, and the acid is manufactured of considerable purity by the ton, and at a price before which no fats or oils suitable for pharmaceutical work could compete. Why this substance has not been made available in pharmacy is not so curious as might appear at first sight. It will be found from the experiments detailed that the so-called oleic acid of commerce presents some slight difficulties as regards its manipulation.

The first and only suggestion of importance that I am aware of for the use of oleic acid in pharmacy was Professor Attfield's paper upon the solution of the alkaloids in this acid, to be used in conjunction with cod-liver oil. These preparations have now gone out of use, and therefore a most valuable suggestion has fallen through. There cannot be two questions about the elegance and practicability of this method, and wherever a powerful alkaloid, such as aconitia in Ung. Aconitiæ is to be mixed with a fatty body, we should use the oleate. We thus obtain a solution in the fats, not a mechanical mixture.

There has been a second application of oleic acid, oleate of mercury; but from its appearance and other causes I do not think it will ever be much used.

I have had a series of experiments made with the view of practically introducing this so-called oleic acid, or the liquid fatty acid of commerce into the preparations where soap is introduced.

Many of the experiments so made, seemed at first to be unpromising; but as they were theoretically correct, they were persevered in until many excellent formulæ, as regards the appearance and general results, were produced.

In speaking of oleic acid as found in commerce, Messrs. Price and Co. gave me the following information which, I think, will be of sufficient interest to note here. There are one or two qualities in commerce, the best of which is known as pale cloth oil. The brown German oleic acid when bought by the ton is extremely cheap, but is much inferior in quality to the oil known under the above name or brand. It is, of course, a kind of by-product, procured by the splitting up of palm or other oils by superheated steam into glycerine and the fatty acids. The stearic acid and hard fatty acids are used in the manufacture of candles and for other purposes, whilst the fluid portion is pressed out, and is the article known as oleic acid of commerce. Although the oleates are perfectly harmless providing the base is so, the acid itself would appear to be therapeutically a poison. Thus, Messrs. Price and Co. point out that, although rats and mice are passionately fond of all neutral fats and oils, they carefully avoid oleic acid. It would be useful to determine how far this is the fact. Externally it seems to produce an irritability of the skin when used unneutralized.

It is my intention, on this occasion, to consider its application to the liniments, a class of preparations in which the oleates form an important part.

The soaps of the Pharmacopœia are as follow:—1. The hard soap, "Castile soap," supposed to be a hard soda soap made from olive oil, but very uncertain in its composition.

2. Soft soap.—An olive oil soap made with potash.

3. Animal soap, "curd soap," supposed to be a soda soap made with tallow, equally uncertain in its composition as the Castile soap.

The oleates, or soaps with which we have to do in this paper, I may as well describe in a concise manner, but it is necessary to bear in mind that this description applies to the oleic acid products as made from the commercial acid.

If we consider oleic acid as a bibasic acid the formulæ of the soaps will be $C_{36}H_{66}M''O_4$. The oleates differ from the palmitates and stearates in being perfectly soluble in alcohol—a most important point when considered in connection with liniments. The neutral oleate of ammonium is a very pectrous salt, capable of a very considerable amount of dilution before it gains a liquid consistency.

The oleate of sodium is practically insoluble in the cold, only a small proportion remaining dissolved, and the mass of it being deposited in a granular condition, or as a curd. It dissolves in weak spirit. The oleate of potassium is very soluble in cold water and pectizes easily.

I might enlarge upon this portion of my subject, but prefer to give a general outline of the practical application of this acid to the production of the liniments.

I may mention that the oleic acid, called "pale cloth oil," is admirably adapted for the production of liniments, but the acid does not improve by age, and very old samples do not pectize so easily as new ones; I may mention that the colour may be improved by digesting with pure animal charcoal.

Linimentum Ammoniæ.—This preparation, the old "oil and hartshorn," is, in the first stage of its existence, an emulsion of olive oil in the presence of an excess of ammonia. By degrees the oil is slowly saponified until we get nothing but a semi-solid ammonium soap.

I should prefer to make this liniment in the following manner:—

Take of—

Oleic Acid	℥ss.
Water	℥ij.
Strong Solution of Ammonia	ʒiss.

Mix the water and oleic acid, and add the solution of ammonia gradually, but with agitation.

The result will be a liniment having a definite and unchangeable composition.

Lin. Potassii Iodidi c. Sapone.—This preparation in the Pharmacopœia is a solution of iodide of potassium with an insoluble oleate of sodium and glycerine, etc. Nothing can be more unmanageable than this formula, and yet it is a useful addition to the medical practitioner's list. It is a powerful stimulating liniment, which can be used with ladies where tincture of iodine is not desirable. It has not come into more general use simply from the great uncertainty and ugly appearance which this curds-and-whey-like preparation presents. I propose to make it in the following manner:—

Take of—

Oleic Acid	6 ounces.
Carbonate of Potassium	2 "
Iodide of Potassium	7½ "
Glycerine	5 "
Oil of Lemon	5 drachms.
Water	2½ pints.
Solution of Potash, a sufficient quantity.	

Dissolve the carbonate of potassium with heat in 10 ounces of the water, and add the oleic acid, and after the effervescence has subsided, add the iodide of potassium, glycerine and oil of lemon mixed together, and then a sufficient quantity of the solution of potash to make it the requisite consistency, which it does by virtue of its power of producing a pectizing oleate.

Linimentum Saponis, B.P.—This has been a much-abused formula, and deservedly so. In this liniment a soda soap acts an important part, and as the fatty acids which are found in the ordinary soap of commerce are only partially soluble in spirits of wine, it only contains a minimum of the soap used. It is supposed to be a fluid liniment, and not a jelly like the original opodeldoc, of which it is a copy. If we obey the directions as regards temperature in making this liniment by maceration for seven days, we get a partial solution of the soap, and the stearates and other fatty salts are left, amounting to a large percentage.

My formula would be as follows:—

Take of—

Oleic Acid	8 ounces.
Carbonate of Sodium	4 ,,
Camphor	5 ,,
Oil of Rosemary	12 drachms.
Rectified Spirit	3 pints 12 ounces.
Water	8 ,,

Dissolve the carbonate of sodium in the water with aid of heat, and add gradually the oleic acid; when the effervescence has subsided, add the oil of rosemary and camphor dissolved in the spirit and filter if necessary.

The advantages are that we have a formula that contains all the soap in solution and in a perfectly neutral state, for if any excess of carbonate of sodium has been used, it is precipitated by the spirit. We are also enabled to make the liniment in as many minutes as it required days by the old process.

There are certain liniments which may be viewed as emulsions. Linimentum Terebinthinæ is typical of their preparation. Oleic acid behaves beautifully in such liniments.

Linimentum Terebinthinæ.—Take of—

Oleic Acid	1 ounce.
Oil of Turpentine	16 ,,
Camphor	1 ,,
Solution of Potash	q. s. ,,

The camphor and oleic acids are dissolved in the turpentine, and the liquor of potash is added gradually with constant agitation, until the whole emulsifies.

I do not pretend for a moment that these formulæ are the best that can be devised in connection with the use of oleic acid; but I do say, and have no hesitation in saying, that the days of the old formulæ are numbered, and that any one who makes the saponaceous liniments from oleic acid will never return to the soaps. I may, in conclusion, mention that no objection can be raised to oleic acid on the score of cost, as it will easily compete with the soaps in that respect. There are other applications of oleic acid which I must reserve to a future occasion. I have preferred to restrict my remarks to one class of medicaments.

The PRESIDENT: This is my first introduction to Professor Tichborne, but I hope we shall often have the pleasure of seeing him here again. His paper contains a great deal of interesting matter which well deserves the attention of the next Pharmacopœia Committee, whether that committee is composed partly of pharmacists and partly of medical men, or wholly of medical men. The subject is certainly worthy of further experiments; and I have no doubt many gentlemen who read the paper will further investigate the subject. I have now to ask you to pass a vote of thanks to Professor Tichborne.

The vote of thanks was passed unanimously.

Mr. FRAZER: I may state, as showing that Professor Attfield's suggestion has not altogether fallen to the ground, that our principal oculist in Glasgow had considerable difficulty in the application of aconite, and applied to myself to get a solvent for it. I applied to Mr. Morson, and he advised me to have it dissolved in oleic acid, and now, for a considerable time, it has been in daily use for this purpose by Professor Reid, lecturer on diseases of the eye in the University of Glasgow.

Professor ATTFIELD: I must say that I cannot altogether claim originality in suggesting the dissolving of matters in oleic acid, because when some seven or eight years ago the method of dissolving alkaloids in oils was published, I had brought to my notice the fact that some one had fifteen or twenty years ago, in the land of Lavoisier, stated that alkaloids could be dissolved in fatty acids.

Mr. SCHACHT: There is one observation I should like to make with reference to this paper, namely, that although one might see the desirability of employing oleic acid in the place of olive oil in the manufacture of soap, I could not help thinking it would be desirable, in most cases at least, that a definite compound should be first of all prepared rather than attempt to extemporize this formula at the moment of use, because the chances are, we should not get so perfectly neutral a preparation as would in many cases be desirable. But I wish to speak of that peculiar, and according to my experience very useful, preparation, the liniment of iodide of potassium and soap, which I believe owes its paternity to Messrs. Smith, of Cheltenham. A very satisfactory result was obtained by the use of one particular kind of soap—one which, I believe, contains very little oleate of soda, but a large proportion of stearate of soda, the curd soap of Messrs. Benbow. When that is used, you certainly do get a charming preparation, one which resembles clotted cream in consistency more than anything else. It is very constant, and maintains its consistency very perfectly for a great length of time, and you can produce the same article invariably by using the same materials. Of course, it is an open question whether much effect is produced by the external application of iodine in any form; if it is to be applied, however, this is a very elegant preparation. But if any one attempts to make it with oleate of soda, they will get a wretched result, neither solid nor liquid.

The PRESIDENT: Are you quite sure that the soap you refer to is a stearate soap, and that it contains no cocoa-nut oil? Because the cocoa-nut oil soaps have this property, that they can be dissolved in saline solutions, whereas stearate soaps cannot.

Mr. SCHACHT: I know that the oleic soap produces a very bad result, but I cannot speak absolutely with regard to cocoa-nut oil.

Mr. MARTINDALE: As oleic acid mixes well with alcohol, I think it might be suggested that it should be used in belladonna and aconite liniments in place of the camphor, as it would aid their absorption, and make them more compatible with liniments generally. It mixes with them, but not quite so well unless it be pure, and there is great difficulty in getting it of sufficient purity. With regard to the statement that all oxides dissolve in it, I have tried oxide of iron, and cannot get it dissolved in any way. It would be a great advantage if you could get oxide of iron dissolved in oleic acid, in order to mix with cod-liver oil.

The PRESIDENT: According to my experience the best way of dissolving peroxide of mercury in oil is to rub up in a warm mortar equivalent quantities of bichloride of mercury and powdered olive oil soap, and afterwards add a little boiling water to produce reaction and form the oleate. I have thus got a nearly white mercurial plaster that dissolved readily in hot oil, and kept well without turning black. By heating peroxide of mercury with the oleic acid I employed, I obtained a plaster that speedily became slate-coloured from reduction.

Mr. UMNEY: The specimen of oleic acid placed on the table by Professor Tichborne is far superior to any we see in trade in England at the present time. I believe many specimens would be better described as oxy-oleic acid; at any rate, that with which one meets in many shades darker than the specimen before us, and might be described as of a deep sherry colour.

Professor ATTFIELD: In reply to Mr. Martindale, I may say that oxide of iron is very slightly soluble in oleic acid; I dare say insufficiently so for any preparation to be used in pharmacy. With regard to varieties in the quality of oleic acid, I have seen some samples used in large quantities quite as good as that on the table; though, no doubt, the bulk of that met with in the trade is much darker. Oleic acid is now produced on an enormous scale, and is extensively used by clothworkers. As is well known, oils and fats of many kinds, which were formerly thrown away, being so impure as to be almost useless, are now recovered, as the phrase goes, and thus an immense amount of oleic acid is thrown into the trade. The better varieties, of course, command higher prices than the darker, but still there is a large quantity of light-coloured oleic acid to be had at a fairly reasonable rate, far more than is ever likely to be used in pharmacy.

Mr. RIMMINGTON thought the smell would be objectionable. The samples now shown had a peculiar smell, and so had every specimen he had seen, in most of them it being much more marked. It was a kind of burnt smell.

Dr. DE VRIJ: I should certainly object to the introduction of oleic acid into pharmacy, for of all the fatty acids I know none which varies so much in its composition. Everyone who has ever experimented with oleic acid knows that it rapidly absorbs oxygen from the air, and therefore it is very difficult to get it pure, so that if you use oleic acid you will have to prepare it yourself. I certainly should not advise its introduction.

Mr. HANBURY: I think it is really very questionable whether the by-product of a German manufacturer, which can be had at a few shillings the cwt., is, after all, such a very admirable substitute for the old-fashioned olive oil which we have been accustomed to use. No doubt, it is right to take advantage of these chemical improvements, but we may, perhaps, be in some danger of preferring cheapness to goodness.

Professor ATTFIELD: The oleic acid is very largely produced in England.

Professor REDWOOD: I may be allowed to express my thanks to the Professor for bringing this subject forward, and for having undertaken so many experiments in reference to it. You are probably aware that some time ago, and on more than one occasion, I have suggested to this Society the desirability of investigating the whole subject of the liniments used in pharmacy, for I consider those of the Pharmacopœia to be at the present time in a most unsatisfactory position. We are very much in want of some general principle upon which to proceed in the preparation of the liniments, and in devising formulæ for them, and here we have a suggestion certainly which may prove useful, and though, as has been stated, the formulæ put forward are, perhaps, not yet perfect, further investigation may lead to very valuable results. I may mention, in particular, the liniment of turpentine with acetic acid—a preparation containing ingredients which separate immediately, and which cannot be kept united. I have made several experiments with a view to getting a more homogeneous liniment as a substitute; in fact, the whole of them require revision, and I hope some day to see some general principle acted upon—some common menstruum adopted, which shall serve as a medium for the application of the more active constituents, and I look rather hopefully to the use of oleic acid.

Professor TICHBORNE: In connection with the objections which have been made, I will first of all make a remark in connection with Linimentum potassii iodidi cum sapone, and the recommendation to make it of curd soap. We have been discussing the merits of the formulæ contained in the Pharmacopœia, and though this liniment is there mentioned, unfortunately curd soap is not. It has lately been introduced into the Addendum, but of course did not exist at the time the formula for that liniment was given, so that it was evidently intended that it should be made from a soap which was an oleate of soda. While upon this subject I may dispose of the question of the purity of oleic acid, more particularly as one gentleman has objected to it as being indefinite, and thus unfit to be used as a substitute for soap. I must ask him did he ever go over a soap-works, and see the curious things that are sometimes put in the vats? Because, if he had, he would find that soaps are much more indefinite than commercial oleic acid. The sample on the table is a commercial sample, Messrs. Price's best quality; they have two, I believe. It is no pet specimen, it is just as any one would get it who ordered the best quality of oleic acid from that house. It is a very old sample, and was simply taken from a cask about half-an-hour before I left Dublin. It is, no doubt, true that, chemically speaking, a change takes place in oleic acid, and that it becomes chemically indefinite, and we have yet a great deal to learn on this subject. But it should be borne in mind I made a reservation, and said I was speaking of the properties of oleates as derived from commercial oleic acid. In connection with liniments, all we have to do with is the peculiar conditions they take as regards their consistence; and I think, on repeating my experiments, it will be found that, when made with oleic acid, it is quite immaterial whether they are one month or twelve months old. Of course this is an important point, but after all it is a question of consistency. There are, I know, some very inferior specimens of German manufacture in the market, but they are introduced for rough work, and no one would buy them for the purpose of making liniments any more than they would common soft soap made from fish oil. I do not think the smell is any practical objection. If you get oleic acid of inferior quality, no doubt it will have a strong smell, and you will find it varies in this respect very much, but I have no doubt, if there is any demand for it in pharmacy, that this little difficulty will be got over. I do not believe the smell has any connection with the oleic acid itself, as is shown by the fact that you find a different smell in different samples; but if you think for a moment that there is not one of these liniments on the table that does not contain a very strongly odoriferous substance, I think one might defy the most sensitive nose to detect the smell of oleic acid in any one of them.

Mr. WILLIAMS: I can well believe Professor Tichborne that the sample of oleic acid from Messrs. Price's he has shown us is an old one, for my experience is that you cannot get anything like it now. I have had a great deal to do with the preparation of oleate of mercury, and I find that oleic acid has become very bad of late, so that there is great difficulty in preparing an oleate that will keep, and be what it ought to be as a pharmaceutical preparation. I have tried many experiments to purify this acid, but I have not yet succeeded to my satisfaction, and shall be glad if any chemist or pharmacist will turn his attention to the subject. I believe there is a great future for this article, and that it must come largely into use, but certainly the commercial samples now in the market are not good enough for pharmaceutical purposes.

A MODIFICATION OF LIEBIG'S VOLUMETRIC PROCESS FOR THE ESTIMATION OF PHOSPHORIC ACID.

BY W. W. STODDART, F.C.S., ETC.

A short time ago, when examining some of the Somersetshire lias quarries, the author noticed the phosphoric appearance of some of the strata, but was too far away from laboratory assistance to prove the fact. In this emergency he applied to a country pharmacist, hoping to find some solution of iron that would enable him to roughly attempt the process devised by Liebig for estimating phosphoric acid. However, the only thing obtainable was the ordinary tincture. A trial, nevertheless, was made by means of that preparation, a little liquor ammoniæ and vinegar, with a small bit of ferrocyanide of potassium, and two long phials in lieu of a burette. The result, of course, only just enabled the author to choose for home examination those specimens that contained the largest percentage of phosphoric acid.

This little incident, after returning home, led to more extended experiments, which ended in the devising of what is believed to be an easy method, as well as a correct one, of determining the value of phosphates in manures and minerals.

This is often required by the agriculturist, geologist, and mineralogist, when both time and facility are of great moment. The magnesium method requires a considerable time for its completion, as well as delicate manipulation to avoid loss.

The uranium method, so well described by Mr. Sutton in his valuable work on volumetric analysis, requires so expensive and special a salt, that it is seldom found outside the well-appointed laboratory, where it is usually employed as extremely reliable and delicate.

It is to meet such cases as those mentioned that the method described in the following notes was devised:—

Long since it has been known that the solution of a soluble phosphate, mixed with an alkaline acetate and free acetic acid, is precipitated entirely by ferric chloride. Taking advantage of this reaction, Liebig suggested a volumetric process, and using ferrocyanide of potassium as an indicator. This is not so accurate a method as that with the uranium salt, and in practice is very troublesome from the decomposition of the precipitated phosphate into a more basic condition, and also from the fact that the precipitate itself will produce a blue colour with the indicator.

The present modification is intended to obviate this difficulty by substituting the sulphocyanide of potassium for the ferrocyanide. The determination of the phosphoric acid is thereby rendered as easy and correct as that of the chlorides by nitrate of silver.

The following solutions are recommended:—

No. 1.

Perchloride of Iron .	240 grains (or 24 grammes.)
Water	10,000 grains (1 litre.)

If not quite dissolved, add a few drops of hydrochloric acid. The liq. ferri perchlor., B.P., answers equally well.

No. 2.

Sodic Phosphate .	504·2 grains (or 50·42 grammes.)
Water	10,000 grains (1 litre.)

One c.c. of this solution = ·01 gramme or one ten-grain division of the burette = ·1 grain of phosphoric anhydride. This solution is of course for the purpose of ascertaining the value of No. 1.

No. 3.

Sodic Acetate . . .	2¼ ounces (or 100 grammes.)
Glacial Acetic Acid .	2¼ ounces (or 100 grammes.)
Water	10,000 grains (1 litre.)

The following is the mode of procedure in performing the analysis:—

Dissolve five grains of the sample in dilute hydrochloric acid, and to the filtered solution add about eight or ten drops of ammonia, and redissolve the precipitate with a little acetic acid. Then add one drachm of No. 3 and a few drops of the solution of sulphocyanide of potassium and make up to about an ounce with distilled water. Now run in the No. 1, previously titrated, till the creamy colour begins to assume a reddish tint. The reaction is then complete, and the volume of iron used indicates the proportion of phosphoric acid precipitated. To find out very exactly the moment when sufficient iron has been employed, and begins to appear free in the liquid, place on a white slab a filtered drop with one of the sulphocyanide, when the slightest reddish-brown tint will show the time of saturation or when sufficient iron has been taken. It is always better to use a very dilute solution of the phosphate under examination, or the red tint will be hidden by the precipitate.

The sulphocyanide of potassium may be readily made by boiling together for ten minutes, 120 grains each of common fused cyanide of potassium and sublimed sulphur in an ounce and a half of water.

The following comparative trials proves the constancy and accuracy of the sulphocyanide process, the result being calculated as tricalcic phosphate:—

	Magnesian process.	Uranium process.	Sulphocyanide process.
1. Superphosphate . .	46·147	46·171	46·174
2. ditto . .	39·165	39·169	36·168
3. Blood Manure . .	32·459	32·462	32·465
4. Liassic Coprolite .	24·163	24·201	24·200
5. Guano	26·440	26·452	26·454
6. Ditto	32·314	32·320	32·326

The PRESIDENT said the use of sulphocyanide as an indicator in place of ferrocyanide seemed a manifest improvement in the process.

NOTES ON A NEW LACTOMETER.

BY W. W. STODDART, F.C.S., ETC.

At the present time, milk analysis is engaging the attention of many chemists, and eliciting the most discordant opinions. This may probably arise from local reasons, or difference in food or weather, or else what is more likely still, from the apparatus employed in the research. Many analysts have, and still do make use of the old-fashioned graduated lactometer, the indications of which are worthless and deceptive in most cases.

I am anxious now to bring before your notice a most ingenious piece of apparatus, invented by Mr. Horsley, of Cheltenham, and which, I think, will turn out extremely useful. It shows the fat or cream distinct and perfectly separated. By it you can calculate the weight per cent., and estimate the casein and the sugar and salts with great ease and rapidity. Indeed, the whole operation only takes ten minutes, or the quarter of an hour, and the results may be kept for observation for any length of time, an advantage of no mean importance when legal consequences are dependent on the analytical evidence.

The method of analysis is this. The milk to be tested is poured into the tube till the first mark is reached, measuring off 250 grains. Methylated ether is then added until the next mark, B, is reached, and the whole well shaken together for five minutes. Methylated spirit is next poured in to 10° of the graduations, C, and again shaken for five minutes. On placing the tube in the stand, the fat will rise to the top as a bright yellow oil, the measure of which will indicate the *weight*, because each graduation is equal to 4·15 grains of fat. The casein separates and falls to the bottom of the tube as a white mass, capable of being strained off, dried, and weighed. The remaining fluid, after evaporation to dryness, will give the amount of sugar and salts.

As an example, the milk in No. 1 tube is a rich sample from an Alderney cow, and it will be seen that the fat occupies four of the graduations on the tube from 250 grains of the milk.

Therefore—

$$\frac{4 \times 4 \times 4{\cdot}15}{10} = \ldots\ 6{\cdot}64 \text{ fat.}$$

Then the sediment = 10·8 grains, so that

$$\frac{10{\cdot}8 \times 4}{10} = \ldots\ 4{\cdot}32 \text{ casein.}$$

Residue after evaporation $= \frac{14{\cdot}2 \times 4}{10} = \ldots\ 5{\cdot}68$ salts and sugar.

Total solid contents = 16·64 per cent.

The other tubes would equally show the same thing, for instance—

No. 2 tube shows 3 graduations $\frac{3 \times 4 \times 4{\cdot}15}{10} = 4{\cdot}98$ p.c.

It has had 25 per cent. of water added.

No. 3 shows 1 graduation . . $\frac{1 \times 4 \times 4 \cdot 15}{10} = 1 \cdot 66$ p.c.

It has had 50 per cent. of water added, and had 25 per cent. of fat removed.

No. 4 shows 2 graduations = . $\frac{2 \times 4 \times 4 \cdot 15}{10} = 3 \cdot 32$ p.c.

This has had 50 per cent. of water added.

No. 5 contains milk made from the Aylesbury condensed milk by adding 4 pints of water.

The tube shows 1·5 graduations $= \frac{1 \cdot 5 \times 4 \times 4 \cdot 15}{10} = 2 \cdot 49$ p.c.

No. 6 contains milk made in the same way from the Anglo-Swiss Company.

The tube shows 1 graduation $= \frac{1 \times 4 \times 4 \cdot 15}{10} = 1 \cdot 66$ p.c.

The tube, if wished, can also be used as an ordinary lactometer, for every degree is $\frac{1}{100}$ of the whole. Another purpose for which I have used Mr. Horsley's tube, is for the analysis of butter, and to show whether or no it is adulterated or lowered with any other fat, etc. A weighed portion of butter is placed in the tube and dissolved in ether; when dissolved as much as possible, water is added to mark B, and well shaken. Methylated spirit is then poured in till mark C is reached, and then well shaken for a minute or two and laid aside to settle. The butter is then measured off and calculated as before. The following example will explain:—Fifty grains of pure fresh butter were placed in the tube, and ether poured in to A. By a little agitation, the butter soon dissolved, and water being added to B, the whole solution well shaken. Methylated spirit was poured in *to the top* of the graduation, and after shaking for one or two minutes, laid aside to settle. In this case, $11\frac{3}{4}$ degrees were obtained, therefore, the sample consisted of $97\frac{1}{2}$ per cent. of pure butter, for

$$11 \cdot 75 \times 2 \times 4 \cdot 15 = 97 \cdot 52.$$

Any adulterating fat will be seen on a layer at the bottom of the bright yellow butter oil. The curd, on the contrary, will fall slowly to the bottom of the tube.

A vote of thanks to Mr. Stoddart having been passed,

Professor REDWOOD said: I should like to ask Mr. Stoddart one question, a satisfactory answer to which would be very valuable to myself and others. I wish to know how he distinguishes between the fat which he says is an adulterant of butter, and the butter itself; what kind of chemical distinction does he draw between butter and ordinary animal fat which would have a similar melting-point? I confess I am not acquainted with any real distinction between the various fats consisting of stearin, palmatin, or olein. If this mode of proceeding does afford a reliable method of distinguishing between butter fat and such a substance as yellow beef fat, which I believe is often added to butter, it would be a most valuable process, for at the present time this is a great difficulty with all analysts.

Mr. STODDART: I would just say, in reply to Professor Redwood, that if he will get an ounce bottle, and put into it 50 grains of butter, half fill with ether, and give it a good shake, if it be good butter it will all dissolve, except the salts and the water. To get rid of that I usually mix the butter with boiling water, so as to free it from salts and soluble matter. If the butter be genuine, it will, when treated as I have stated, all dissolve; but if lard or meat fat be added it will not dissolve, on stirring for two or three minutes it will go to the bottom. Some people would say, without further consideration, that what sank to the bottom was fat, but it may be curd, for what country people call whey-butter has frequently 8 or 9 per cent. of curd in it. You have, therefore, to distinguish whether it is fat or curd. A very simple way of determining it is to put a small portion on a glass slip and heat it; if it is fat it will, of course, melt, and if it is curd it will dry and go to powder.

Mr. RIMMINGTON inquired where these tubes could be obtained?

Mr. STODDART: They may be had of Mr. Balcomb, chemist, Cheltenham.

The Conference now adjourned, it being past five o'clock

FRIDAY, *August 7th.*

The Conference re-assembled in the lecture hall of the Pharmaceutical Society at ten o'clock; Mr. Groves, the president, occupying the chair.

The proceedings commenced by Professor Attfield, the general Secretary, reading the list of names of gentlemen who had been proposed as members, and who were unanimously elected.

The following paper was read by Mr. H. C. Baildon on—

BRIEF NOTES ON THE BARK OF THE BLACK ALDER TREE (CORTEX RHAMNI FRANGULÆ.)

BY H. C. BAILDON.

I think I may assume that most of the members of the Conference that are present have read Mr. Ince's contribution regarding this bark, which appeared in the *Chemist and Druggist* of June last. This paper, and my remarks in the *Pharmaceutical Journal* of the 9th of May, have already brought it into considerable use, and I feel confident that it will be found to be a very valuable addition to the rather limited list which we possess of vegetable aperients. In making these brief remarks, I am more anxious to elicit the opinions of those members who have experimented upon it, than to add to what I have already communicated. To prevent disappointment, it is very desirable that the bark used corresponds to the description of it given in the German Pharmacopœia, viz., "the cortex of the younger trunks and the larger branches of the indigenous shrub gathered in the spring." The sample now shown is taken from a bale recently received from Antwerp, and corresponds with this description. The concentrated decoction prepared either *in vacuo* or by Mr. Giles' process of exhausting successive quantities of the bark, will, I think, be found the most eligible form for its administration, and this is now ordered in prescriptions by some of the leading practitioners in Edinburgh. In addition to the concentrated decoction, I have prepared a strong tincture by distilling off a great part of the rectified spirit, a drachm of which represents an equal quantity of the bark. From its small bulk, it may occasionally be found a convenient preparation. A sample of extract is also on the table, and it is probable that in the form of pills it may be advantageously used. I know Mr. Giles has experimented a good deal upon this bark, and I should be glad to hear the conclusions he has arrived at as to its value in pharmacy. Both Mr. Ince and Mr. Umney have also paid considerable attention to this drug. I am also glad to observe Dr. De Vrij present, as he will be able to state the estimation in which it is held in Holland and on the Continent.

A vote of thanks was passed to Mr. Baildon.

Mr. INCE: Mr. Baildon has made an allusion to a paper which he has kindly described as my own on the Cortex rhamni frangulæ. I was very happy to be able to take his facts and experiments, and arrange them into a connected and intelligible form, but I cannot claim the slightest originality for the remarks I then made. I am bound, however, to say that I approached the subject entirely from a personal motive, because the greater part of my occupation being sedentary, it has induced a constant constipation which is extremely hurtful in its effects. Now, though I am strongly opposed to anything in the shape of testimonials at meetings of this kind, I think we must distinguish between testimonials and testimony, and that I am entitled to bring forward the results of my own experience with regard to the use of this drug. I first became acquainted with it by reading an old paper by Mr. Baildon, read, I think, at Edinburgh, but which, being short, did not at the time receive much attention. He there described the manner in which this drug was used in Holland, where I found the people were in the habit of taking a small quantity of the bark, say half an ounce, putting it into a pint of water and evaporating down to one-half, which was then taken in the ordinary doses of a decoction, *i.e.*, about one ounce and a half at a time. I thought it would be well to try the effect of this very simple remedy, and the result was truly marvellous, though I am afraid of using exaggerated terms. It answered in every possible respect the purpose intended. Now, it is well known that it is of no use attempting to introduce a mere plain decoction into general medical practice, because it will never be faithfully executed; persons accustomed in ordinary domestic life to make preparations of this kind very successfully, seem to lose their presence of mind when the same thing comes under what may be called the scientific aspect, and, in practice, decoctions are very seldom well prepared. I was therefore rejoiced to find that a good preparation of the cortex was to be introduced, as it has now been, by Mr. Baildon. The method is simply to exhaust the bark by cold water, exactly in the way originally proposed by Mr. Giles, and then concentrate into a liquor, not into an essence, which I consider very objectionable, as being much too concentrated. This method seems to me to leave nothing to be desired; the whole of the active principle of the bark seems to be got out, and it is then evaporated to a proper consistency *in vacuo.* This makes a very attractive-looking liquor, and I can answer personally for its efficacy. It is very difficult to get an aperient which is not accompanied by distressing effects; senna, for instance, is often followed by very bad results, and it is also uncertain and distasteful. Now, the cortex rhamni has certainly the advantage of an agreeable taste, it produces no bad after-effects, and, as far as my experience goes, is an exceedingly satisfactory and efficient preparation. I think, therefore, it is quite deserving of a more definite notice than has yet been accorded to it, and might well be added to any future Pharmacopœia.

Mr. GILES: I am quite prepared to fully endorse everything which has been said in praise of this article by Mr. Baildon and Mr. Ince. Mr. Baildon has, I think, re-introduced a most valuable agent into our materia medica, and I am disposed to say not only a better aperient than any other, but the only aperient that we have. We have many cathartics, but not aperients. Perhaps this may seem an artificial distinction, but the especial character of the *Rhamnus* is that it appears to be an invigorating stimulus to the bowels, and not an irritant. Irritants are followed by a sort of collapse, the over-stimulation is followed by a reaction, and very often, as we know, by greater constipation than preceded their use. Now, the *Rhamnus* has the exactly opposite character; it appears to regulate the conditions of the functions of the body, and I do not think this is limited to the action of the bowels. People may take it, and after it has produced its effect, instead of requiring to take more, they become more and more independent of it. It is a remarkable fact, as has been pointed out by Mr. Baruchson of Liverpool, that the same doses, or rather less doses than the original one, continue to be operative. I have met with cases where it has been said to fail, but I believe that is because people do not distinguish between this regulative aperient action and a cathartic action. They want some *ad captandum* explosive purgative, and are disappointed if they do not meet with it in *Rhamnus frangula* bark. But I think they are looking for that which is just undesirable, and to what we have been driven to use for want of something better, but which I think will be superseded by a larger experience of the *Rhamnus frangula.* One does not go far into therapeutics at a meeting of this kind, especially if they touch on delicate functions; but I must say I have reason to believe that the action of this article in restoring the regularity of the alvine action in females, also leads to greater regularity in other constitutional functions, and that of course is a matter of very high importance. I cannot say that I have yet sufficient general experience in that direction, but I am strongly induced to believe that it is so, and I propose to carefully watch its action in this respect. So far as to its general therapeutical effects. As to its preparation, obviously, as Mr. Ince says, we require something which shall be more permanent than a decoction, although it is a remarkable fact that the decoction, in virtue apparently of some prussic acid constituent, is very permanent, and my opinion is it would keep, even in the summer, for a month. Still we want something perpetually permanent, and that is easily obtained in the form of a liquor, such as Mr. Baildon and myself agree in approving. The reduction of things *in vacuo* is unquestionably the best form of reduction, but there is no necessity for any reduction at all in this case, because it is perfectly easy to prepare the liquor in its due strength by the first process, and that is the course I adopt, not by a cold-water infusion, but by simply stewing for a quarter of an hour consecutive portions, by which means I easily get a result three times as strong as the decoction which Mr. Baildon introduced, and it has simply to be preserved by the addition of a sufficient quantity of spirit. You then have a liquor which has been subject to no process of evaporation, or any further action of heat than in the ordinary decoction, which is quite permanent. I have watched the action of the two, and there is no appreciable difference in their value. I think Mr. Baildon has been the means of introducing to medical practice in this country a most valuable remedy, and I have not the smallest doubt the more it is investigated the more it will be approved, and that it must ultimately find a place in our official materia medica.

Dr. DE VRIJ: I can only confirm what has been said by all three gentlemen who have spoken about this medicine, which is very much used in Holland. A brother of mine, who was a physician, used it for many years without any bad effect whatever, and, contrary to the majority of other purgatives, he did not become accustomed to it; in fact, the same dose always had the same effect. He used the decoction, but I quite agree that this preparation is much better, because you can keep it longer, and always have it at hand.

Mr. SIEBOLD: It has long been a matter of surprise to me that this article has not found its way into the British Pharmacopœia, because for the last twenty-one years I have known it to be used uninterruptedly in Germany, where it has been universally liked as a very pleasant purgative—pleasant not only in taste, but also with reference to its effects. Considering the intimate intercourse which now exists between the different European countries, it seems astonishing that a medicine can be very much appreciated for many years in one country, and yet hardly be noticed in another so close to it. I think that meetings such as the present will tend to rectify this evil, and that, in course of time, those medicines which are proved to be of great value, will not simply be the property of one country, but of all the world.

Professor BENTLEY: I have been very glad to hear the repeated observations to-day as to the merits of a substance which has been certainly known in this country for more than twenty-five years. As long as I can recollect anything connected with scientific subjects, I remember Dr. Pereira mentioned to me, when I was a colleague of his at the London Hospital, this very bark, of which he gave me a specimen, not knowing exactly what it was. I had then an opportunity of examining the plant from whence it was derived, and determining its botanical source. I know that at that time it was in use in Germany, as Mr. Siebold has said, and from that period to this it has always been esteemed as a medicine of considerable value. It is certainly a remarkable fact that such a substance should not have received more attention in this country, and I am very glad to hear the testimony now given as to its efficacy. I should like, however, to have heard whether, as Mr. Baildon has brought it before the notice of the profession for some time, and as Mr. Giles has investigated its properties very carefully, it has been tried at the Bristol Infirmary, or if any results have been obtained by physicians; because it is very important not only to have the testimony of pharmaceutists to its value, but, if it is to be strongly recommended, that this should be supplemented by the acknowledged experience of those whose special duty it is to take notice of these remedies. This subject raises a question which I have more than once alluded to in this room, as to the desirability or necessity of having some list of medicines which are of considerable reputation, or which are known to have some repute on the Continent, or in America, or elsewhere, added to our Pharmacopœia as a secondary list.

The President: I quite agree with what has been said as to the desirability of introducing an aperient of the character ascribed to the Cortex rhamni frangulæ, and I think we are greatly indebted to Mr. Baildon for bringing it forward. When he first introduced it at Edinburgh I obtained a few samples from him, made a decoction, which I preserved with glycerine, and tried it on myself. But I must say that I cannot endorse all that has fallen from Mr. Ince and Mr. Giles with respect to it, for I did not find any definite action beyond that of other purgatives, still, I shall be inclined, after what has been said, to try it again.

Presence of Lead in Liquor Ammoniæ Acetatis.

BY LOUIS SIEBOLD.

Some time ago, I was asked to certify the total absence of lead in a sample of water used for the manufacture of soda water. 500 c. c. of this water, acidulated with pure HCl and treated with H_2S, remained clear and colourless.

In order to detect the smallest trace of lead, if present, a somewhat larger quantity of the water was slightly acidified with acetic acid, mixed with two fluid drachms of strong solution of ammonium acetate (to prevent any precipitation of sulphate of lead), evaporated to the bulk of two fluid drachms, filtered and treated with H_2S. A very distinct black precipitate was obtained, which, upon examination, proved to be sulphide of lead. The striking reaction obtained contrasted so strangely with the entirely negative result of the first experiment that I felt convinced the quantity of lead found did not emanate from the water, and upon now testing two fluid drachms of the same solution of ammonium acetate with H_2S, I obtained as distinct a precipitate of PbS as in the previous experiment. I then prepared some fresh solution of ammonium acetate from pure acetic acid and pure solution of ammonia, and using two drachms of this in precisely the same way as before, the water under examination was found to be absolutely free from lead. I preserved the remainder of the solution of pure acetate of ammonium in a white glass stoppered bottle, and marked the date when it was made and tested on the label. About a month afterwards, I used some of this solution for the same purpose as before, and was much surprised to find it contaminated with lead, which it had evidently dissolved from the glass bottle in which it had been kept. This circumstance induced me to procure, from different retail establishments, samples of Liquor ammoniæ acetatis concentratus (as generally sold by wholesale houses), which is eight times as strong as the B. P. article. Out of ten samples examined only two were free from lead. My own stock was found to be thus contaminated, though it was certainly free from that metal when it was made. I have also examined four samples of Liquor ammoniæ acetatis of the B. P. strength, but could only find very small traces of lead in one of them.

The solvent action of ammonium acetate upon sulphate of lead and other insoluble lead compounds is well known, but its power of dissolving lead from glass has, I believe, not been previously observed. Fresenius, in describing the extraction of lead from substances insoluble in water and acids by means of ammonium acetate, states in a foot-note, that this method is not applicable for the detection of lead in silicates. Yet the above experiments show that by the long-continued action of Liquor ammoniæ acetatis upon glass containing lead, an appreciable quantity of the latter is dissolved, and as this is undoubtedly a most objectionable impurity, I would suggest that this liquor, and especially the concentrated preparation, be kept in bottles free from that metal.

The President: Mr. Siebold's investigations show a very possible source of error in the analysis of potable water. The action of acetate of ammonium as a solvent of some of the soluble lead salts was pointed out some twelve months ago in the case of iodide of lead. An instance of that occurred to me the other day. I expected to get a precipitation of iodide of lead, but found that I got none until I added some nitric acid. I could not make out the reason of that for some time, but at last I found that I had acetate of ammonium in the liquid, so that the iodide of lead was kept in solution. I beg to propose a vote of thanks to Mr. Siebold for his paper.

The vote of thanks passed unanimously.

The Adulteration of Scammony.

Mr. Benger then read a paper by Mr. Greenish on "The Adulteration of Scammony." We have been requested by the author to defer the publication of this paper for a short time.

A vote of thanks was passed to Mr. Greenish for the paper.

Mr. Hanbury: One point in the paper interests me much, and that is Mr. Greenish's observations about the powder which is found on the outside of the pieces of scammony. I was lately much surprised to hear the presence of starch in scammony accounted for by the notion that it was used to prevent adhesion of the lumps. Mr. Greenish says that he does not find any starch on the exterior of the pieces nor any calcareous matter. I cannot speak as to starch, but I long ago noticed that the powder that occurs on the outside of a piece of scammony does not effervesce, and therefore is not identical in nature with the calcareous matter used to adulterate the drug. There appears, in fact, no ground for supposing that the pieces are rolled in any powder in order to prevent adhesion. I regret that Mr. Greenish has not sent the specimens he alludes to, because I should like to know what are the drugs he terms Angora and Syrian scammony. I am not aware of any such distinctions existing in the London trade.

Mr. Giles: I should just like to refer to the introduction in our Pharmacopœia of the resin of scammony, and the retention of the virgin scammony, one being used for some preparations and the other for others. I believe this has been discussed before, but it appears to me there ought to be some conclusion arrived at as to which is the best, and that that should be adopted. I do not see the advantage of using virgin scammony for the pill, and resin of scammony for the extract.

The President: Have you not the option?

Mr. Giles: No.

Professor Redwood: I do not know whether Mr. Giles has sufficiently taken account of one circumstance, which certainly did come under the notice of the Pharmacopœia Committee, and that was that it has not been quite clearly decided which is the best of the two, or whether there is any difference between them. Some advocate the use of resin of scammony, and others consider the virgin scammony more active and reliable, and it was thought, as there were two preparations similar in their effect, that at least we might give an option to medical men to select which preparation they would prescribe. I think that was the motive which led to the introduction of the new form of resin of scammony in the one case, and its not being adopted in the other.

The following papers on hydrocyanic acid were then read:—

Note on the Diluted Hydrocyanic Acid of Pharmacy.

BY MR. BARNARD S. PROCTOR.

The variability of pharmaceutical hydrocyanic acid has long been felt to be of serious moment, and has recently become a matter of great notoriety, attention having been called to the extent of the variations by analysts in sundry neighbourhoods. In June, 1873, Mr. Abraham, of Liverpool, gave the results of four examinations as 2·11 per cent., 2·02 per cent., 1·64 per cent., and 1·30 per cent.

At the Pharmaceutical Conference at Bradford, Mr. Siebold stated that he found it vary from about 2·00 per cent. to 0·25, or even less, and he attributed the variation to evaporation from imperfect stoppering of the bottles.

Dec. 27, 1873.—Mr. Towerzey having titrated nine samples, gave his results as 1·93, 1·52, 1·36, 1·32, 1·26, 1·22, 1·16, and 0·26 per cent. Other analysts, at different dates and places, gave similar testimony.

That such a condition should continue to exist is highly unsatisfactory—we may even say a disgrace to pharmaceutical chemistry. Many remedies have been proposed, and I now purpose to bring before pharmacists the unripe fruit of my small labour in this field.

Two objects seem desirable of attainment—first, the discovery of some simple, cheap, rapid, and accurate process for preparing small quantities of hydrocyanic acid of the official strength, by which every pharmacist could prepare his week's or month's supply, and throw away his old stock without any unreasonable sacrifice of time and money; the second object being the production of an acid of official strength which, by some simple addition or alteration, would be less liable to variation in strength by keeping.

It is unnecessary for me to recount in detail what has been done in these respects, but I may just mention that two processes for extemporizing the solution, one from the decomposition of cyanide of silver with dilute hydrochloric acid, leaves nothing to be desired but economy; and the other, in which cyanide of potassium is decomposed by solution of tartaric acid, depends upon a salt liable to deliquescence and decomposition, and the product is contaminated with a trace of organic acid, which, it has been said, though I do not know upon what evidence, has the reverse of a conservative action.

The official acid is liable to loss of strength from at least two causes—evaporation, and the formation of paracyanogen, probably also some other decomposition not indicated by a visible change in appearance. The customary precautions against these sources of loss are, careful stoppering and inversion of the bottles to retard evaporation; the exclusion of light, and the addition of sulphuric or hydrochloric acids to protect it from decomposition.

My first experiments were with the view of finding some solvent which, from a greater affinity for the acid, or from a volatility more equal to that of the acid, would diminish the variation dependent upon evaporation.

Alcohol and ether naturally suggested themselves, and in November last I made three specimens of the acid to test the relative merits of these solvents.* The first solution, prepared with water for comparison, and marked A; the second being rectified spirit, and marked B; the third, C, being ether. These acids, when prepared, were decanted into three well-stoppered bottles of the same size, and having necks of precisely the same width (the stopper of any one fitting the other two).

The acids were decanted from the precipitates on the 12th of November, and at once tested volumetrically with nitrate of silver.

A	contained	1·86	per cent.	of HCy.
B	"	1·86	"	
C	"	1·92	"	

In these, and the subsequent determinations, I place little reliance on the second decimal figure. My object is to ascertain what can be conveniently done as an ordinary pharmaceutical process. I therefore operated with ordinary pharmaceutical weights and measures. The error in measuring thus may readily amount to two or three units in the decimals, but this is of little moment, as the variations in actual practice are so large as not only to affect the fractions, but the integers. But to return to the experiment.

The phials containing these specimens were placed in my office, stoppers uppermost, not exposed to a strong light, and the stoppers were removed, half a minute to two or three minutes at a time, several times a day for a week; this being supposed to represent, in a rather exaggerated form, the kind of exposure which it is desirable a pharmaceutical acid should stand in actual practice. To ensure that the specimens were equally treated, the stoppers were always taken out and replaced in rotation, the stopper being taken out of A and laid beside the bottle, while the same was done for B and C, and then, after a short interval, replaced again in the same order.

On the 19th of November (*i.e.*, at the interval of a week), they were again subjected to analysis, with the following results:—

A = 1·76 per cent.
B = 1·80 "
C = 1·84 "

The loss in all cases was very much smaller than I anticipated, though the comparative losses were in the order which theory had suggested.

The specimens were then exposed to a more severe test, by the stoppers being removed from the bottles for periods varying from half an hour to three hours daily for eighteen days; at that date (Dec. 6, 1873,) they were again analysed, with the following results:—

A = 0·84 per cent.
B = 1·16 "
C = 1·84 " *

These results very much astonished me.

Bearing in mind the numerous statements of rapid loss by evaporation, it seemed scarcely credible that the aqueous solution should retain nearly half its original strength after such exposure. Take for comparison the statement of Mr. L. Siebold, whose accuracy I cannot question. In illustration of the rapid loss by evaporation he says:—"I purchased a two-ounce bottle of the Pharmacopœia acid, freshly made, from a very respectable wholesale house, and at once estimated its strength by volumetric analysis. It contained 1·6 instead of 2 per cent. It was kept in the same bottle without being tied over, and the escape between stopper and neck was noticeable at some distance. After twenty-four hours it contained 1·2, after two days hardly 1 per cent., and after a month it contained only traces of HCy."

The strength of the ethereal solution was also unexpected; for, though the ether had evaporated much, we

* The general formula being—Cyanide of silver 40 grains diffused through 7 fluid drachms of the solvent, and 36 minims of hydrochloric acid added, the mixture well shaken and allowed to subside. The solution decanted after a week (though probably an hour might have sufficed).

* These having been kept till Jan. 31, 1874, without any special precautions, but occasional opening, yielded:—

A . . . . . 0·48
B . . . . . 0·76
C . . . . . 1·80

could not have predicted that it would have passed off in as great a proportion as the HCy, since, of the two liquids in their anhydrous state, HCy is the more volatile; but, on the other hand, it is quite supposable that a compound of the two may be formed, less volatile than either separately.

With the view of estimating the comparative affinity of water and ether for the acid, I took equal volumes of ether, and a specimen of commercial hydrocyanic acid which contained 1·90 per cent. of HCy; after agitation and subsidence, the ethereal solution contained 1·48 per cent. of HCy, and the aqueous only 0·5 per cent. This total is apparently more than the aqueous acid contained, but the discrepancy is accounted for by the ethereal solution being smaller in bulk—a portion of the ether having been dissolved by the water.

From this result it would appear that the ether has about three times the affinity for the acid which is possessed by water.

I have made no attempt to estimate the affinity of alcohol for the acid, and a considerable time must elapse before we can determine the relative keeping qualities of acids in which the menstrua are mixtures of alcohol and ether.

For the present I have left this part of the subject to try a few experiments upon processes for the extempore preparation of the acid in combination with any of the solvents.

The problem is to find a base which forms a definite cyanide not liable to spontaneous change under ordinary keeping, but readily and completely yielding its acid, the base being completely precipitated by one of the common acids, from a solution in one of the three solvents already spoken of.

Cyanide of potassium, as met with in commerce, is very impure, and liable to decomposition, but that which has been crystallized from spirit is probably sufficiently uniform and stable to be used with satisfaction if a better salt be not found. A specimen which I have had for eight years, *not* very carefully corked up, contains 80 per cent. of its theoretical cyanogen, 7 per cent. of water, part of which was probably present when new, and so much carbonic acid as to effervesce on the addition of tartaric acid to a strong solution, though not to do so visibly, when the strength of the solution is calculated to yield hydrocyanic acid of 2 per cent.*

Fifty grains of this salt, with 980 grain measures of rectified spirit, and decomposed with a little more than an equivalent of sulphuric acid, gave a bulky precipitate of potassium sulphate, which, after a few days, contracted, and became contaminated with a brown matter, perhaps paracyanogen. These proportions were calculated to give an acid of 2 per cent., had the cyanide been perfect, or an acid of 1·6 per cent. with the sample of salt used: it was found, however, to contain only 0·68 per cent., and a similar specimen prepared in the same way, except that the spirit was mixed with $\frac{1}{8}$ of ether, presented similar appearances, and gave 0·74 per cent. of HCy. Fifty grains of the same cyanide dissolved in 980 grain-measures of water, and decomposed with an excess of tartaric acid, speedily deposited its cream of tartar, and yielded a solution containing 1·56 per cent. of HCy—1·60 per cent. being the strength it was calculated to be.

A similar mixture made with rectified spirit in which neither the salt nor the tartaric acid is so freely soluble, was titrated after standing an hour, and only indicated 0·28 per cent. of HCy. After a lapse of three hours the titration was repeated with the same results. After two days a pale brown granular deposit had taken the place of the lower part of the precipitate, and the per centage of HCy had increased to 0·36.

A third modification of this formula was made by dissolving the acid and cyanide in separate portions of water, mixing the solutions, and after the lapse of an hour adding an equal bulk of rectified spirit, the general proportion between solvent and solids being maintained. This solution contained 1·64 per cent. HCy.

A fourth modification consists of cyanide of zinc and potassium precipitated by tartaric acid; this has an advantage over the other in the greater stability of the salt, which does not absorb water or carbonic acid, nor part with cyanogen by ordinary keeping. It has the disadvantage of yielding a more bulky precipitate.

The details of the experiment were as follows: —

Two grams of cyanide of zinc and potassium dissolved in 42·8 grams of water (Towerzey's form as a substitute for B.P. acid) when titrated gave results equal to 1·92 per cent. HCy. Four grams of tartaric acid being added to the solution yielded a bulky precipitate which, after standing three hours, occupied one-third the bulk of the liquid. The clear liquid again examined was found equal to 1·88 per cent. HCy. The phial being set aside from the time it was made, about the middle of February, till the middle of July, the sediment had diminished to about $\frac{1}{5}$ the bulk of the liquid, and though only stopped with a common cork, the strength of the acid was still 1·86 per cent. The apparent loss of strength consequent upon the addition of the tartaric acid is no doubt due to the increase in bulk due to this addition.

The solution of course contained a little acid tartrate of potassium and only a trace of zinc.

It has been suggested to introduce this double cyanide of zinc and potassium as a substitute for hydrocyanic acid for medicinal purposes, it being supposed, on theoretical grounds, that it would have similar therapeutic value, together with constancy and permanence; but, however much may be expected from it in these respects, it cannot, for a considerable period at least, displace the acid which, with all its faults, has had a good reputation for several generations.

A fifth modification consists of cyanide of potassium and tartaric acid, dissolved in small portions of water, mixed, and, after a few minutes, adding spirit and ether, the proportion of solvents to solids being still the same, but the solvent consisting ultimately of equal parts of water, spirit, and ether.

This being made with the new sample of cyanide, should have yielded an acid of 1·88 per cent., but it was found to be 1·78.

The cyanides of lead, calcium, and barium to be decomposed by sulphuric acid appeared next in order of prospective merit, but cyanide of lead is said to be an uncertain compound, containing variable proportions of oxide.

I am also informed by Messrs. Hopkin & Williams, that "the cyanides of calcium and barium, prepared from the ferrocyanides, are worthless, and when prepared in solution by neutralizing baryta or lime water with hydrocyanic acid, decomposition sets in at once, and in the course of an hour or so black solutions result quite free from cyanogen in any shape."

I have consequently limited my experiments to the materials already mentioned.

Of fifteen specimens made by different formulæ and kept for five months, one only has turned brown; it contains cyanide of potassium, water, sulphuric acid, and spirit, and gives an alkaline reaction with red litmus, though it has a strong odour of HCy, and contains 1·58 per cent. now, against 1·64 while new. Two other specimens turned slightly yellow; they were prepared from cyanide of potassium, with sulphuric acid and spirit, and, as before mentioned, had deposited a brown sediment along with the potassium sulphate.

Comparing the different specimens containing water only with those containing water and spirit, I do not note any very clear advantage in the keeping quality of the alcoholic, except in the first series, previously named A, B, C. The following table gives the dates at which

* A new sample of crystallized cyanide of potassium I find contains 94 per cent. of the theoretical cyanogen—a little carbonic acid and moisture.

these samples were examined, and their value in percentages of the B.P. standard :—

	A.	B.	C.
November 12, 1873. . .	93	93	96
„ 19, „ . . .	88	90	92
December 6, „ . . .	42	58	92
January 31, 1874 . . .	24	38	90
July 17, 1874	6	32	—

In drawing any conclusions from this table, it is, of course, necessary to take into account the exposure to which they were subjected, which has already been described, except as regards the last date. Between January and July they had been occasionally, but not very frequently, opened, and not much exposed to light. What little remained of C, after the January examination, had entirely evaporated before July. I have, therefore, not any evidence of the stability of the ethereal solution under long keeping.

Eight specimens, made by various formulæ in February, and examined again in July, had lost on an average 0·085 per cent. of HCy, or about 5 per cent. of their original strength, two of the bottles having glass stoppers of ordinary quality, the others having common corks.

I do not observe any difference in the keeping quality of the samples prepared respectively with tartaric and with sulphuric acid; the latter, however, necessitates the use of spirit to precipitate the sulphate formed.

Looking over these experiments, the conclusions which they point to are, that the aqueous hydrocyanic acid does not lose by evaporation so rapidly as some recent essayists would have us believe; that the alcoholic acid loses strength less by evaporation than the aqueous; and that the ethereal acid suffers comparatively little from this cause. We also find that as extempore processes the decomposition of cyanide of silver by aqueous hydrochloric acid leaves nothing to be desired but economy; that crystallized cyanide of potassium may be obtained commercially pure enough for extemporizing hydrocyanic acid; and that it is permanent enough for practical use; that in the decomposition of cyanide of potassium by sulphuric or tartaric acid in the presence of alcohol only part of the cyanogen is liberated as hydrocyanic acid, but that after the precipitation of the potassium as an acid tartrate in the presence of a small quantity of water, the subsequent addition of alcohol or alcohol and ether yields an acid not deficient in strength; that crystallized cyanide of zinc and potassium may be substituted for the simple cyanide of potassium with advantage, being free from deliquescence and tendency to decomposition on exposure to the air.

I may add that a common cork appears to be all that is necessary to prevent loss of acid by evaporation, and is probably better than a common glass stopper.

The following may be regarded as a cheap and easy method of extemporising hydrocyanic acid of B.P. strength :—

Water	1 ounce.
Cyanide of Zinc and Potassium .	22 grains.
Tartaric Acid	40 „

Dissolve the cyanide in the water, add the acid, and allow the precipitate to subside; decant the clear liquor, and preserve it in a corked phial; renew the stock at intervals not exceeding three months.

My observations have only thrown a negative light upon the causes of the great variation found in the hydrocyanic acid of the shops, and leave us with the impression that something more to the point, both as regards causes and remedies, remains to be done.

Some Recently Proposed Substitutes for B.P. Hydrocyanic Acid.

BY W. A. SHENSTONE.

At a meeting of the Bristol Pharmaceutical Association, in December, 1873, a paper was read by Mr. Towerzey on hydrocyanic acid. The author gave, in his paper, the results of some experiments which showed that the strength of the hydrocyanic acid used in pharmacy has not by any means improved since attention was first called to the subject by Dr. Tilden, in 1871, and he proposed as a substitute the double cyanide of zinc and potassium, adducing the result of an experiment to show that this compound has not the disadvantage of volatility. In the course of the discussion which followed the reading of this paper, Dr. Tilden suggested that experiments should be tried with an acid one-tenth the strength of that at present in use, as it seemed probable that the loss of strength through volatilization would be much decreased by the use of so weak a solution, and because there would be no necessity to obtain the prescriber's sanction to the use of such a preparation in the place of that ordered in the Pharmacopœia. I am aware that at the last meeting of the Conference, the use of a more dilute acid and also of some of the metallic cyanides was proposed, and that averments of their greater stability were made in support of the several propositions; but as I have no knowledge of any experiments having been brought before English pharmacists, either on very dilute hydrocyanic acid or on solutions of metallic cyanides of a convenient strength, I have, during the past few months, endeavoured to carry out Dr. Tilden's suggestion, and have also given some attention to the zinc and potassium cyanide. It is the results of my experiments that I have to place before the members of the Conference.

Hydrocyanic Acid.—Some Scheele's acid, containing some free hydrochloric acid, was diluted, and the amount of HCN determined in two portions by the volumetric method with silver nitrate, the percentage found was ·186, ·185 respectively. Two other portions were placed in white glass bottles, one of them was closed with a stopper, the other merely covered over with unsized paper; each of them was about one-third full, and they were kept in the dark. At the end of a month the bottle covered with paper was perfectly free from hydrocyanic acid; this may have been the case earlier, but I was unable to examine it during the interval. The stoppered bottle was kept from March 28th to June 16th (two and a half months) during which period it was opened twelve times, the bottle being carefully inclined as it would be in pouring out a portion of the contents each time; there then remained ·183 per cent. of HCN; an acid containing 2·28 per cent., under similar conditions, was reduced to 2·18 per cent., about three times as great a loss in proportion to the original strength of the solutions.

In my next experiments I kept the acid a much shorter time, but opened the bottles more frequently, that I might ascertain what depreciation of strength would occur when a bottle of the acid was frequently opened for removing part of its contents.

In each of six white glass-stoppered bottles was put some previously diluted acid, and the HCN determined in the first and last bottles filled; they contained ·206, ·204 per cent.

The four intermediate bottles, labelled A, B, C, D, were kept in the dark for one month, and opened A once, B twice, C three times, and D four times daily; on examining the contents, the following results were obtained:—

A	opened	28	times, contained	·202
B	„	56	„ „	·192
C	„	84	„ „	·194
D	„	112	„ „	·195

From these numbers it would appear that when the percentage of hydrocyanic acid has been reduced to ·195 or thereabouts, no further decrease in strength takes place from volatilization, unless the exposure to which it is subjected is very considerably in excess of what occurs in removing portions of the contents of the bottle holding it.

The second of my experiments indicates that when an acid of about ·2 per cent. is kept in a well-stoppered bottle, in the dark, and only occasionally opened, a very trifling loss occurs, and therefore it is evident that under these conditions the loss of strength by *decomposition* is unimportant. To decide whether this is also the case when the acid is exposed to light, two stoppered bottles, about one-third full of a solution containing ·206 per cent. of HCN were taken; one of them was placed in diffuse daylight; the other in a window (on which the sun shone some hours almost daily) for a month: the strength of the first was then found to be ·195 per cent., of the second ·199.

These experimental results seem to me to prove that a solution of hydrocyanic acid thus diluted, has the advantage of being considerably less instable than it is before dilution, and an additional point in its favour is, that it may be sucked up into a pipette with very little inconvenience and (taking ordinary care) without danger, which enables one to dispense with a balance in estimating its strength. Mr. Siebold has pointed out, and I suppose all agree with him, that the strength of such a variable medicine should be frequently determined, but, unfortunately, though many are able to do this, only a few have the necessary appliances. In estimating the strength of this weak acid, the only absolute necessities are a pipette of 20 c.c. capacity, graduated in cubic centimetres (costing 1*s.* 6*d.*), and a standard solution of silver nitrate, containing 6·296 grammes of the nitrate in a litre, 20 c.c. of which will produce turbidity when added to 20 c.c. of a solution of hydrocyanic acid, containing ·2 per cent. The necessary operations consist in measuring with the pipette 20 c.c. of the acid to be examined into a stoppered bottle containing a little solution of caustic soda, then rinsing the pipette, filling it to 0 with the silver solution, and dropping this into the bottle containing the hydrocyanic acid with constant agitation until the contents become turbid, the number of c.c. required to effect this, indicate the percentage. Thus, if 9 c.c. are required ·09 per cent. of HCN is present; if 19 c.c., then the solution contains ·19 per cent. of real acid. The whole process only occupies four or five minutes, and the results are sufficiently close for practical purposes, as with care differences of ·005 may be observed. In more accurate work, I measure the hydrocyanic acid in an ordinary pipette and drop in the silver solution from a burette; there is a considerable saving of time even here, but more apparatus is required.

Zinc and Potassium Cyanide.—That a solution of this salt does not lose strength from volatilization is, I think, sufficiently proved. I have, therefore, only endeavoured to ascertain whether it is stable or not when in dilute solution. Three white glass bottles one-third full of a solution of the salt in water, containing an amount equivalent to 2·00 per cent. of hydrocyanic acid, were labelled A, B, C. A was placed in the dark, B in diffuse daylight, C in a window through which it was exposed to sunlight for several hours every day. Each of them was opened from time to time, perhaps twenty times in all, and they were kept for one month. At the end of that time the contents of A contained the equivalent of 2·00, B 2·00, C 2·01 per cent. of HCN; in short, no change had occurred.

Three similar bottles, containing a solution of the salt just one-tenth as strong as the above, were treated in exactly the same manner for the same length of time. On examination it was found that the contents of A contained the equivalent of ·198, B ·199, C ·199 per cent. of HCN. The experiments were made during the hot weather of the present summer, and bottles C were at times quite hot to the touch. This, I think, shows pretty conclusively that zinc and potassium cyanide is an exceedingly stable compound, and would be much more reliable for medicinal use than the B. P. hydrocyanic acid, or, indeed, than the more dilute acid treated of in the first part of this paper. I doubt, however, if it would be legitimate to substitute it for the B. P. preparation without the consent of the prescriber, whereas in the vast majority of cases where water is an ingredient in medicines containing hydrocyanic acid, the use of this diluted acid would be both legitimate and beneficial.

On Hydrocyanic Acid.

BY LOUIS SIEBOLD.

The variable nature of the diluted hydrocyanic acid of the B.P. has been so fully discussed that not another word is needed in proof of the very unsatisfactory condition of this powerful medicinal agent. But though the evil has been fully recognized, no sound remedy for it has as yet been suggested. The improved methods of storing and dispensing the acid which have been proposed do not sufficiently prevent its volatilization, and do not even pretend to check its spontaneous decomposition. Several metallic cyanides have been proposed as substitutes for hydrocyanic acid on account of their greater stability; but unless we can induce the medical profession to forego the use of the acid in favour of such cyanides, we as chemists have no right to dispense them in its place, however fairly we may assume that their medicinal effect would be the same as that of the acid. Perhaps the best substitute of this kind would be the Aqua laurocerasi or the Aqua amygdalarum amararum of the *Pharmacopœa Germanica*, two preparations of equal strength, which, in Germany, are now exclusively prescribed instead of hydrocyanic acid, so that the latter is not even mentioned in that pharmacopœia. I alluded to the stability of Aqua laurocerasi in the discussion which followed the reading of my paper on the officinal acids at the last meeting of the Conference, but I was not then in a position to state whether the greater stability of this preparation is due chiefly to the very diluted state of its hydrocyanic acid, or to the fact of the latter being present in it in organic combination. The solution of this question appears to me of importance, for though we have no right to substitute Aqua laurocerasi for hydrocyanic acid, we are certainly entitled to dispense corresponding quantities of a pure but largely diluted hydrocyanic acid of known strength in place of the acid of the B.P., and it need only be proved that such a preparation is as stable or nearly as stable as Aqua laurocerasi, to put an end to all our difficulties in reference to hydrocyanic acid, without any appeal to the medical profession.

With this view, I have undertaken a number of experiments, the results of which I have now the pleasure of communicating to the Conference.

A quantity of pure dilute hydrocyanic acid, B.P., was procured from a very respectable wholesale firm, and at once mixed with nineteen times its weight of distilled water. A careful gravimetric examination of this mixture proved it to contain 0·0957 per cent. of HCy (the mean result of three determinations). A number of sixteen ounce bottles were filled with this weak acid, and two of these bottles, marked 1 and 2, with the stoppers securely tied over with bladder, were put into a cool place, laid on their sides, and protected from the light. The other bottles were also kept in a dark cool place, but in an upright position, and these were opened three times every day, each time for about a quarter of a minute, and their contents examined, at first once every day and afterwards once every week. These bottles were marked A, B, C, and D, and the samples of acid required for examination taken from each in its turn, so that a sample of A was examined on the second, a sample of B on the third, one of C on the fourth day, and finding no change a sample of D was tested at the end of a week, one of A after another week, and so on. 100 c.c. of the diluted acid were used for each determination, and were always measured in the same pipette. 5 c.c. of the normal solution of KHO were used in each experiment, and the standard solution of nitrate of silver containing one-tenth of a molecular weight of $AgNO_3$ in one litre was added each time, not only from the same burette, but from the same part of the burette, the instrument being refilled for every experiment. These precautions enabled me to obtain the most accurate results.

During the first three days, the acid was tested every day, but no change was observed in its strength. In each case 17·8 c.c. of the silver solution were required, indicating 0·0961 per cent. of HCN.

The acid was then examined from week to week, and the following results were obtained:—

	Used of solution of $AgNO_3$.	Per-centage of HCN.
During the first three days .	17·8 c.c.	0·0961
At the end of the 1st week.	17·7 c.c.	0·0955
" " 2nd " .	17·6 c.c.	0·0950
" " 3rd " .	17·5 c.c.	0·0945
" " 4th " .	17·3 c.c.	0·0934
" " 5th " .	17·0 c.c.	0·0918
" " 6th " .	16·8 c.c.	0·0907

showing that the acid kept exceedingly well for a month though the bottles were opened three times every day.

The bottle marked No. 1 was opened a month after it was filled, and its contents examined, 100 c.c. required 17·8 c.c. of the silver solution. The bottle marked 2 was not opened until two months after being filled, when 17·6 c.c. of the $AgNO_3$ solution were required for 100 c.c. of its contents. The acid in these two bottles, which had been kept carefully closed, had undergone no appreciable change within two months.

On the strength of these experiments I venture to recommend wholesale houses to supply, and retail chemists to keep, a dilute hydrocyanic acid containing $\frac{1}{10}$ of a per cent. of HCN., of which 20 minims are equivalent to 1 minim of the B. P. acid. This preparation might be conveniently purchased and kept in 8 oz. bottles, of which one should be in use at a time, and replaced by a fresh one a month after it has been opened, provided it lasts so long. The whole stock should be renewed as soon as the percentage of the acid becomes reduced to 0·095, which I feel sure would not be the case in less than three months, if the bottles be kept in a dark and cool place, laid down and securely closed. In this simple and inexpensive manner we could make sure that the patient gets the exact dose of hydrocyanic acid intended by the prescriber, and we should thus remove one of the greatest and most serious anomalies of practical pharmacy.

Permit me now to offer a few remarks on Liebig's method of determining the strength of hydrocyanic acid. All who are practically familiar with this titrimetric method will, no doubt, be aware that the use of a large excess of KHO or NaHO, will make the result somewhat inaccurate, as in that case too much of the standard solution of $AgNO_3$ will be required to produce a permanent precipitate. The amount of alkali used should be slightly in excess of the quantity required for converting the HCN completely into KCN or NaCN; and if very accurate results are desired for the purpose of comparison, as in the experiments I have quoted, the amount of alkali should be the same in each determination. But the error caused by the addition of too much alkali is small indeed compared to that resulting from the use of an insufficient quantity, and this is a point which, as far as I know, has never been alluded to in chemical literature. Let us bear in mind that Liebig's method is in reality a method for the estimation of KCN, but not of HCN, and that the use of less KHO than is required for the complete conversion of HCN into KCN must of necessity impair the result. The Pharmacopœia tells us to add sufficient NaHO to the acid to render the mixture alkaline, and this is precisely the statement which we find in the various books on chemistry and quantitative analysis. The mere use of sufficient alkali to produce a distinct or even a strong alkaline reaction, may lead an inexperienced analyst into serious errors, for the complete conversion of HCN into KCN or NaCN, cannot be recognised by red litmus paper. I will give some practical instances. In each of the experiments above recorded 5 c.c. of a standard solution of KHO, containing a molecular weight in one litre, were used. Of this solution 3·5 c.c. would be required to convert the 0·0961 grams of HCN present in the 100 c.c. of diluted acid into KCN. But a much smaller quantity would suffice to produce a distinct alkaline reaction; ½ c.c. instead of 3·5, would produce a distinct, 1 c.c. a strong, and 2½ c.c. a very strong alkaline reaction, although in each case the acid would only be partially converted into KCN. A solution of KCN turns red litmus paper blue, even in the presence of a large quantity of free hydrocyanic acid. If the standard solution of $AgNO_3$ is added to such a mixture of KCN and free HCN, a permanent precipitate is obtained as soon as the KCN has been converted into KAg, 2 CN, when the alkaline reaction will be found to have ceased, as the double cyanide has a neutral reaction. The following experiments will show the very erroneous results which may be caused by an insufficient use of alkali.

100 c.c. of the diluted acid, as before, were used for each experiment.

Standard solution of KHO added.	Reaction of the mixture.	Standard solution of $AgNO_3$ required to produce a permanent precipitate.
½ c.c. .	Alkaline	2·4 c.c.
1 c.c. .	Strongly alkaline . .	5·1 "
2½ c.c. .	Very strongly alkaline	12·3 "
3½ c.c. (The exact quantity required for converting the HCN into KCN.)	do.	17·5 "
5 c.c. . (Containing a moderate excess of KHO.)	do.	17·8 "

In the first four experiments the mixture ceased to be alkaline after the addition of the $AgNO_3$; in the fifth it remained alkaline.

The number of c.c. of $AgNO_3$ used in each case corresponds almost exactly to the calculated quantity of KCN present, which clearly shows that the excess of HCN does not affect the result. It is interesting to observe that KCN and HCN can thus be accurately estimated in a mixture of the two.

I do not suppose that experienced analysts would be likely to make such serious mistakes in the determination of hydrocyanic acid as the above experiments show to result from the presence of too little alkali; but I feel sure that the less experienced chemist who is accustomed to work strictly according to the recipe, having implicit confidence in the *modus operandi* prescribed by Liebig, Fresenius, and other eminent analysts, may very probably make such mistakes. Let it therefore be well understood that it is incorrect to use, as the books tell us, sufficient KHO or NaHO to render the mixture distinctly alkaline, or even strongly alkaline, but that the quantity of alkali should somewhat exceed, though only to a moderate extent, the amount required to convert the acid into a cyanide. If at the end of the experiment the mixture does not turn red litmus paper blue, the quantity of alkali used was insufficient, and the result of the analysis will be inaccurate. Should the hydrocyanic acid contain HCl, as is frequently the case, it is evident that the inaccuracy caused by the use of too little alkali would be still increased.

As a rule the chemist will have some idea of the strength of the hydrocyanic acid he is testing; if he has not, a rough experiment with a large excess of KHO will give him one, and he may then calculate the amount of alkali required for an exact determination. An acid containing 2 per cent. or more should be very largely diluted with water in order to obtain a distinct end reaction. Liebig recommends the addition of five to eight volumes of water, but I believe that a much larger quantity (fifteen to twenty volumes) will be found preferable. A slight excess of alkali is useful or even necessary; a very large excess, however, impairs the result. I found that for every 10 c.c. of the solution of KHO which were added in excess of the required quantity, an additional 0·1 c.c. of the solution of $AgNO_3$ was required to produce a permanent precipitate, so that but a slight error will be caused in the result of the analysis by an excess of alkali which is not unreasonably large. The injurious influence of a very large excess of potash is pointed out in several handbooks on quantitative analysis, but no reference is made to the far more serious mistake of using too little alkali in any of the books or journals that have come under my notice.

The Preservation of Diluted Hydrocyanic Acid.

BY JOHN WILLIAMS, F.C.S.

In an important paper by Mr. Towerzey, which was reported in the *Pharmaceutical Journal*, No. 183, page 509, attention was called to the very varying strength of hydrocyanic acid, as found in pharmacy. The author in fact concluded by recommending the disuse of the liquid acid altogether, and suggested the use of a definite salt, such as the double cyanide of zinc and potassium, in its place. To this suggestion there are, however, objections which it is not necessary I should discuss at present. But supposing the liquid acid to be continued in use, it is evidently most important that something should be done, if possible, to preserve and maintain it of a uniform strength, as the present preparation appears not to be reliable after being kept for any length of time.

Now, I have long been aware of the fact that glycerine has the property of preserving hydrosulphuric acid (or sulphuretted hydrogen), and have been in the habit of making such a solution of the gas for some years. If an aqueous solution of the gas is exposed to light, in the course of twenty-four hours decomposition will have occurred, sulphur deposited, and all smell of sulphuretted hydrogen lost, but if to the water 25 to 50 per cent. of glycerine is added, and the liquid then charged with the gas, no change occurs even for months; some I have examined at the end of six months appearing to be as strong as ever.

Bearing this fact in mind, I determined to try if the same thing would happen with the somewhat analogous body—hydrocyanic acid.

A preliminary experiment was made: a 50 per cent. solution of glycerine was charged with 2 per cent. of pure hydrocyanic acid, and at the same time a pure watery solution of the same strength was prepared. At the end of two weeks the solution in pure water was black and spoiled, and had lost the whole of its hydrocyanic acid, while that in the glycerine was colourless, and when tested was still of 2 per cent. strength. This result was so encouraging that I determined to make a series of more careful experiments, to determine not only for how long and to what extent the glycerine should act as a preservative, but also what the effect would be of different proportions of glycerine.

Before proceeding to refer to the results of my experiments, which are shown in the annexed tables, I ought to mention that comparative experiments were made with acid preserved in water in the ordinary way. The makers of hydrocyanic acid, as a rule, add to the acid as sold a small per-centage of a mineral acid—generally hydrochloric acid. Without this addition, as I have already mentioned, the acid will not keep, even for a very short period. In the glycerine solution of the acid employed in my experiments, I need hardly say no mineral acid was added, and I found Price's glycerine better adapted for the purpose than some redistilled of foreign make. The latter caused the acid to assume a slight yellow colour, after a few days, although the strength did not appear to alter. The solution in Price's glycerine remained colourless to the end.

Two samples of hydrocyanic acid, both made exactly 2 per cent. in strength, the one in the usual acidulated water, the other containing 50 per cent. glycerine, were carefully tied over on January 26th, as shown in table 1. The bottles were kept cool, in the dark, and under the most favourable conditions for keeping. On April 26th, or after an interval of three months, they were again tested. The ordinary aqueous acid had become 1·80 per cent.; the acid with glycerine, 1·96. Thus the glycerine had acted almost perfectly, as the loss of $\frac{4}{100}$ths is quite trifling and practically of no importance.

At the same time an experiment shown in table 2 was made under reverse conditions. The samples of acid both made of accurate strength, on January 26th, were purposely left half filled, loosely stoppered, exposed to diffused light, and, in fact, in as unfavourable a condition for good keeping as could reasonably be devised. After an interval of two months the watery acid was found to have fallen to 1·80 per cent., and the glycerine to 1·96 only, but by April 26th, or at three months' interval, the watery acid had gone down to 1·32, while the glycerine had only fallen to 1·84. Thus the glycerine, even under these unfavourable circumstances, had preserved the acid comparatively well.

Table No. 3 shows the results of experiments made with glycerine of various strengths, and also with acid of much higher per-centage than the ordinary medicinal acid of the Pharmacopœia.

The experiments commenced on March 26th. A 50 per cent. solution of glycerine was charged with 8·80 per cent. of hydrocyanic acid—also with 4·12 per cent., which may be taken as representing acid of Scheele's strength.

Also glycerine of 25 per cent. strength was charged with 13·68 per cent. of anhydrous acid, and also with 4·12 per cent. and 2·12 per cent.

Again, a solution of 15 per cent. of glycerine was charged with 16·24 per cent. of anhydrous acid, and also the same strength of glycerine with 2·12 per cent.

These various acids were tested at intervals of one month for three months, and the results are very instructive and interesting.

It will be observed that the weaker strengths of acid, both 2·12 and 4·12, have kept perfectly with all three strengths of glycerine, and show no change of strength during any of the testings. The stronger acids, however, show some change, especially at first. The 13·68 acid becomes 12·40 in a month, while the 16·24 acid becomes 15·20 in a month, 14·64 in two months, at which strength it remained at the end of the experiment. I ought to add that the bottles containing the acids used in these experiments were kept with every possible precaution, to preserve the acid as perfectly as possible.

It appears from these results that there is no advantage in employing a large per-centage of glycerine, 15 per cent. appearing to act as effectively as 50 per cent. I have lately prepared some acid with 20 per cent. glycerine, containing 2 per cent., 4½ per cent., and of the high strength of 26·5 per cent., and shall take a future opportunity of reporting upon them. I think 20 per cent. glycerine would probably be the most convenient proportion for use, supposing it was considered desirable to authorize the use of glycerine for preserving the acid.

It is hardly necessary that I should state that, in performing these experiments, measured—not weighed—quantities of the acids to be tested were taken.

A comparative experiment was made between a white and blue glass bottle. The acid of the same strength preserved by glycerine was kept for two months in diffused daylight. The glycerine had acted equally well in each case—in fact, no difference could be detected, thus proving what has been long known to many, that blue bottles, however useful they may be as distinguishing hydrocyanic acid from other liquids in a dispensary, present no real advantage over white glass in the preservation of the acid.

It is not my wish to offer any opinion as to the propriety, "medically speaking," of introducing glycerine with hydrocyanic acid; my object has simply been to see to what extent the glycerine can be made to act as a preservative of the acid, at any rate for a moderate period. The Pharmacopœia process of testing the acid was in all cases employed. I have to offer my thanks to Mr. Everson, who has performed the many testings required during these experiments with great zeal and care.

TABLE No. 1.

Real Hydrocyanic Acid.	Jan. 26th.	April 26th.
In water	2·00	1·80
In glycerine, 50 per cent.	2·00	1·96

TABLE No. 2.

Real Hydrocyanic Acid.	Jan. 26th.	Mar. 26th.	April 26th.
In water.	2·00	1·80	1·32
In glycerine, 50 per cent.	2·00	1·96	1·84

TABLE No. 3.

	March 26th.	April 26th.	May 26th.	June 26th.
Glycerine, 50 per cent.	8·80	8·56	8·56	8·56
	4·12	4·12	4·12	4·12
Glycerine, 25 per cent.	13·68	12·40	12·40	12·40
	4·12	4·12	4·12	4·12
	2·12	2·12	2·12	2·12
Glycerine, 15 per cent.	16·24	15·20	14·64	14·64
	2·12	2·12	2·12	2·12

The PRESIDENT : After these four very elaborate and able papers, I should imagine the question of hydrocyanic acid has been thoroughly threshed out, except that Mr. Williams has promised us a second report. Mr. Proctor's paper evidences a very great amount of research, such as he always displays. Mr. Siebold seems to me to have hit the right nail on the head, for I have always thought myself that the aqueous hydrocyanic acid of the Pharmacopœia is far too strong. It is a very dangerous thing, and a very little variation makes a vast difference in its effects. I do not see, except on the point of permanency, why we should use so strong an acid. Mr. Siebold finds that actually pure hydrocyanic acid, containing only one-tenth per cent. instead of 2 per cent., keeps remarkably well, and undergoes no change whatever. Mr. Williams seems rather to differ in this respect, and finds the addition of a mineral acid necessary to produce permanency. I fancy myself that a settlement of the question might be arrived at in this way—that the weaker acid of Mr. Siebold's might be employed preserved with the glycerine recommended by Mr. Williams, and that an acid preserved in that way would better meet the wants of pharmacy than the officinal acid now in use. I now ask you to accord a vote of thanks to the four writers of these valuable papers.

The votes of thanks passed unanimously.

Mr. RIMMINGTON : I must say I think, on the whole, there has been more attention paid to this subject than it really merits. I have never been a firm believer in the extraordinary changes that have been set forth, and I think it signifies very little in medicine if you have a change of one, two, or three units in the second figure of decimals. It is not a matter of practical importance ; I may state as a result of my own experience, that I have made hydrocyanic acid in some quantities for many years, and I can keep it three or four years with comparatively little change ; indeed I have some which I had made twenty-five years ago, which is still good. I make a concentrated acid, and dilute it down to the standard of the Pharmacopœia or to Scheele's strength. Then you get the exact quantity, and may keep it for a long time. I quite agree with Mr. Proctor that a corked bottle is better than a stoppered one, because there is a much closer contact between the two surfaces.

The PRESIDENT : I believe myself that ether keeps better in a corked bottle than in one with a stopper.

Mr. RIMMINGTON : I think so, too, and I frequently recommend corked bottles for these very volatile fluids. I hope the gentlemen who have read these papers will not take it that I at all doubt their results ; I am merely speaking from a practical point of view.

Mr. SCHACHT : I thought, as I heard Mr. Proctor's paper being read, I should like, in answer to one observation of his, that the assertion of the variability of this acid is somewhat exaggerated, to give my assurance of the absolute truth of the observations recorded by my then assistant and present partner, Mr. Towerzey. Those experiments, to which allusions have been made, were conducted by us both, and the observations of one were completely verified by those of the other, so that I am perfectly certain that those differences in strength, as reported by him, existed in the samples we examined. Some were taken from my own stock, and some were kindly lent or given us by our neighbours. As such changes do occur, I must confess I am a little surprised to find Mr. Rimmington express an opinion that such differences are of slight importance. One sample, which was positively being used by a gentleman in his dispensary, contained only 0·12 per cent., which was very different from that of another gentleman, whose sample yielded 1·9 per cent., or, as nearly as possible, the correct standard solution. I think the most important contribution to this subject would be any suggestion which would enable us to keep something of the strength of Scheele's. The other part of the business might be easily settled by an occasional dilution of the stock of Scheele's to the strength of the Pharmacopœia, simply putting this into small bottles, keeping them downstairs, and using them one at a time as required. That is one way of easily meeting the difficulty, but we want to be pretty sure that we are not using Scheele's acid, which might happen to be in a stoppered bottle, but has gradually reduced to about half its strength. There, again, I must assure you I am not exaggerating the possibility of this action, for it really happened, that between two occasions of our doing this in my own house, the last being only a week before I left, a change equal to that positively occurred ; what was in the bottle about four weeks ago being of the strength of four per cent., and one week ago it had reduced itself to just one-half. It was kept in our wareroom. and I am sorry to confess it was accidentally left on a high shelf, where it had no business to be, in an uncovered place, where the sun had made the upper stratum of air distinctly hotter than the lower. No doubt, that was a mistake, but it shows the risks to which this preparation is liable. If the addition of glycerine would have the effect of preventing this evaporation—and I suppose its action is simply mechanical—it would be a great boon, because we should then probably be able to conserve our moderate stock with a tolerable certainty of finding it constant in strength. The suggestion which Dr. Tilden made at Bristol seemed to strike every one as a sensible way out of the difficulty, that inasmuch as our general experience showed that the strongest acids most readily parted with a portion of their potentiality by keeping, that if this acid were kept systematically reduced to one-tenth, it would be a strength which would be sufficient for medicinal purposes, and it could be preserved tolerably constant. That struck us as being an extremely sensible suggestion, and I am not surprised to find that Mr. Shenstone finds that strength is less liable to change than any stronger form. Still this little difficulty r mains, that it would be very inconvenient to keep Winchester quarts of hydrocyanic acid instead of smaller parcels. I should like to ask Mr. Williams if he thinks there is any mechanical effect produced by the glycerine. Of course when added to the sulphuretted hydrogen solution it would not be simply a mechanical effect, but in this case I should like to know if it is the mere thickness of the fluid which prevents the evaporation of the vaporous hydrocyanic acid.

Mr. WILLIAMS: That is a very difficult question to answer. I have thought a great deal upon the matter, and I have an idea it is connected with the diffusibility or the non-diffusibility of the menstruum in the air. For instance, glycerine is a non-volatile body, and it may be that it prevents the volatilization of the hydrocyanic acid, which is very volatile. So, with hydrosulphuric acid, it prevents it, or holds it in from its own inclination to diffuse into the air. It struck me that the cherry-laurel water, which is known to keep the acid much better than artificial hydrocyanic acid, probably owes its keeping property to having some essential oil or other body which is not diffusible in air to any extent in the solution. It is also an interesting fact that Mr. Proctor finds the acid to be best preserved by ether, next by alcohol, and least by water, which is exactly the order of the diffusibility of the several vapours in air.

Mr. SQUIRE: I am getting too old, gentlemen, to take part in these discussions as formerly; but I might tell you what I practically found some forty years ago. At that time Scheele's prussic acid was very much in use, and the great objection to it was its loss of power by keeping; hence the 2 per cent. strength was adopted in the Pharmacopœia of 1836. At that time I used to manufacture prussic acid for the greater part of the trade in the city, and I remember Faraday holding up two bottles at the Royal Institution, and saying, "*This* is probably the pure acid, and *this* probably has had hydrochloric acid put into it." It so happened that the one which was colourless was mine, and I went to him afterwards and said, "There is no hydrochloric acid in that at all." He said, "When Davy and I operated on prussic acid we found that hydrochloric acid kept it very well." I said, "Still you must not jump to that conclusion, because I believe, myself, that prussic acid keeps best when perfectly pure, at the strength of 2 per cent." I have had an experience of something like thirty years of prussic acid, and I think if you have it pure and of the strength of 2 per cent., and keep it at a tolerably low temperature, it will keep very well. I bow to recent experience, especially of such men as Mr. Williams, but still I hold my own until I am set right, and, moreover, when we find a thing which has kept its ground since 1836, we should not be too ready to throw it over.

Mr. GILES: We do not intend to throw over this strength, but to introduce it into mixtures in larger volume, and there will be no necessity for altering the Pharmacopœia for that purpose. In the paper this matter is discussed as a chemical question, and as such it appears to me to be settled, and that the difficulty can be met by diluting the solution. As to the question of the difficulty of keeping solutions in the state in which we obtain them, I think it is very easy, and I therefore agree with Mr. Rimmington that, as a practical difficulty, it is much overrated. It appears to me that by moderate care, and by the exercise of common sense, you can easily keep dilute prussic acid within such slight bounds of variation as are unimportant, but I certainly should not keep it in the Winchester quarts, in the form in which I receive it. I always bottle it off into 4 oz. bottles, and it is brought into use in the pharmacy in quantities of twelve drachms at the time. A more interesting question is, How does the glycerine retain the hydrocyanic acid? I think it does that just as we find in other cases volatile or gaseous matters are entangled by a viscid fluid, an illustration of which is the much longer time effervescence is retained in champagne than in soda-water.

Mr. ALLEN: Possibly the difficulty which has been referred to of keeping hydrocyanic acid from volatilizing might be got over by adopting a similar plan to that which I have found very useful in keeping a solution of sulphuretted hydrogen, and in keeping caustic soda away from the air. I keep them in an apparatus fitted like a wash-bottle with two tubes, covered with a layer of paraffin oil, which entirely excludes the atmosphere. When I want any out, I use a small syringe to blow some out through the wash-bottle tube, and if a little cap is kept over the orifice, there is no contact of the air at all, and I cannot imagine that any volatilization could occur in a case of that sort. Sulphuretted hydrogen keeps generally until the bottle is empty, though it gradually deposits some sulphur, I believe by a sort of secondary action. I think the same thing might be done with hydrocyanic acid, and if you do not like to use paraffin oil you might use olive oil, and in that manner keep it entirely from the air. As a pure chemist I have been much interested in Mr. Proctor's paper and his description of the method of preparing hydrocyanic acid from the different cyanides; certainly it seems very unnecessary to take such extreme precaution in preserving it when you can prepare it so readily of any strength you want from cyanide of potassium, or cyanide of zinc and potassium, by the action of tartaric acid. You thus get it very readily and perfectly pure. One other point struck me especially, in Mr. Siebold's paper, and that is the failure of litmus in indicating the real neutrality of the solution, which becomes alkaline with the least quantity of caustic alkali. I was puzzled for some minutes to know how Mr. Siebold ascertained whether he had enough soda there without actually calculating it, and I was very much pleased when he showed us that it was by the alkalinity of the solution on the completion of the operation.

Mr. SIEBOLD: I quite share Mr. Schacht's surprise that some gentlemen are still in doubt as to the great variability of the hydrocyanic acid of the Pharmacopœia. It is evident that either the gentlemen who have so far published their results are not reliable, and their results are false, or else the acid is very variable. If it is so, the question now proposed to the Conference is, I believe, one of the highest importance, considering the powerful nature of hydrocyanic acid as a medicinal agent. I believe everything in our power should be done to remedy the evil which has existed so far, and it is much better we should remedy it by our own experience than that it should be done at the dictation of magistrates, or public analysts, or police inspectors. There are two causes of the deterioration of hydrocyanic acid; one is volatilization, and the other, spontaneous decomposition. The loss by evaporation is, no doubt, the greater. As to the addition of hydrochloric acid to preserve it, opinions have differed at all times; it has been maintained by eminent men that the addition is useful or necessary, whilst others equally eminent have disputed it, not only on theoretical but also on practical grounds. I believe the discrepancy may be explained in this way:—Last year Mr. Rimmington pointed out that hydrocyanic acid acts upon the alkali in the glass of some bottles; that some glass readily yields its alkali to weak acids, and whenever the hydrocyanic acid is put in such a bottle, there cannot be a doubt that the addition of hydrochloric acid is of extreme value, because the alkali would be more readily yielded to hydrochloric acid than to the hydrocyanic acid. I have experimented on bottles of various kinds, and I believe I am justified in saying that the addition of hydrochloric acid is perfectly useless except in the case I have referred to, and my experience agrees with that of Mr. Squire, that the pure acid does not change any more without the hydrochloric acid than with it. But I cannot see any objection to the scheme proposed of storing hydrocyanic acid in a diluted form. I used to make large quantities of cherry laurel water in Hamburg, half a hundredweight at a time, and that was kept in bottles of one pound each; at the end of a year there was no appreciable deterioration in its strength. My experiments now show that the highly diluted form of hydrocyanic acid will keep as well, or almost as well, as the cherry laurel water. Why, then, should it not take the place of the more concentrated form? I do not think myself that the cherry laurel water ought to take its place, but if we have a simple solution in water we are in the same position as using a solution of a common mineral salt in dispensing instead of using the salt itself. For instance, if five minims of the acid are prescribed, and our acid contains $\frac{1}{10}$ per cent., we must use 100 minims. We act in a similar manner continually in the case of bichloride of mercury, sulphate of magnesia, morphia, and other substances.

The PRESIDENT: How would you do in the case of concentrated medicines, where so many drops are ordered to the teaspoonful; the dilute acid would not be applicable to such a case? Pharmacists, however, should not encourage the prescribing of "drops."

Mr. SIEBOLD: I believe this case would rarely occur in the case of hydrocyanic acid. There is another objection as to the dose. In the Pharmacopœia it is from two to eight minims, which is very large when compared with the largest dose permitted to be used in Germany. As I have said, the German Pharmacopœia does not contain hydrocyanic acid, but cherry-laurel water, and the largest dose of that substance allowed to be prescribed is half a drachm, which is equivalent to the smallest dose of the hydrocyanic acid of the British Pharmacopœia. This is certainly a great anomaly, which may be occasioned by this fact, that in fixing the highest dose of eight minims, experiments may have been relied upon which had been made with an acid which had become greatly deteriorated in strength. We continually meet with acids containing less than one per cent., and very seldom does it contain anything like two per cent., unless freshly made. We have no proof whatever that these hospital experiments were not made with a weak acid, and, at any rate, it seems to me a great anomaly that in England the largest dose should be eight minims, whilst in Germany it should be only equivalent to about two. I cannot suppose that there is such a difference in the constitution of Englishmen and Germans as to allow the former to take four times as much as the latter.

(*To be continued.*)

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE LEAD-TANNIN PROCESS.

Sir,—In reviewing 'Tea, Coffee, and Cocoa Analysis,' by J. A. Wanklyn, in your issue of to-day, you refer to "Allen's process of titration by means of lead." Permit me to remind you that the method in question was originated and worked out wholly by myself; this acknowledgment accompanying its publication with Mr. Allen's contributions to the *Chemical News*.

FRED. W. FLETCHER, F.C.S.

August 29th, 1874.

WHEAT STARCH.

Sir,—The Pharmacopœia defines "amylum" to be "the starch procured from the seeds of common wheat." As met with in commerce, in powder, such it used formerly to be, but, so far as my experience extends, such it is not now. All which I have had an opportunity of examining microscopically of late, is the starch of maize. On application to an eminent firm of starch manufacturers, I am informed that they cannot supply wheat starch. Can any of your readers inform me where it can be procured?

JOHN ABRAHAM.

Liverpool, 1st September, 1874.

SCIENTIFIC ATHEISM.

Sir,—That the pages of the *Pharmaceutical Journal* are not ordinarily occupied with theological matter will not, I hope, forbid the presence of these few lines in reference to the poison of rank atheism propounded in the elaborate oration of Professor Tyndall with which a late number of your Journal was unfortunately contaminated.

The learned Professor, after proving to his full satisfaction, his own immediate development from the lowest orders of creation with the comforting assurance that "man carries with him the physical texture of his ancestry, as well as the inherited intellect bound up in it," allows further that "the period necessary for completion varies with the race and with the individual." This is a satisfactory admission, inasmuch as it yet holds out a ray of hope that the time may come when the acknowledged ignorance of the learned Professor as regards the origin of life, of which he says, "the whole process of evolution is the manifestation of a Power absolutely inscrutable to the intellect of man," may pass away, and that he may yet be led to see that that Power, of which he knows or desires to know nothing, is none other than the Eternal God, Jehovah, "by whom were all things created that are in heaven, and that are in earth, visible and invisible," of whom, had Professor Tyndall quoted scripture correctly, he would have acknowledged to his auditors, "Canst thou by searching find out God? Canst thou find out the Almighty unto perfection?" and had he turned over the leaves of his Bible a little further to the 38th chapter of the book of Job, and applied the queries therein contained to his own finite intellect, he might have felt constrained to acknowledge with the Psalmist, "The fool hath said in his heart there is no God."

As the antidote to the sad poison of scepticism with which the whole of that Address, abounds, would you allow me to commend to your readers, young and old, the example of the Bereans, of whom we are told that "they received the word with all readiness of mind, and searched the scripture daily whether those things were so, therefore many of them believed," and at the same time to give heed to the exhortation of Paul to Timothy, by "avoiding profane and vain babbling, and opposition of science falsely so called, which some professing have erred concerning the faith."

EDWIN B. VIZER.

September 2nd, 1874.

W. Saville.—The syrups contained in the mixture have a tendency to ferment in the summer. See that they are not fermenting before the mixture is made, and keep it in a cool place below 50° F. if possible. This will be the best means of preventing change.

D. A. Stevenson.—See 'Wanklyn's Water Analysis' and 'Sutton's Volumetric Analysis,' for descriptions of the tests you require.

G. Welborn.—Your communications shall have early attention.

James Mayne.—The smell arising from such factories has sometimes been prevented by ventilating into a tall chimney. (2.) Fresenius, Sutton, or Wanklyn.

An Aspirant for the Major.—We fail to perceive the vagueness you speak of, but if you desire it we will forward your letter to the Board.

Aprons.—We have not had any space that could be spared for your letter, which in reality contains only an "oft told tale," and is not, we think, likely to be conducive to the end you desire.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

CURIOUS CONVERSION OF ALCOHOL INTO ACETATE OF ETHYL BY THE AGENCY OF CRYPTOGAMIC LIFE.

BY F. M. RIMMINGTON.

To those acquainted in any degree with the remarkable power of metamorphosis possessed by some of the microscopic cryptogami, this paper will be of interest. It may probably have been noticed by others that concentrated infusion of quassia is very prone to become acid, but the conversion of alcohol into acetic ether has probably not been before noticed. I assume, both from my own observation and the published experiments of Pouchet and Pasteur, that this transformation has been brought about by the agency of cryptogamic life in the fluid, whether that life was fungoid or otherwise.

My attention was recently drawn to a bottle of concentrated infusion of quassia that I had made myself some months ago, which smelt so strongly of acetate of ethyl that it was rather difficult to resist the belief that some had not been introduced. The fluid was quite clear and bright without any sign of fermentation or other change going on. On pouring off the clear liquor, a very thin stratum of sediment appeared at the bottom of the bottle, looking very like mud.

The circumstance aroused in my mind an interest to know the explanation of this phenomenon, and the inquiry took the following shape:—Lignum quassiæ has often a fusty smell and a corresponding taste; this I attributed to the presence of some form of fungus growth—and most probably the fungus is a penicillium—and, assuming this to be so, the probability is that some of the spores have got into the fluid, and have been slowly and silently effecting the conversion of the alcohol into acetate of ethyl. It is this fact which constitutes the point of interest, for if the alcohol had only become changed into acetic acid, the presence of fungi or anything else would not have been necessary, but the change is of a more complex and delicate character. The amount of acetic acid present is only small, and much diluted, but the odour of the ether is powerful. The next point was to prove the theory I had set up, and I proceeded to examine the sediment microscopically. With a one-fifth objective it looked like granular amorphous matter, mere points, without structure. But sufficient was shown to determine that it was not inert matter, and, on submitting it to the amplifying power of 800 or 900, its nature was clearly and beautifully displayed; it was made up entirely of unicellular organisms, of a somewhat irregular roundish form, about one-third the size of a yeast cell, and having like that one or more nuclei. Besides these cells, were a considerable number of bacteria, or vibrios.

To mycollogists there is another point of interest I will mention; these exceedingly minute bodies, when viewed by reflected light, look opaque, and of a *drab or grey colour*, and are not globular, but flattened on two sides. These flattened sides have raised edges and slightly raised centres, something like the top of a pork pie.

August, 1874.

VEGETABLE POISONS AND THEIR ANTIDOTES.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from page* 1014, *Vol. IV.*)

Cicuta virosa.—This plant being of much less frequent occurrence in this country than *Œnanthe crocata*, cases of poisoning by it are not very common. These two plants are often confounded, on account of the term water-hemlock being erroneously applied to both of them. For this reason, it is difficult to ascertain, in several recorded instances of poisoning by water-hemlock, to which plant the symptoms which were produced should be attributed.

The two plants may be readily distinguished thus:—

Cicuta virosa (water-hemlock or cowbane) has globular fruit, narrow lanceolate, distinctly serrate leaflets, a præmorse root, which is hollow within, with transverse partitions.

Œnanthe crocata (hemlock water dropwort) has narrow, cylindrical fruit, surmounted with two styles, of nearly the same length as the fruit; the leaflets are wedge-shaped, with two or three teeth at the apex, and the root consists of four or five fusiform tubercules.

Cicuta virosa is said to be fatal to horned cattle and dogs, but to be eaten with impunity by goats and sheep. In the few cases of poisoning by this plant, in which the symptoms have been observed, they appear to have been as follows:—Giddiness, bloated face, burning pain in the stomach, spasmodic breathing, intermittent pulse, at times feeble and at others tumultuous, coldness of surface, dilated pupils, and coma. The occurrence of tetanic spasms is also very marked, and the brain seems to be affected no less than the spinal cord.

Death has occurred, in a few cases, in half an hour, but in others not until sixteen hours after taking the poison. Paralysis of the muscles of respiration appears to be the immediate cause of death.

Cases of Recovery.—The following case occurred in Germany:*—Four children ate a large root; one of them died almost immediately, but the other three recovered after having been given milk, a sulphate of zinc emetic and decoction of nutgalls; external stimulants were also used. The recovery was attributed to the decoction of nutgalls, but the treatment was so varied that the conclusion is, perhaps, open to discussion.

In another case† some boys having eaten the root of water-hemlock, all recovered by the administration of an emetic of mustard and warm water, except two of them, to whom it was found impossible to administer an emetic on account of tetanic spasms.

Antidotes.—In a case of partial recovery, the amelioration was marked by contraction of the pupils of the eyes.‡ In the cases of recovery on record, early vomiting was induced, probably before much of the poison was absorbed into the circulation.§ No real antidote is known, nor is it possible to suggest a probable one, until more accurate knowledge of the physiological action of this group of poisons has been obtained.

The best treatment is to administer, as speedily as possible, an emetic of mustard and water, followed by milk and purgatives. Probably the cautious inhalation of chloroform might be useful in some cases to relax the tetanic spasms, and thus permit the administration of an emetic. Judging from the pupils being dilated, and the occasional presence of delirium, opium might possibly prove of service.

Œnanthe crocata.—This is one of the commonest

* *American Journal of Pharmacy*, vol. ix. (2), p. 153.
† *Pharm. Journ.*, vol. 2 (3), p. 1063.
‡ 'Taylor on Poisons,' p. 810.
§ *Lancet*, Sept. 16th, 1871, p. 396.

of the British poisonous Umbelliferæ, and the most virulent in its action.

It would, however, appear to vary in strength in different specimens, for Dr. Christison states that *Œnanthe crocata* and *Cicuta virosa* were innocuous when grown near Edinburgh;* it has been also stated that roots containing a yellow juice are more poisonous than those with a colourless juice. Stephenson and Churchill state that the root contains a milky juice which turns yellow on exposure to the air. Probably the colour of the juice depends upon the age of the plant. It would be interesting, however, to determine this point, and to know whether the strength varies in different parts of the plant, as in conium.

The symptoms of poisoning generally commence with convulsions, and insensibility soon follows. Other symptoms are bloated countenance, dilated pupils, great prostration, imperceptible pulse, and sometimes tetanic spasms, death occurring in half an hour to two hours† after taking the poison.

Cases of Recovery.—In one case in which the roots dug up in March were boiled and eaten by a woman, her husband, and two children, recovery took place by the use of emetics.‡ Orfila relates that out of thirty-six soldiers who partook of the root, only one died; the rest, having vomited freely, recovered.§

Dr. Kane|| relates full particulars of a case of recovery from poisoning by a plant which might have been either *Œnanthe crocata* or *Œthusa cynapium*, as both grew in the same locality. In this case chloroform was administered to relax the rigidity of the muscles; and emetics of mustard and water and antimonial wine having failed, an enema of turpentine was administered, as well as thirty drops by the mouth in milk. This treatment, together with cautiously repeated doses of whisky as a stimulant, was followed by perfect recovery.

How far the recovery in the last case was due to the use of chloroform, or to the fact that the child vomited before the symptoms came on, it is difficult to say; but, judging from the majority of cases in which recovery has taken place, the most important thing to do seems to be to produce vomiting as speedily as possible; possibly for this purpose the subcutaneous injection of apomorphia might prove more effectual and speedy than the internal use of an emetic. The use of *chloroform*, *chloral*, or *gelsemium*, to relax muscular rigidity, and thus prevent the exhaustive action of the poison upon the nervous system, and the subcutaneous injection of *liquor ammoniæ* as a stimulant, are perhaps the best antidotes that could be suggested until more accurate knowledge is obtained concerning the physiological action of this plant.

Œthusa Cynapium.—The leaves of this plant somewhat resemble parsley in appearance, but are darker in colour, and have more finely-cut leaflets.¶ It has occasionally been mistaken for that plant, and thus caused death. It also somewhat resembles hemlock, but may be distinguished from it by the three long pendent bracts beneath each partial umbel. A case of poisoning which occurred through mistaking this plant for hemlock is recorded in Stephenson and Churchill's 'Medical Botany.'**

* *Pharm. Journ.* (2), vol. iii., p. 432.
† *Pharm. Journ.* (3), vol. i., p. 110.
‡ 'Taylor on Poisons,' p. 811.
§ 'Orfila on Poisons,' vol. v., p. 67.
|| *Medical Times and Gazette*, 1869, vol. ii., p. 379.
¶ 'Orfila,' vol. ii., p. 251.
** Vol. i., No. 8.

The symptoms produced closely resemble those of poisoning by *Œnanthe crocata*—bloated face, heat in the stomach, shortness of breath, muscular rigidity, nervous tremors, numbness of limbs, and occasionally delirium. Death usually takes place in from one to twenty-four hours, and paralysis of the respiratory muscles appears to be the immediate cause of death.

Cases of Recovery.—In two cases mentioned by Taylor,* the recovery appears to have been due to the plant having been eaten on a full stomach, and to vomiting having taken place early. In other cases, the recovery seems also to have been due to speedy evacuation of the stomach.

Antidotes.—The symptoms are so similar to those produced by *Œnanthe crocata* that the same treatment is probably the best that could be suggested.

Observations.—It will be seen that the symptoms produced by these three plants are very similar. So far as their physiological effects are known, they appear to be these: the secretory power of the liver is arrested, and the sensibility of the intestinal canal much depressed, while the vessels of the brain become turgid with blood. The use of such purgatives as calomel and podophyllin would therefore seem to be indicated, together with the use of some powerful stimulant, such as Liq. Ammoniæ, injected hypodermically, to restore the equality of the circulation.

Our knowledge of the alkaloids of these three plants is in a most unsatisfactory state. *Œthusa* is said to contain conia or an analogous principle, as well as cynapine, and *Cicuta* probably contains a volatile alkaloïd, although some have failed to detect it; for the leaves, when dried, are stated to be without poisonous properties.†

Œnanthe crocata has not, that I am aware, been analysed. Yet it is probable that these plants may, in small doses, possess useful medical properties.

An infusion of the leaves and the expressed juice of *Œnanthe crocata* have been used in lepra and ichthyosis, and it is said with success,‡ and in Westmoreland a poultice of the leaves is used to heal ulcers in the feet of horned cattle.§

FREEZING MIXTURES.||

BY M. BERTHELOT.

The researches of the author upon the crystallized hydrates of sulphuric acid have supplied him with the data necessary for calculating the lowering of temperature which these hydrates develope when mixed with snow or powdered ice. Some of these details he has discussed in their relation to freezing mixtures in general in a paper from which the following is taken. It may be as well to notice that he uses the old notation (C = 6, O = 8) throughout.

The thermic effect which is produced when snow is mixed with solid crystallized bihydrated sulphuric acid is the sum of three effects, viz.—the fusion of the acid, which absorbs heat; the fusion of the snow, which also absorbs heat; and the combination of the two liquids, which disengages heat. Thus, for example, with three parts of acid and eight parts of water—that is to say, in equi-

* 'Taylor on Poisons,' p. 815.
† 'Woodville's Medical Botany,' vol. i., p. 96.
‡ *Philosophical Transactions*, vol. lxii.
§ 'Stephenson and Churchill's Medical Botany,' vol. i., No. 35.
|| Abstract of a paper read before the French Academy (*Comptes-Rendus*, vol. lxxviii., p. 1173).

valents, SO_4H, HO (58 grams) and 17 HO (153 grams)—both bodies solid and taken at 0°—

	Heat units.
The melting of SO_4H, HO absorbs, according to the author's experiment	— 1,840
The melting of 17 HO, according to M. Desains, absorbs	—12,155
Upon the union of SO_4H, HO with 17 HO the two liquid bodies disengage.	+ 4,900
	— 9,015

This is the quantity of heat absorbed by 211 grams of the mixture. To ascertain the lowering of the temperature, it is sufficient to divide it by the product of the weight of the mixture and its specific heat. Thus—

$$-9{,}015 \div (211 \times 0{\cdot}813 =)\ 171{\cdot}5 = -52^{\circ}{\cdot}6.$$

If the operation is conducted at a lower initial temperature and with ingredients previously cooled, a calculation based upon the formula which expresses the variation of the heat of reactions with the temperature,* shows that the heat absorbed increases by the variation of the heat of combination = — (0·1715 — 0·089 heat units), or about $\frac{1}{110}$ for each degree less in the initial temperature. Commencing at —20°, the additional lowering would be 62°, and so on, increasing but slowly, in proportion as the initial temperature is lower.

If the bihydrated sulphuric acid, in the liquid state, be employed at 0°, the heat absorbed would be only —7,155 heat units, and the lowering —42°. Commencing at —20°, it would be —50°, which would lead to a final temperature of —70°.

Lastly the monhydrated sulphuric acid liquid SO_4H, in the presence of 18 HO, solid, starting at zero, will absorb only 4·025 heat units, producing —23°·7.

It will thus appear that the absorption of heat and lowering of temperature vary a little with the initial temperature, the final temperature being increasingly lower in proportion as the operation is commenced with a mixture previously more cooled. The only limit is the freezing point of the mixture of water and sulphuric acid, but that point is excessively low.

It has been found by previous authors that a cold of 32°·5 can be obtained with three parts of snow and one part of liquid sulphuric acid containing one-fifth of its weight of additional water. An analogous mixture, with its ingredients previously cooled to —7° would lower the temperature to —51°. From the eighteenth century, mercury has been congealed with similar mixtures of snow and sulphuric acid. MM. Pierre and Puchot, in recent experiments, have obtained only —26° with a mixture of three parts of crystallized bihydrate and eight parts of pounded ice.

All these numbers are below those deduced by theory, but it is necessary to observe that the heat is diffused between the mixed substances and their surroundings; radiation leads to considerable loss. Besides, and this is the principal cause of the differences observed, one portion of the ice remains solid, and diminishes proportionally the cold obtained. Snow is preferable to ice in this respect.

During last century, it was principally by means of mixtures of dilute nitric acid and ice that operations for the solidification of mercury were conducted, a problem that greatly interested the chemists of former days. The following is the calculation relative to one of the most frequently employed of these mixtures. With a mixture of nitric acid ($NO_6H + 3\,HO$) and twice its weight of snow ($10\,H_2O_2$), the heat absorbed, starting at 0°, is 11·000 heat units, the lowering of temperature —56°.

Generally, the artificial production of cold depends upon the following artifices, either alone or combined in the same operation:—

1. Transformation of a liquid or a solid into gas (vaporization of ether or sulphurous acid, treatment of a bicarbonate with an acid).

* *Annales de Chimie et de Physique* [4], vol. vi. p. 304.

2. Liquefaction of a solid in contact with a liquid (solution of salts) or with another solid (crystallized sulphuric acid and ice, ice and chloride of calcium, etc.).

3. Chemical reaction effected in the midst of a liquid with the formation of substances the solution of which would absorb more heat than that of the primitive compounds (solution of an alkaline acetate, and solution of tartaric acid, according to the author's experiments); or the formation of bodies that gradually decompose in the liquid, such as the salts of feeble acids (carbonate of ammonia, formed by a mixture of solution of an alkaline carbonate and a solution of sulphate or nitrate of ammonia), the acids, salts, etc.

4. Whatever be the reaction employed, the lowering of the temperature (t—t_1) may be calculated from a knowledge of the heat absorbed in the reaction (Qt), the weight of the substances, between which it is distributed (p, p'), and their respective specific heats (c, c').

$$t - t_1 = \frac{Qt}{\Sigma pc}.$$

This reduction changes slowly with the initial temperature (t) as long as Qt is considerable and the specific heats can be regarded as constant. But it is limited by the freezing points of the saline solutions, which do not admit of the indefinite reduction of the temperature.

It should be observed that no other system is capable of producing a refrigeration comparable to that produced by the integral transformation of a liquid into gas, as may be ascertained by calculation. For example, ether in vaporizing produces a lowering of temperature theoretically of —192° C.; sulphide of carbon of —530° C.; liquefied ammonia of —460° C.; and the protoxide of nitrogen of —440° C. But the refrigeration is arrested at points far short of these; which arises from the tension of the vapour of the liquid that is changed into gas becoming so feeble that the cold produced in a given time is compensated by the ambient radiation, by which it becomes reheated. In fact, the cold produced by the vaporization of a liquid, even in a vacuum, scarcely allows of the lowering of the temperature more than 60° to 80° C. below the boiling point of such liquid under atmospheric pressure; hitherto only in a single case, the congelation of water, has 100° been exceeded. However this may be, these figures, both theoretical and practical, show that no process of refrigeration is comparable to vaporization, and the same result has been arrived at industrially. But M. Berthelot is of opinion that a better directed employment of the sources of cold, which theory indicates to be at our disposal in liquefied gases, should make it possible to go much lower than has been done at present, and to approach nearer to that actual zero which appears to be about — 273° C.

CRYSTALLIZED DIGITALIN.*

BY M. NATIVELLE.

The process described by the author in his former paper on the preparation of crystallized digitalin,† is one that presents considerable difficulties, and, in unpractised hands, has frequently only yielded negative results. Sensible of this, M. Nativelle has during the past two years sought to discover a satisfactory modification of it, and he has recently communicated to the Academy of Medicine and the Society of Pharmacy in Paris the details of a process by which he states the new substance can be obtained inexpensively in considerable quantity, and absolutely pure. The modification consists chiefly in the separation of the digitalin from the digitin by means of chloroform, and afterwards removing the yellow oily substance,‡ which

* Abstract of a paper in the *Journal de Pharmacie et de Chimie* [4], vol. xx., p. 81.

† See *Pharm. Journ* [3], vol. ii., p. 865.

‡ This substance consists of a thick fatty oil, having the peculiar odour of amorphous digitalin, and a yellow colouring substance which is reddened by alkalies.

accompanies the digitalin and retards its crystallization, by treatment with ether.*

Before describing the process, the author gives some details as to the comparative value, for the purpose, of digitalis in its different stages of growth. The plant of the first year, especially that which is collected too young, is not rich in crystallizable digitalin; fleshy and full of juice, it abounds in digitalein and extractive matter. Digitin, a crystallizable but inert substance, which must not be confounded with the active principle, is present in it as in the older plant. The plant of the second year's growth, collected just when the first flowers appear, using only the leaves from which the petioles have been removed, is what the author has found most suitable, both for the preparation of digitalin and for use in the natural state.

M. Nativelle's experiments confirm the observations of previous authors as to the comparative value of different parts of the plant. He has found that the root, stems, petioles, and nerves contain only a very small proportion of the active crystallizable principle, and in operating upon equal quantities of the petioles and of the green portion of the same leaves from which the petioles had been removed, he obtained five times as much crystallized digitalin from the latter as from the former. Thus selected, the ordinary yield of digitalin is one part in one thousand, but from the mature plant collected in the Vosges, he has obtained 12 centigrams to the 100 grams.

The following are the details of the process :—

Digitalis Leaves (Vosges) in moderately fine powder	1000 grams.
Neutral Plumbic Acetate	250 „
Distilled Water	1000 „

The lead salt is dissolved in the cold water, the powder added and thoroughly mixed, then passed through a sieve, and left in contact during twenty-four hours, taking care to stir it together from time to time. The mixture is next exhausted in a displacement apparatus with 50° alcohol until it ceases to impart any bitterness. To this liquor is added 40 grams of bicarbonate of soda dissolved to saturation in cold water. The effervescence having terminated, the spirit is distilled off, and the remaining liquor evaporated in a water-bath to about 2000 grams; it is then allowed to cool and diluted with six times its weight of water. Two or three days afterwards the clear liquor is decanted by means of a syphon, and the precipitate drained and pressed.

The extractive liquor being thus removed, the precipitate weighs about 100 grams. This is suspended in about 1000 grams of 80° alcohol, and the whole passed through a fine metallic or silken sieve. The resulting turbid liquor is then heated to ebullition, and ten grams of neutral plumbic acetate added to it; the heat is continued for a few minutes and the liquor filtered through paper. Upon the deposit in the filter alcohol is poured, to remove any liquor it may retain, and it is then pressed. To the liquor is added 50 grams of quite neutral vegetable charcoal, in fine powder, and it is then distilled. The charcoal remaining is heated for some time in a water-bath to drive off any alcohol it may retain, then allowed to cool, and put to drain upon the sieve used for the separation of the precipitate, and thus separated from the coloured liquor. This charcoal is dried in a stove, and exhausted by displacement with chloroform until the latter passes through colourless.† This liquor is distilled to dryness, and the residue is crude digitalin, mixed with a pitchy substance and oil. It is dissolved with heat in 100 grams of 90° alcohol, one gram of neutral plumbic acid dissolved in a little water is added, and ten grams of washed animal charcoal in fine grains without powder; after boiling for ten minutes it is allowed to cool. After the liquor has settled, it is filtered through a glass cylinder, furnished with a tight cotton plug; it passes quickly and clear, and to the residue the deposit is added, and the whole exhausted of all bitterness by alcohol, which is afterwards distilled. The digitalin appears in a crystalline grumous mass, contaminated by the coloured oil. It is separated from the small quantity of aqueous liquor in which it is found, then dissolved with heat in ten grams of 90° alcohol, five grams of rectified sulphuric ether, and fifteen grams of distilled water added, and the whole shaken together in a stoppered vessel. Two layers are formed: the upper is coloured and consists of ether which has taken up the fat oil; the lower is colourless and contains the digitalin, which, being set free, quickly crystallizes. Two days afterwards the whole is poured into a small cylinder furnished with a tight cotton plug; the mother liquor passes through, and then the coloured layer, what remains of the latter adhering to the crystals being washed off by a little ether.*

This first crystallization of digitalin is slightly coloured. To obtain it perfectly white, two purifications are necessary, but previously a treatment with chloroform is indispensable to separate about one-tenth its weight of digitin, which it still retains. The digitalin well dried, is, therefore, reduced to a fine powder† and dissolved in twenty parts of chloroform, and the solution filtered through a tight plug of cotton. The clear liquor which passes is distilled to dryness, and a little alcohol then added for the purpose of removing by evaporation the last traces of chloroform.

This digitalin is dissolved in 30 grams of 90° alcohol, 5 grams of washed animal charcoal in granules added, the liquor boiled during ten minutes and filtered, the charcoal exhausted as before, and finally the product is distilled; the digitalin crystallizes on the sides of the vessel, but it is still coloured. To obtain it white, it is again dissolved with heat in 8 grams of 90° alcohol, 4 grams of ether, and 8 grams of water added, and the whole shaken together in a close vessel. After being exposed during a night, nearly the whole of the digitalin is deposited in small white acicular groups; that which still retains colouring matter (about one-fifth) remains in the mother liquor, from which, however, it can be purified by further operation with very little loss. The whole is poured into a cylinder as before described, and the crystals washed with ether.

The digitalin so obtained is white and pure; but, by a further treatment, it may be obtained still more beautifully and perfectly crystallized. For that, it is dissolved in twenty-five parts of 93° alcohol, 5 parts of black added and treated as before. The liquor obtained is colourless and is distilled until reduced to ten parts; the heat is then raised to boiling temperature, to dissolve a little digitalin that is deposited, and poured upon a slightly-heated glass, supported under a bell-glass, and covered with a disk. The crystals then form slowly in groups or bundles of very white slender brilliant needles. When they no longer appear to augment, the disk is removed, and the alcohol being nearly evaporated, the crystals are dried in the air upon folds of paper.

---

* Carbon bisulphide may also be used for this purpose, but it offers certain inconveniences. The author, however, used it in the preparation of some very fine specimens of crystallized digitalin, which were exhibited at Vienna last year, and have since been presented to the Academy of Medicine.

† The residue contains digitin. To separate it the chloroform is recovered by distillation and the residue exhausted with boiling 80° alcohol, the liquor filtered, half the alcohol removed by distillation, and all the remainder left to crystallize. The mother liquor retains a little digitalin, which may be recovered by evaporating to dryness and treating with chloroform. The digitin is purified by dissolving it in boiling alcohol, decolorizing with charcoal in grains, filtering, and allowing to crystallize. It appears in very white, fine, nacreous needles, totally devoid of taste.

* This mother liquor retains some digitalin and the fixed oil. These can be separated one from the other by distilling off the ether and alcohol, and agitating the residue with carbon bisulphide, which dissolves the oil only. The digitalin can be recovered by dissolving it to saturation in hot alcohol, and adding to the liquor half its volume of ether and a little water to determine its crystallization.

† The pulverization of digitalin is dangerous; its inspiration may be avoided by putting cotton in the nostrils.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 12, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

A NEW SEAT OF PHARMACEUTICAL EDUCATION IN GERMANY.

UNDER the French domination in Strassburg, there was an École Supérieure de Pharmacie the establishment of which had been ordered as early as 1803, by the same law which likewise instituted the Schools of Pharmacy of Paris and Montpellier. The Strassburg school, however, was nothing more than a board of examination until 1840, when all the three schools of pharmacy were incorporated by law in the *Université de France*, which includes all the scientific institutions, the *Faculté*, as they are termed, of the whole country. Some years previous to this, the professors of the Strassburg school had delivered some lectures, yet it was only in 1841 that they obtained a building for opening a laboratory. There were then six professors, teaching physics, materia medica, natural history, inorganic chemistry, organic chemistry, toxicology, botany, pharmacy, and practical and analytical chemistry in the laboratory. It is to be regretted that there is no history of the school of Strassburg, which for thirty years had certainly a great, and we may say, useful influence on the progress of pharmacy in the eastern parts of France.

After the war, the professors left for Nancy, where the French Government established a new School of Pharmacy; while in Strassburg five pharmaciens of the city were provisionally entrusted by the German authorities with the lectures of the old school, which they opened in November, 1871.

But the Chancellor of the German Empire abolished the five *Facultés* hitherto existing at Strassburg and also the School of Pharmacy; and instituted, by a law of April 28th, 1872, the *University*, instead of the six above-named scientific institutions. German universities, at least the more considerable among them, are expected to comprehend all branches of science, so that, in German eyes, a school or college exclusively devoted to pharmacy is by no means desirable either from a professional or a scientific point of view. This feeling is in contradiction with English, American, or French ideas, yet it is strongly prevalent in Germany. In fact no school of pharmacy is in existence in that country, and nobody seems to have cared for the abolition of the school of Strassburg, except the pharmaciens of the annexed country, who were unable to save it. The examinations and lectures were stopped on 30th September, 1872.

Yet it must not be supposed for a moment that by these measures the imperial government sacrificed the interests, either practical or scientific, of pharmacy. The fine building, the garden, and the collections of the French establishment continued to be devoted to the same purposes, and were, in the beginning of 1873, placed under the superintendence of Professor FLÜCKIGER, of Berne, who was appointed *Professor ordinarius* in the University, and especially charged with the pharmaceutical lectures. He also was soon appointed to preside over the *Prufungs-commission*, or Board of Examinations, similar boards being in activity in all the universities of Germany.

As to pharmaceutical education, whether practical or scientific, in the University of Strassburg, it is not based on any programme or plan whatever; all is simply regulated by the examinations. The students are free to choose the university and the lectures which they prefer. They are not, however, admitted to the examinations unless they prove to have devoted due time to their scientific acquirements in a German university.

We need scarcely add that all students, whether German or not, are freely admitted to both the lectures and the laboratory, and the fees are very moderate. English students desirous of pursuing their education in Germany, would, we are assured, meet with a very kind reception in Strassburg, whether they came for a short stay, or to enter on a full course of study. German is the language in prevalent use, but French is universally understood, and English by at least the professor who is at the head of the pharmaceutical department.

As to the lectures and practical instruction which will commence in November, 1874, those of particular interest to pharmaceutists are the following:—

Inorganic Chemistry, Professor Baeyer; Laboratory, Professor Baeyer and Professor Rose; Industrial Chemistry, Professor Rose; Analytical Chemistry, Professor Rose; Toxicology and Forsenic Chemistry, Professor Hoppe-Seyler; Action and Application of the more important Medicines, Professor Schmiedberg; Materia Medica, including important Vegetable Substances used in the Arts, Professor Flückiger; Laboratory for Pharmaceutical Research and Practical Demonstrations in Materia Medica, Professor Flückiger; Anatomy of Plants, Professor de Barry; Practical Botanical Researches, Professor de Barry; Algæ and Fungi, Professor de Barry; General Botany, Professor Count Solms Lanbach; Musci, Filices, Professor Count Solms Lanbach; Magnetism, Electricity and Heat, Professor Kundt; Optics, Professor Kundt; Practical Researches in Physics, Professor Kundt; Introduction to Practical Physics, Dr. Röntgen; Physical Chemistry, especially Gasometry, Dr. Röntgen; Theory of Heat and Capillarity, Professor Warburg; Palæontology, Professor Benecke; Practical Geology and Palæontology, Professor Benecke; Petrography, Professor Rosenbush; Practical Examination of Rocks, Professor Rosenbush; Mineralogy, Crystallography, Practical and Theoretical, Professor Groth; Introduction to Geology, Professor Schimper; Palæontology of Plants, Professor Schimper; Zoology, Dr. Götte.

It will be seen from the above, that the German Government of Alsace-Lorraine, while abolishing the ancient school of pharmacy, have largely replaced it by all the means of a thorough scientific education, which they liberally offer to pharmaceutical as well as to other students.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS' AND APPRENTICES' ASSOCIATION.

The first meeting of the session was held on Thursday, August 13th, when refreshments were provided, and the following Inaugural Address was delivered by the President, Mr. W. B. Clark :—

Gentlemen,—In opening the business of this session with a short Presidential Address, I propose to confine myself chiefly to a brief review of the past history and present prospects of this Association. In the course of my remarks, I shall endeavour to trace out the elements of its past success, noticing also the dangers that threatened to swamp it, glancing also at those causes which, in my estimation, have stunted its results; trusting from reflection upon these to be able to draw a chart (even if a poor one), which will guide us safely through the half-year upon which we are now entering, so that at the close of the session the Association may consist of a greater number of real students than have ever been enrolled before.

In the beginning of the year 1869, Messrs. E. H. Butter and H. Cooper first conceived the design of banding those employed in the Drug Trade in Leicester together, for the purpose of helping them in their preparation for the Pharmaceutical Examinations. Upon calling upon a few of the assistants, they speedily found sufficient encouragement to lead them to arrange for an early meeting. At this meeting, a committee was formed, with Mr. E. H. Butter as President, which guided the affairs of the young Society over its first half-year. During this season of its existence, its difficulties were numerous, such as scarcity of gentlemen who would deliver lectures, the want of a suitable room, the lack of pecuniary resources, and finally the fact that but very few of its members had passed the Preliminary examination. At the close of the half-year, progress had been made, for we find, from the report, that four principals had assisted the Association with their approval of its objects, as well as by annual subscriptions, and that, after paying all expenses, the Treasurer had a balance in hand of £2 9*s.* 10*d.* Perhaps the chief reason of the success of the Society at this, its early stage of existence, consisted in the fact that almost every member had some examination to pass, and was firmly persuaded that the Association would provide him powerful help.

The next session, with Mr. John Young as President, found the Association growing stronger, having obtained a suitable room for its meetings, at St. George Street; the principals also testified their approval of the Society by sustaining its financial affairs. The attendance also of the members was very good, a great improvement having taken place among the juniors, owing to the fact that the committee had started a class specially for their instruction, but still we notice that at the end of this session no member had during the year passed any one of the examinations of the Pharmaceutical Society. Entering upon the third half-year of the existence of the Association, we find again Mr. Young elected President, with Mr. W. E. Hill as Vice. And now we find that the first twelve months had not been wasted by the members, for we note that three Minor, two Modified, and six Preliminary examinations are passed in the following half-year. In spite of all this, the success of the Association was but partial, for we find that a most serious falling-off of the number of members was experienced; this was occasioned partly by some little jealousy springing up among a few of the members, and partly perhaps by the fact that a great number of the younger members had given their spare time almost solely to the preparation for the Preliminary examination. Again, the financial affairs of the Society were in a safe condition. And now with the same two gentlemen as leaders, we find the business of the Association being transacted at much more suitable rooms, in Halford Street, which have been found very convenient to the present date. We notice again the Association with diminishing numbers, in fact, the smallest number of members since its establishment, only having eleven assistants, with a like number of apprentices, upon its books. But, nevertheless, we had two members pass the Major, one the Minor, and one the Modified examination. I will here quote from the remarks of the committee concerning the supper :—"That it is greatly conducive to that good feeling among principals and their assistants which for the interests of future pharmacy it is desirable to maintain."

At the commencement of the fifth session we find Mr. W. B. Clark, President, and Mr. H. Cooper, Vice-President. In the first place, there was an increase in the number of members; secondly, one member passed the Minor and two the Preliminary; thirdly, we find the apprentices of the Association being ably instructed for the Preliminary, by Mr. N. S. Grigsby. We read also of an impetus being given to the Association by a grant from the London Society towards the formation of a library, etc. At the next general meeting of members, we have Mr. W. E. Hill appointed as President, with Mr. T. Wright, as Vice-President. Under the leadership of these two gentlemen the Association made rapid advances, improving very much the number upon the books; possibly this was the most prosperous period of the existence of the Society since its formation, although no examinations were passed. In my opinion, this elasticity was accounted for by the following facts: firstly, that the two gentlemen at the head of the the Association were very popular, and testified to the interest they felt by the frequency of their attendance; secondly, the classes conducted by Messrs. Hill, Wright, Clark, and Thirlby were suited to the needs of the members, whilst a series of instructive lectures were delivered by Messrs. Cox, Young, Burton, and Weaver. The seventh half-year started with Mr. W. Bradley for President, and Mr. S. H. Cadoux as Vice-President, and again there was a very flourishing session, for again there was a large number of members enrolled upon the books, and what is of much more importance attending very frequently. We find also four members passing the Preliminary and the Minor. Before passing on, I wish to pay a tribute of respect to Mr. Bradley for the painstaking manner in which he helped to forward the Association during the time he was connected with it. And now having lost, for a time at least, Messrs. Hill, Wright, and Bradley by removal to other spheres of labour, the Association found its chief officers in Mr. Cadoux as President, and Mr. W. B. Clark as Vice-President. A successful half-year was again passed; the papers which were usually read at about monthly intervals were discontinued for a time, some difficulty having been experienced in finding gentlemen competent enough and willing to undertake them. Again we notice the President devoting much time and energy to the interests of the Association, the botany class being a great success. The ninth session was passed under the presidency of Mr. N. Thirlby, and again the Society makes headway. It increases in number, the attendance is even more regular, and it is assisted by a grant of ten pounds from the Pharmaceutical Society towards the purchase of a materia medica cabinet.

A well-devised cabinet having been built, and carefully filled with specimens, has been of the greatest use to the members. At the next general meeting, Mr. J. Wright was elected to preside, with Mr. S. H. Cadoux as Vice-President. We again find the classes fairly attended, but at this period some little harm was done to the Society by a few of the members deeming themselves slightly injured by others, indulging in personal feelings, and thereby endangering the general good. But wise action upon the part of the Committee, coupled with forbearance upon the part of the disputants, speedily restored order. And now we find ourselves at the beginning of our last half-year, with the old President re-elected. I will not trouble you with many remarks, the printed report being just in your hands. Suffice it to say that in spite of the largest number of members we have ever had, the average attendance at each class has been below the mark; in other respects a most satisfactory session has been passed.

Having now glanced at the work of the Association since its rise, I wish to bear testimony to the way in which your committee have discharged their numerous duties, for in my opinion the well-being of the Association has depended very largely upon the official arrangements these gentlemen have made. Having had some opportunity of noticing, I will add that when unanimity has not prevailed, the minority have heartily aided in carrying into effect the wishes of the majority. One of the causes of success I think we find in the fact that our presidents have usually been those most eminent for their pharmaceutical knowledge, and have been most popular; in almost every case attending a large percentage of the meetings. In selecting our committees, the members have most wisely remembered that business skill and tact are oftentimes of equal value with technical knowledge; the one may provide the weapons, while the other will furnish the strong arms to use them. And now to turn to the most important source of the success that has attended us; it has been, we think, in the fact that the Association has always had among its members those who have made it a point to be present at most of the meetings, not always to obtain additions to their own information, so much as to support, by their presence and remarks, the interest of the less warm-hearted. Much good has also resulted from the great care shown by both juniors and seniors in avoiding, as subjects of conversation, the affairs of their principals; in our esteem, too much praise cannot be given on this account. The continual hearty support of the honorary members is the best proof of their opinion.

I wish also to allude to the prizes which have been occasionally given; the good effect of this has been evident in spite of the difficulties that must always attend the offering of rewards to small classes, when no easy means exist for the testing of the progress of the members during a given time; for let it be remembered that our prizes should not fall to the most advanced students, but to those who, by constant, steady attention, have gained, during the half-year, the largest accessions to their previous knowledge.

And now, gentlemen, it remains for us to look at the causes that may affect us in the future. In the first place it will be plain to you all that higher qualifications will be necessary for the future pharmacist than have been demanded in the past; not long will the nation be satisfied with unpassed men to dispense their prescriptions. The Council of the Pharmaceutical Society have already wisely decided that a three years' apprenticeship qualification shall be demanded of candidates for the Minor. You ask how will these arrangements affect our Association? I reply (bearing in mind the fact that at many establishments only apprentices who have passed the Preliminary are admitted), that we shall have a much larger number of students preparing for the Minor, and in these the strength of the Association will be found; for, having passed the Preliminary, these will be ready to study for the Minor, and being almost unable to obtain assistants' situations, if, at the expiration of their apprenticeship they remain unpassed men, they will probably, by earnest study, endeavour to fit themselves for the Minor ordeal by the time they attain their majority.

Another ground of hope for the future consists in the possessions of the Association, such as a well-stocked library, a working laboratory, a carefully arranged museum, and suitable rooms for the usual meetings. With these advantages, unenjoyed by the members of early sessions, the assistants and apprentices of the future should have an easy task before them to make the Society more flourishing than heretofore. But how is this to be obtained? First, by the committee arranging suitable classes and lectures—to find gentlemen to conduct these should be no very difficult task; secondly, the presidents should be those who will bring as far as possible honour to the chair; thirdly, the secretary should be most exact in all matters of detail, such as keeping the attendance list, the giving notice of all important lectures and meetings, together with placing the objects of the Association very conspicuously before each new assistant and apprentice entering the town; fourthly, each member upon joining the Association, should feel that it is his privilege and duty, either to bring new food for thought to the Society's meetings, or at least to make himself acquainted with all matters brought before the members by more advanced minds. If for a moment we think in what alone real success can consist, viz., the obtaining of as large an amount of knowledge as possible, by as many persons as possible, with the smallest outlay possible of time, energy, and money, we shall see to what a large extent the future of the Society depends upon the regular attendance of even the youngest.

And now, having looked at the prospects of our Association, and having seen much to encourage us, it remains with us either to allow the Society, of which it has been said, "It scarcely has its equal in the Midland Counties," to sink into oblivion, or to degenerate into a more social club, or to raise it into a far higher position than it has ever been its lot yet to enjoy. I leave the matter confidently in your hands, only reminding you that it is by individual effort alone that this can be achieved.

Now, gentlemen, with your permission I will offer a few brief remarks upon one or two matters affecting pharmacy. In the first place the Adulteration Act, although so faulty in itself, and administered more faultily, has been of very great service. Through its influence purer drugs are in better demand; official preparations resemble the Pharmacopœia in something more than name; and, although many incompetent analysts have been appointed, yet little harm, except in a few unjust convictions, have resulted from this. The three points in the Act that in our opinion require to be provided for, are—firstly, an authoritative standard of purity of most drugs and articles of food; secondly, a suitable examination to be passed by all gentlemen aspiring to the office of public analyst; thirdly, some provisions by which the retail trader can obtain compensation from the wholesale houses for any article supplied below the official standard.

In conclusion, I will draw your attention to the general prospect of pharmacy in this country. Doubtless, most of the members present have read the articles in the *Pharmaceutical Journal* upon the state of pharmacy in Germany. It must be with some degree of sadness that our fellow labourers on the Continent view the future of their profession, for the conclusions enunciated in these papers, will, I think, commend themselves to every thoughtful mind. But happily a different look-out greets us in England, for instead of a large body of ignorant chemists, we think the day is fast approaching when a much smaller body of well-educated chemists will perform, not only the dispensing duties of the druggists of to-day, but that large portion of it now consigned to the medical profession. Our only sign of downward tendency consists in the large increase of wholesale chemical manufacturers, which necessarily limits to very plain operations the manipulations of the retail laboratory. This, although upon the one hand to be deplored, is much to be welcomed, for perfection of product is not often easy of attainment with the use of small quantities. With these prospects before us, gentlemen, we have every reason to stimulate us to be earnest, patient students of the great book open before us.

Mr. E. H. Butter, in proposing a vote of thanks to the President for his address, congratulated the members on the election of Mr. Clark as President, and said, that whilst Mr. Clark had mentioned the part he and Mr. H. Cooper had taken in the formation of the Society, he had, with characterestic modesty, omitted to state that he himself had been one of the most active promoters of that movement. Mr. Butter also spoke at some length on the most important points of Mr. Clark's address, and remarked that the members might point with considerable satisfaction to the fact, that the gentleman who had been appointed public analyst for the towns and counties of Leicester, Rutland, and Northampton had occupied the Presidential chair of the Association, and had always been one of its most active supporters. He concluded by expressing his desire to do in the future, as he had done in the past, all that lay in his power for the welfare of the Association.

The vote of thanks was seconded by Mr. Wright, and carried with applause.

A vote of thanks was also proposed by Mr. Bishop, in an appropriate speech, to Messrs. Wright and Cadoux, for the time and trouble they had expended in preparing for the entertainment of the evening. Mr. Clark seconded, Mr. Cadoux responded, and the proceedings came to a close.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Friday, *August 7th.*

(*Continued from page* 200.)

The Analysis of Butter.

The President: After the reading of Mr. Stoddart's paper yesterday, I understand that a wish was expressed on the part of some gentlemen, especially interested in the question as analysts, to hear further details. Mr. Stoddart has this morning been kind enough to repeat his experiments in our presence, and he will now exhibit the results.

Mr. Stoddart: After leaving here last night, it was intimated to me that some of my results could not be correct, and to show you that they were correct, I thought I had better bring you the same experiment this morning. The consequence is, I have analysed part of my breakfast. In this tube is the milk which I poured out of the milk jug. At the bottom is the casein, and here are the salts. It is a very good milk, because it has four lines of fat, which is equal to 6·64 per cent. by weight of fat. Then I took a small pat of butter, which is in this tube, and it appears to be really pure butter. This deposit at the bottom is simply curd, which arises from the butter not being well washed—there is no adulterant. Here, on the other hand, is one which has 25 per cent. of something like lard in it. Here is the butter at the top, and the bottom is the white layer of lard. In this case you see there is no curd. This distinctly proves the value of these tubes, and that you may rely upon them. Mr. Squire has repeated the experiment, and has found it quite correct. I was asked yesterday, by Dr. Redwood, how you could distinguish fat from butter, and I replied that you could do so by ether. The bottle that I have this adulterated butter in was shaken up with ether, and at the bottom of the phial bottle you can distinctly see the difference between the two. The yellow butter is at the top, of course it is coloured with annato, or something of that sort, and the white sediment at the bottom is lard. When I mixed pure lard with ether, and held it in my hand, it was as clear and limpid as water. But when it got cold the lard entirely separated, showing that cold ether will not dissolve lard. So that if you avoid any warmth, of the hand or otherwise, you will find that ether will dissolve butter, but not lard. Of course I do not go so far as to say that an artificial butter could not be mixed up as described by Mr. Wanklyn, which I could not detect. I do not profess to know every fat that is made; I only say that, with the ordinary fats that are used, ether will distinguish between the two.

Professor Redwood: I am much obliged to Mr. Stoddart for having taken the trouble to demonstrate the fact which he has just put before the meeting, and which certainly, to some extent, is satisfactory; but I wish, however, just to put the matter to him in rather a different form from that in which he has explained it—probably somewhat in the form that he has referred to as having been adopted by Mr. Wanklyn. Of course we should all be ready to admit that there may be an adulteration of butter that may be detected by this or by other means; that is, there may be a fat, as I put it last evening, which would differ entirely in composition from the ordinary fat of butter—differ in the proportion of the constituent parts of the stearin, and palmitin, and olein, and which, therefore, would have a different melting-point; and seeing that the stearin and palmitin are not acted upon by solvents in the same way and to the same extent that olein is, it would be quite possible to indicate the presence of a fat of that description; suet, for instance, would be very easily detected. But what I meant to say, and what I still hold, is this, that if the butter, instead of being clumsily adulterated, has been dexterously adulterated, and if the foreign fat which has been introduced, is a fat having a similar composition to the butter fat, that is to say, if the proximate constituents are present in the same proportions as in ordinary butter, then it still remains to be shown how their presence is to be indicated. And I say, as I said yesterday, that if this method will indicate the presence of foreign fats in that way, it certainly will be a great step in advance. I think I understood Mr. Stoddart to say that, in one case, where lard had been treated with ether in the same way, it entirely separated. Now, I should like to ask him if there is absolute evidence of the entire separation of the whole of the lard.

The President: In this tube the lard appears partly in solution and partly not.

Professor Redwood: The question would amount to this: is it not the separation of the crystalline and more solid fats which are less soluble in the ether than the others?

Mr. Allen: I have taken a great interest in this explanation by Mr. Stoddart of Mr. Horsley's ingenious apparatus. When Mr. Horsley first published his pamphlet, he sent me a copy, and I very carefully tried this experiment myself, but I must say I did not succeed. I never could get the butter fat to assume this peculiar form in the tube; it always formed a spheroidal globule, so that I could not read it off. However, it is evident that in some way my manipulation was faulty, since Mr. Stoddart has succeeded very capitally. He told us just now that the milk he had for breakfast had upwards of six per cent. of butter fat in it; but it is a curious thing that when you estimate fat in other ways it does not yield more than three or three and a-half per cent.; therefore, I should like to know why it is we have upwards of six per cent. estimated in this way. It is very evident, I think, that the fat is not pure; it is liquid at ordinary temperatures, and shakes about in the tube in a very different manner to oil, and it is evident to me that it contains something else, I presume a mixture of ether not thoroughly separated. I presume, therefore, that in order to get the exact amount of the fat, we ought to drive off the ether, and dry it. With respect to the application of ether for the distinguishing of other fats in butter, I have used ether myself very frequently, and believe it is a most useful test for the purpose, and this seems a nice way of applying it; but I quite agree with Dr. Redwood that it is merely a question of stearin, which is the principal constituent of suet and lard, being less soluble in cold ether than the olein and butyrin contained in butter. To say that lard is not soluble in cold ether is merely to say that stearin is sparingly soluble in cold ether, and I think if Mr. Stoddart takes a given quantity of lard, and shakes it up in a given quantity of ether, he will find a portion of it will dissolve even in the cold ether. Then comes the question, if you have fats of the same constitution as this, in butter how are you to recognise the existence of foreign fats? You must remember that butter is peculiar in containing butyrin, that is, butyrate of glycyl. That is not found in any other animal fats, and it has been proposed, I think by an assistant of Dr. Hassall, to get an idea of the amount of butter in any mixture on this principle. If we saponify olein and stearin, we obtain a certain amount, I think about 95 per cent., of solid stearic acid. Now, if we take butter, we only get about 85 per cent. by weight in the form of insoluble fatty acids; therefore, there is a clear 10 per cent. difference to work upon. If we have butter we ought not to have more than 85 per cent., but if we have a mixture of foreign fats, it would go from that up to 95 per cent.

Mr. Ekin: I was rather surprised to hear Mr. Allen say that he found any difficulty in working that apparatus, because since Mr. Stoddart brought it under my notice I have tried it several times, and have never had the slightest difficulty. I cannot think that Mr. Horsley's directions have been properly followed, or there would have been no failure. Then as to the discrepancy Mr. Allen finds between his measure of the oil and the weight, I have checked it over and over again by weighing it, and found it quite accurate. Mr. Horsley tells you that a certain measure weighs so much, and that I have checked on several occasions, and found perfectly accurate. He says nothing in his pamphlet about butter, and that application of his apparatus is entirely due to Mr. Stoddart. The fact is indisputable that though we may talk very learnedly about stearin, butyrin, and so on, practically Mr. Stoddart has been doing for months now what I perceive, by reports in the papers, London analysts have not been able to do; he has condemned, and on the strongest grounds, I think, several samples of butter, and the consequence is that Somersetshire, at any rate, gets the benefit of it, for the butter supply is considerably improved there. I must add that I have been exceedingly struck with the extreme readiness with which Mr. Stoddart always imparts any fresh knowledge he obtains, to others. Indeed, he seems to take the greatest pleasure in doing so.

Mr. Allen: I should like to explain to Mr. Ekin, with regard to the proportion of weight and volume, that what I meant was this:—When we hear of upwards of 6 per cent. of butter fat being found in milk, I say that milk does not contain that amount, and therefore it is evident it must not be taken by the volume there. It may be that the volume always bears a certain proportion to its weight, but you cannot actually estimate the per-centage in such a way, because it is quite certain there is not 6 per cent. of fat in milk.

Mr. Ekin: I maintain that the volume of the oil is in direct and constant relation to the weight of pure butter fat.

Mr. Estcourt: I understood Mr. Stoddart to say there was 6 per cent. by weight of fat in that milk. Now I believe that percentage has never yet been found.

The President: May I ask Mr. Ekin whether he carefully dried the fat, and drove off any trace of ether there might be present in it before weighing.

Mr. Ekin: Yes, on several occasions. The fat was dried in a platinum capsule on a water bath, until it ceased to lose weight.

Mr. Allen: What weight does it dry to? It does not dry so as to leave you 6 per cent. of dry fat?

Mr. Ekin: The percentage of fat of course varies in different samples of milk. All I say is, that there is a constant relation between the weight and the measure, and that what Mr. Horsley states is correct.

Mr. Stoddart: I do not know whether Mr. Allen was present yesterday, but if he had been I do not think he would have said what he has. To say that milk has not 6 per cent. by weight of fat, is not correct, for Alderney cows to begin with, for I have cows at home which I milk myself that had 25 per cent. of cream thrown up according to the usual lactometer, and that which I brought up the day before yesterday in one of these tubes, showed 6 per cent. of fat in it. I then put 50 per cent. of water in the next tube to that, and that showed exactly two lines, whilst that with 25 per cent. of water showed exactly three lines. In a fourth tube I skimmed off the cream, and put 50 per cent. of water, and that showed one line. This process, therefore, is very consistent. I have tried it over and over again, thirty or forty times, and I really must say that if Dr. Voelcker, for instance, has any cows that do not agree with ours, he had better send them down to Somersetshire. There is such a tremendous difference of result between the London chemists' and Mr. Ekin's and my own examinations, that we cannot explain it at all. We can only suppose that our cows must be fed on better material, or that they are a different kind of animal. With regard to the fat in butter, I would ask Professor Redwood what fat there is that would resemble butter so closely, because I am not aware of any. I must confess that I had something to do with butter manufacture about ten years ago, and know something about it. In the first place you do not get absolutely pure lard; what is sold for lard being simply pieces of meat boiled in water and the fat skimmed off. To adulterate butter you must have something that pays; it will not do to make an expensive fat for this purpose, and I am not aware of anything that is cheaper except what I came across some months ago, when I found that a glue manufacturer was melting up the bits cut off the skins and selling it to mix with butter. I know, as a truth, that three hundred tins of butter were sent out of England about eight years ago, which only had thirty per cent. of butter in it, and about ten months afterwards an order came back for a repetition of the cargo, with the orders that it was to be exactly the same quality, because it was so much approved of. Now, such a thing as that must have been easily detected. I have had a lot of French butter in my laboratory, which has made quite a mess in the place from the water and salt running out at the bottom. Speaking practically, it would not pay to put less than twenty per cent. of fat into butter, and if you have such a mixture, and shake that up in a phial with cold ether, holding it by the neck so as not to warm it, if it is pure it will dissolve perfectly, but if there is anything foreign in it, it will go to the bottom. The only ground for mistake is this, that butter sold in the country very frequently has a quantity of whey with it, and thus you may have a curd going to the bottom. But that may easily be determined by putting a little on a glass slip and warming it. These experiments prove that two things in our ordinary books are wrong. First, that ether will not remove fat from milk, because here we see that it does so; and on the other hand I am satisfied that lard, or any other fat that I am aware of in the meat way, will not dissolve in cold ether. When I put the lard into some of Mr. Squire's ether just now, it was as clear as the water, because I held it in my hand, but in two or three minutes, when it got cold, it all separated.

Mr. Linford: Dr. Redwood alluded just now to the possibility of adulterating butter scientifically, and I may mention that not long ago I had the opportunity of seeing beef suet treated in such a way that its melting point was reduced to within two degrees of that of butter, and the consistency was almost the same as butter, so that with the addition of a very little butter to it, it was exceedingly difficult to tell that you were not eating good fresh butter. In that instance, pure fresh beef suet was used. Now, the question arises, how the alteration was made in the suet; that I was not able to learn, but it struck me it was attained in this way. We all know that if a piece of fresh meat containing fat is boiled and the fat skimmed off, the fat becomes soft and does not set hard, whereas, if the same fat be boiled in plain water without the lean meat, when the cake of fat is taken off it sets as hard as tallow. Now, I have very little doubt that whatever substance it is in the meat that prevents the fat acquiring the same melting point, was that which was made use of in this article. It is now exported very largely to France and sold as *beurre de cuisine*, and I believe a large proportion of it is re-imported and comes back here as the best Ostend butter. It would be interesting to find out if Mr. Stoddart could distinguish this from the ordinary butter as well as the lard.

Mr. Estcourt: I wish to call attention to the fact that Mr. Horsley gives himself as the quantity of fat in average milk, 3·32 per cent., and I should like to know how Mr. Stoddart arrives at his result of 6 per cent. by weight.

Mr. Stoddart: The average of milk is certainly 3·32. I do not say that this sample I have here is the average, I only say it is the simple fact that it contains 6 per cent.

The Conference then adjourned for luncheon.

On re-assembling at two o'clock, the first paper read was on—

Liquid Extract of Sarsaparilla.

BY H. BARTON.

At the present time sarsaparilla does not appear to sustain the high position once held by it as a remedial agent, and the question arises, were its reputed good qualities a delusion, or are the usual preparations of it defective? Looking into the older compendiums of pharmacy, such as Dr. Jourdan's Pharmacopœia Universalis, it becomes strikingly apparent that considerable boiling was thought an essential, and it is beyond question that well-boiled decoctions were in great favour; but when it became necessary to meet the demand for concentrated preparations, or liquors, it was, and with good reason, supposed that, however well decocting might exhaust the root, the continued application of heat dissipated into the surrounding atmosphere much of its peculiar aroma; also after a time the concentrated decoctions deposited in considerable quantity a something which would, most likely, contain further portions of their active properties. I used to dispense a much-prized old prescription, written by the late Dr. Scott, of Bromley, principally, Pulvis Radicis Sarzæ, the verbal instruction to the patient having been, "Mind where you get this, and do not be persuaded to take any of the concentrated decoctions; I have no faith in them."

We now come to the truly "elegant extracts," the preparations *par excellence* for appearance and good-keeping qualifications, those made by cold or moderately hot infusion and careful evaporation, leaving, so far as appearance is concerned, nothing to be desired; but, looked at in the light of a more than usually interesting reprint, which appeared in the *Pharmaceutical Journal* some thirty one years ago, of a paper read by Mr. T. J. Husband, of the Philadelphia College of Pharmacy, I much fear these "elegant extracts" are at the bottom of the present lukewarm reputation to which, in this country, the drug has descended. Mr. Husband advocated the use of alcohol in the processes for preparations of sarsaparilla, and expressed fear that the permission to make compound syrup by a cold water method would result in the destruction of its valuable character. His experiments and the report of the committee to whom his paper was referred, appear well worthy of re-perusal and consideration at the present time. Bearing them in mind, I have for the last ten years departed somewhat from the *letter* of the official process, and thrown rather more *spirit* into the fluid extract in the following manner:—Each ten pounds of select fibrous root, after being dried and coarsely powdered at a loss of about 8 per cent., has been equally moistened with a gallon of dilute alcohol, containing 25 per cent. of 60 over-proof spirit, and set aside for ten days, then pressed, giving up 65 to 68 ounces of fluid, the pressed root well worked up with five gallons of water at 160°, set aside for about sixteen hours, and again pressed, the watery solution decanted and evaporated to about ten pounds, filtered, and further reduced to make, with the spirituous portion, 80 fluid ounces. Prepared in this way the liquid extract retains more of the taste and smell of sarsaparilla than a liquor made in strict accordance with the letter would do; still to my mind it is not a satisfactory preparation, nor in any respect equal to the following unorthodox sample:—

Take 40 ounces similar root, dried and coarsely powdered, moisten with 40 ounces *proof spirit*, set aside ten days, press from it 20 ounces; macerate the pressed root for sixteen hours with 15 pounds of water at 160°, press, decant the liquid into a water-bath, adding 8 ounces of sugar, and evaporate to produce, with the spirit portion, 40 ounces, each f℥j representing ℥j of the root. Thus prepared, the proof spirit is very much charged with the odour and taste of sarsaparilla, and has to a high degree the frothing characteristic; again the addition of a little sugar to the aqueous solution exerts a marked influence during evaporation, filtering being unnecessary, the finished product depositing scarcely anything. It may be said there is considerable loss of spirit; loss I admit, but waste I do not think; that remaining in the bulky pressed powder, is rapidly diffused in the hot water, and, although dissipated during subsequent evaporation, would leave in the saccharated solution what it had dissolved. One further experiment: 1 lb. transversely cut select root was digested as directed in the Pharmacopœia in two waters at 160°, kept hot during the twelve hours; the second portion pressed away by hydraulic force to exhaust the root so far as this process can do so; the liquid reduced in water bath, at a temperature never exceeding 165°, to make with the spirit fl. ℥viii. The root having been redried and bruised was moistened with 16 oz. proof spirit, set aside four days, when it was again pressed, and from it obtained a fluid, a little of which, added to water and shaken, froths up, developing the odour in a decided degree; or a few drops tasted, leaves upon the palate a persistent rather pungent taste, showing that digestion with seventeen and a-half times its weight of water at 160°, and pressed away by a force not always applied in practice, still leaves the root retaining much that we should suppose ought to have been in the "Extractum sarsæ liquidum."

The President: We have to thank Mr. Barton for an account of the experiments he has carried out, as I have no doubt you will do. The preparation, made by treating the root first with proof spirit, and subsequently with water and sugar, appears to me to be a very capital sample of Liquor sarsæ; it contains more of the active principle than usual, which I think depends upon saponin. I think it is that which causes that frothing and also that turbidity when a sarsaparilla preparation is treated with an acid. I have long been of opinion that the comparative value of sarsaparilla preparations would be indicated by the amount of turbidity caused by acidulating them with hydrochloric acid. There is no doubt that in southern countries the use of sarsaparilla is attended with far more benefit than it is here. In many cases it, and nothing else, is used for the cure of syphilis.

The vote of thanks was passed unanimously.

The next paper read was—

A Note on the Administration of Phosphorus.

BY JOHN WILLIAMS, F.C.S.

A short time since I had occasion to prepare a solution of phosphorus in mixed alcohol and glycerine. The form is given, though not quite accurately, in the *Pharmaceutical Journal*, No. 191, page 684, but practically it may be considered to be a solution of 12 grains of phosphorus in 9 fluid oz. of alcohol, to which 9 fluid oz. of glycerine is afterwards added; it consequently should contain $\frac{1}{75}$th grain of phosphorus to each fluid drachm.

The solution of the phosphorus in alcohol is not easily effected; in the cold, alcohol hardly acts upon the phosphorus. To effect the solution it is necessary that the alcohol should be heated, and kept at a temperature rather under its boiling point until the solution is complete. I find it requires from 12 to 24 hours to dissolve the 12 grains of phosphorus in the 9 oz. of alcohol, and it must be done either in a flask or retort so arranged as to condense and retain the spirit. A flask immersed in a water bath, fitted with a good cork, through which passes a long narrow tube three or four feet long, answers very well, the alcohol condensing in the tube, and dropping back into the flask, and unless the alcohol is made to actually boil, the loss of the spirit is quite trifling.

This process is of course a very tedious and troublesome one, and it struck me it might be possible to materially simplify it by reversing the mode of proceeding, and upon trial it was found that hot glycerine easily dissolves phosphorus, although most of it is deposited on the cooling of the glycerine. Still some is retained in solution, as can be proved by adding it to a solution of chloride of gold, when purple gold is at once precipitated.

To make the solution of phosphorus, therefore, 12 grains of phosphorus were dissolved by shaking for a few minutes in 9 fluid oz. of pure glycerine, heated in a bottle sufficiently large to hold three times the quantity, and then the absolute alcohol, previously heated to an equal temperature, was added, and the whole well shaken for a few minutes. In this way, a perfect solution was effected in as many minutes as it required hours to do it by the other process; but it was found, that although the solution was perfect at first, some phosphorus was always deposited by standing for about 12 hours. This was very puzzling, and led me to examine the two solutions more carefully, as it was evident that 12 grains of pure phosphorus was more than could be held in solution by 18 fluid oz. of mixed glycerine and absolute alcohol.

Upon testing the two liquids diluted with water, it was found that the alcoholic solution of phosphorus was highly acid, while the recently prepared glycerinic solution hardly reddened litmus paper; thus proving, what might have been predicted, that a large proportion of the phosphorus was oxidized during the long digestion in hot alcohol, while that hardly occurred in the glycerine solution.

I have attempted to determine the quantity of real phosphorus (unoxidized) retained in the two solutions, and although my experiments have not proved quite conclusive, they still possess some interest.

If we add a solution of phosphorus to bichloride of mercury, reduction occurs on boiling, and calomel is precipitated. If we suppose phosphorus becomes entirely phosphoric acid, and that the precipitate is entirely calomel, as shown in the following equation—

$$P_2 + 10HgCl_2 + 5\,H_2O = P_2O_5 + 10HCl + 10\,HgCl\ ;$$

then 62 grains of phosphorus should produce 2350 grains of calomel, or 1 grain of phosphorus $= 37{\cdot}9$ of calomel. Of course the amount of oxidation of the phosphorus ought to be shown by the deficiency in the amount of calomel produced, and as each fluid ounce of the solution of phosphorus is calculated to contain $\frac{2}{3}$ grain of that body, we ought to obtain, in round numbers, 25 grains of calomel from that quantity.

A trial was made by dissolving 5 grains of phosphorus in sufficient alcohol as rapidly as possible, and with the least possible exposure to air. It should have yielded 188·6 grains of calomel—it only yielded 131·0 grains, thus nearly one-third of the phosphorus was oxidized.

In another instance, where the solution had been effected in a large flask, and had required application of heat during twenty-four hours, the amount of calomel produced from the solution of $\frac{2}{3}$ grain of phosphorus, instead of being 25 grains, as theory indicated, only gave 4 grains, thus proving that hardly any phosphorus as such remained in the solution.

Testing the glycerinic solution of phosphorus prepared as previously described, and after it had deposited its excess of phosphorus, I obtained 11 grains of calomel from one ounce instead of 25 grains, which it ought to have yielded, had the whole of the phosphorus remained in the liquid. This would show that rather more than half the phosphorus is deposited, and that $\frac{1}{24}$ grain is nearer the quantity which can be held in solution in an unoxidized condition than $\frac{1}{12}$ grain.

However, there are several reasons why the results of these experiments are not conclusive. Not only phosphorus itself, but the lower oxides of phosphorus, equally reduce chloride of mercury, and although I thought I might have been able to obtain some constant by which I could calculate the proportion between the unoxidized and the oxidized phosphorus, I have not succeeded in doing so. We must also remember that the precipitate may consist partly of phosphate of mercury; and I think it likely if the phosphorus has been oxidized to the state of hypophosphorous acid, that some at least of the mercury might form hypophosphite of mercury, and thus remain in solution, and this may account for the very low per-centage of calomel I have sometimes obtained.

Considering the whole matter, however, I think the glycerinic solution of the phosphorus a very good and advantageous form of exhibiting this element; that it contains the phosphorus in an unoxidized condition is easily proved by adding some to water, when the phosphorus is separated in a milky form. The taste also is very marked, for, although sweetened somewhat by the glycerine, the strong garlic-like flavour of the phosphorus is very pronounced.

I think if such a solution as I have described should be employed in medicine, caution should be used as to the dose to be administered, as I am strongly of opinion that many of the preparations in use, and supposed to contain a certain per-centage of real phosphorus, would, if carefully examined, prove to contain it in a condition more or less oxidized, and thus medical men may have been deceived as to the real maximum dose proper to be administered.

A vote of thanks was passed to Mr. Williams.

The President: The use of phosphorus is now becoming very general, I suppose from our overtaxed brains requiring a little stimulus of that kind. I hope, therefore, that Mr. Williams's experiments will tend to make its exhibition more controllable than it has hitherto been.

Mr. Umney: I look upon Mr. Williams's experiments as very valuable. I should like to ask him whether he subjected the alcohol to any special treatment before he made these experiments in order to determine whether it contained any acetic acid, aldehyde, or any of the other bodies which are frequently present in alcohol.

Mr. Williams: I used pure absolute alcohol, not ordinary spirit.

Mr. Martindale: The disagreeable taste of phosphorus when administered in a liquid form, is objectionable, but the glycerine solution seems to be a very elegant method of giving it. I did not quite catch the strength which Mr. Williams would recommend.

Mr. Williams: I believe the right strength which can be made practically is from $\frac{1}{30}$ to $\frac{1}{24}$th grain in each drachm of absolute alcohol and glycerine in equal parts.

The President: What is the medicinal dose?

Mr. Williams: From $\frac{1}{30}$th grain to $\frac{1}{10}$th grain, but I should be inclined to take a somewhat smaller dose.

The President: That would be about one drachm of the glycerine solution to a dose.

The Utilization of Iodoform Residues.

BY EDWARD SMITH, F.C.S.

Iodoform, or tri-iodomethane (CHI_3,) may be obtained by the action of caustic or carbonated alkalies on ethyl alcohol, acetone, aldehyde, and several other bodies. It is, however, I believe, very generally prepared according to the well-known formula of Wittstein, by heating in a water-bath a mixture of iodine, ethyl alcohol, potassium carbonate, and water, until the reaction is completed, and the liquid colourless. Wittstein does not recommend any particular temperature, other than that of a water-bath, but says, "The receiver must during the operation be well cooled."

I have found that if the temperature is kept down to 68°—70° C., there is no necessity to attach a receiver, since but very few cubic centimetres of condensible bodies pass over. I use a glass flask fitted with a thoroughly sound cork, through which passes a long (———) tube protruding half an inch or so into the flask, and exteriorly bent at an obtuse angle, so that any fluid condensed in the tube runs back into the flask.

The yield of iodoform is from 16 to 17 per cent. of the weight of iodine employed. The reaction is somewhat complicated, but may be written thus :—

$$7\,I_2 + 6\,K_2CO_3 + C_2H_6O + n\,H_2O =$$
$$CHI_3 + KCHO_2 + 6\,CO_2 + 10\,KI + KIO_3 + 2\,H_2O + n\,H_2O.$$

This does not express the exact reaction, for then 7 molecules of iodine should yield one molecule of iodoform ; or about 21 per cent. of iodine employed should be utilized in building up iodoform, but this per-centage is never reached in practice. Five-sixths ($\frac{5}{6}$) of the iodine is found in the filtrate from iodoform as iodide and iodate of potassium together with some little potassium formate, produced during the operation, and the excess of potassium carbonate. Wittstein secures the iodine in this residue by evaporating to dryness, and heating to redness with "powdered wood charcoal," digesting with alcohol, filtering and evaporating to crystallization. This answers well when large quantities are operated upon, but, upon a small scale, such as most pharmacists would undertake, the iodide does not come out well.

Rother (*Pharm. J.* [3], vol. iv., p. 594,) has propounded a method of overcoming some of these difficulties, by freeing the iodine in the residue by an acid in conjunction with acid potassium chromate; more iodine and potassium carbonate are then added, and the mixture heated. In this way successive crops of iodoform are obtained, the last filtrate, however, still holding iodine.

The process I have devised, and successfully employed many times, to secure the whole of the iodine in a useful form from the filtrate, is as follows :—

The filtrate from the iodoform consists essentially of—

$$n\mathrm{KI} + n\mathrm{KIO_3} + n\mathrm{K_2CO_3} + n\mathrm{KCHO_2} + n\mathrm{H_2O}.$$

If now a stream of sulphuretted hydrogen be passed through the solution the iodate is reduced to iodide, and sulphur is precipitated, according to the equation :—

$$KIO_3 + 3\,H_2S = KI + 3\,H_2O + 3\,S.$$

The solution is now gently warmed to expel excess o sulphuretted hydrogen filtered to remove sulphur ; and whilst warm, cautiously neutralized with nitric acid, to drive off the carbon dioxide from the potassium carbonate. We now have in solution simply :—

$$n\mathrm{KI} + n\mathrm{KCHO_2} + n\mathrm{KNO_3} + n\mathrm{H_2O}.$$

To this is now added lead nitrate until all the iodine i precipitated :—

$$2\,KI + KNO_3 + KCHO_2 + Pb\,2\,NO_3 =$$
$$3\,KNO_3 + KCHO_2 + PbI_2.$$
s

If by chance the PbI_2 should carry down a trace of lead formate, very slight washing removes it, inasmuch as the formate is soluble to the extent of about 1 part in 40 of water, whilst PbI_2 is practically insoluble in cold water.

The following, taken from my laboratory note-book, will show the results of actual working :—

96 grams iodine were heated, in a water-bath, at 68° C. with alcohol, potassium carbonate, and water, until all action ceased ; solution filtered, the iodoform washed and dried ; weight = 15 grams. Now, 15 grams iodoform contain 14·5 grams iodine ; therefore, leaving 81·5 grams iodine in filtrate. H_2S passed through solution to excess, filtered, neutralized with nitric acid and finally lead nitrate added, the resulting precipitate washed and dried ; weight = 146·0 grams. Theoretically, the 81·5 gr. iodine should yield 148·0 gr. very nearly, so that the difference, viz. 2·0 gr. lead iodide, which contain 1·1 grams iodine, represents the loss of iodine. Working on a small scale, the loss of iodine, therefore, barely exceeds 1 per cent, and, doubtless, working with larger quantities, a proportionately less percentage of loss would be realized.

The product obtained (PbI_2) is one of common use in pharmacy.

Rother, in the paper above referred to, states that "the most satisfactory results are obtained by the use of wood spirit. In this case the yield of iodoform, at each operation, exceeds one-third the weight of iodine used." "An exceedingly irritating gas (to the eyes) is simultaneously evolved." I am unable to corroborate this statement. I have observed that different samples of methylic alcohol yield very varying amounts of iodoform. I doubt very much if *pure* methylic alcohol yields any iodoform whatever. The product obtained by operating upon commercial methylic alcohol is, in all probability, derived from acetone or some analogous body, invariably present in the wood spirit. The gas evolved may be methylic aldehyde, which, of course, would very speedily absorb oxygen to form formic acid. At the present moment, however, I am unable to speak with certainty. I propose, therefore, at some fitting opportunity, to operate upon *pure* methylic alcohol obtained from methyl oxalate, and thus set at rest the question whether or not methylic alcohol yields iodoform.

A vote of thanks having been passed to Mr. Smith.

The PRESIDENT said : There are not many pharmacists who, like Mr. Smith, will take the trouble to make iodoform, a thing not very frequently used, or required in large quantities ; but I know that he makes a point of making everything that can be made with any advantage, and I wish his example were more frequently followed.

Mr. STANFORD : May I ask Dr. Attfield to read again the portion which refers to the precipitation of iodine by charcoal.

Professor ATTFIELD, having re-read a passage from the paper, said : That is simply to take away the oxygen from the iodate. I have never found any difficulty in obtaining iodine itself from such a residue, not only by merely adding a little nitric acid, as recommended by Mr. Smith, and then iodide of lead, but by continuing the addition of nitric acid; hydriodic acid is set free, and then on gently warming it the nitric acid attacks the hydriodic acid, and you get free iodine which you can collect and wash. With regard to methylic alcohol, there is one very good method, I think, of obtaining it, that is, by treating common wood spirit with chloride of calcium, evaporating to dryness, and pretty strongly heating the residue—not enough to char the compound, but to get rid of any volatile matters ; then add water, which decomposes the crystalline compound of chloride of calcium with methylic alcohol which is formed, and distillation gives you methylic alcohol, which one or two fractional rectifications will render nearly pure.

Mr. WILLIAMS : Some of Mr. Smith's results do not quite accord with my experience, because, in making iodoform, there is, no doubt, a large quantity of volatile compounds of iodine—iodide of ethyl, for instance—always produced ; and a considerable loss of iodine, much larger than Mr. Smith speaks of, occurs from the volatilization of this organic compound. I do not think it would be possible to carry on the process with a loss of only 1 per cent. of the iodine used, for I have never succeeded in doing it without a loss of nearly 10 to 15 per cent.

Professor ATTFIELD : Mr. Smith would probably condense the volatile compounds in his long tubes, though something would depend on their length.

Mr. STANFORD : When Professor Attfield first read the paper, I thought allusion was made to a method of precipitating iodine by charcoal, but I find that is not the case. I asked the question because the affinity of charcoal for iodine is so remarkable. It has been one of the greatest difficulties I have met with, in making seaweed into charcoal instead of kelp; we can produce about three times the amount of iodine obtained in the ordinary way, but there is an extreme difficulty in washing the charcoal; in fact, washing the iodine from the charcoal on a large scale is really impossible. We are obliged always to use caustic soda for the purpose. As an iodine manufacturer, I must say I feel bound to discourage as far as possible any method of saving iodine, for what we want is some new method of securing a better outlet for it. I should like to add that none of these processes which have been constantly brought forward for the manufacture of iodine have ever been successful in the manufacturer's hands. The old process of distillation with manganese and sulphuric acid is still followed just as it was twenty years ago, though the form of the apparatus is a little altered. The reason of this is that none of the new processes will produce iodine in a dry commercial state; whilst the old method of employing a large quantity of oil of vitriol enables the iodine to be got at once in a perfectly dry form, and fit for the market.

Syrups containing Phosphoric Acid.

BY SILAS DANIEL.

The difficulty of preparing chemical food according to the formula published in Parrish's "Practical Pharmacy" is well known. The phosphate of lime is only partly soluble; the strict operator is puzzled to know how much the syrup should measure when completed. He probably thinks that he has solved the difficulty when he finds in the description of the syrup that each teaspoonful contains "about" 1 gr. phosphate of iron, and $2\frac{1}{2}$ grs. phosphate of lime. Beginning with the lime phosphate, he finds that to agree with the description, the syrup should measure 36 fluid ounces. Attempting to check these figures, he calculates the quantity of ferrous phosphate produced —supposing all the iron to be utilized, which, as will be shown, is not the case—he finds that if he makes 36 fl. ozs. of syrup, each fl. drachm will only contain ·894 of a grain of phosphate of iron. As is now shown in recent works on elementary chemistry, when phosphate of soda and sulphate of iron are mixed together, sulphuric acid is liberated, $2\,Na_2HPO_4 + 12\,H_2O + 3FeSO_4,7H_2O = Fe_3P_2O_8 + 2\,Na_2SO_4 + H_2SO_4$, which would dissolve a portion of the newly formed phosphate.

Again, can a syrup be made to contain 40 ozs. (apothecaries') of sugar, besides several kinds of phosphates and acids, and be limited to 36 fl. ozs., and have all its constituents in solution? It is palpably impossible. Neither is the difficulty removed by using phosphate of lime, made by double decomposition from chloride of calcium and phosphate of soda, and a smaller quantity of sugar. The phosphate readily dissolves in the acid, forming a strong solution; but immediately sugar or syrup is added, in spite of a liberal use of hydrochloric acid, a gelatinous precipitate is the result.

An elegant syrup, of definite composition, and which keeps fairly well, may be made by using tribasic acid. The method I adopt is as follows:—

Syr. Ferri Phosph. Co.

Sulphate of Iron	671	grains.
Phosphate of Soda	2503	"
Acetate of Soda	222	"
Chloride of Calcium	585	"
Carbonate of Soda	40	"
Carbonate of Potash	60	"
Cochineal	120	"
Phosphoric Acid, syrupy, sp. gr. 1·5	30	fl. drachms.
Sugar	24	ounces.
Orange Flower Water	1	"

Dissolve the sulphate of iron in 3 ozs. and the acetate and 600 grains of the phosphate soda in 8 ozs. warm distilled water. When quite cold, mix the two solutions, and, after careful stirring, wash the precipitate, by means of decantation, with distilled water, and collect on a filter. Dissolve the chloride of calcium in 1 oz., and the remainder of the phosphate in 17 ozs. warm distilled water. When cold mix the two solutions, wash by decantation, and collect on a calico filter. After draining submit the precipitate to strong pressure. Dissolve the two precipitates in the acid. To the solution add the carbonates, which should first be rubbed down in a mortar with a few drops of distilled water.

The cochineal having been reduced to a very fine powder, is mixed with the sugar and 13 ozs. of distilled water, and the whole raised to the boiling point. Strain through flannel, and when quite cold add the orange flower water, the solution of phosphates, and distilled water, if necessary, to make 36 fluid ounces.

By boiling the sugar and cochineal a bright syrup of rich colour is produced. It contains 1 gr. phosphate of iron, $2\frac{1}{2}$ grs. phosphate of lime, and fractions of grains of phosphates of soda and potash and acid equal to about 35 min. acid. phos. dil. B.P. in each fluid drachm. Sp. gr. 1·308.

The difficulty of keeping unchanged syrup of phosphate iron, B.P., for any length of time has been recognized by all. Several chemists have at various times made experiments with a view of preventing this change, but to the present time no satisfactory result has been ascertained. Recognizing this, Mr. Carteighe, some time ago,* in order that it might be made with greater facility, at shorter intervals, published formulæ for shorter processes for this and other allied syrups, in which phosphoric acid, sp. gr. 1·5, is used, instead of the ordinary dilute acid of the Pharmacopœia. As the phosphates to be used in these processes were only to be a few days old, and would practically have to be made purposely, it is very questionable whether the processes would be shorter than the B.P. method. More recently, two writers have proposed a liquor ferri phosphatis to be mixed with the syrup when required. It has been stated that the solution keeps for an indefinite length of time. It becomes interesting to know whether it is as stable as has been claimed for it. In the early part of last December I prepared solutions of phosphates of iron, iron and manganese, iron and lime, and manganese. Bottles were filled with the solutions and placed in a dark cupboard. In June last, six months after having been made, no change was perceptible. Being out of the syrup I had to open the bottle and use some of the liq. ferri phosph. Since that time a slight but distinct deposit has taken place, whilst the colour has remained unchanged. The latter fact seems to confirm the conclusions of the President of the Conference, that the dark colour is due to the production of caramel by the action of the phosphoric acid and the iron salt upon the sugar.† The brown tinge noticeable in all the solutions containing ferrous phosphate is the same as when first prepared, and is probably due to the partial oxidation of the salt during washing. It is not discernible when mixed with syrup. Considering the length of time the solution has been made, the amount of deposit is very small, and consequently the solution is an excellent method of preserving the salt.

In the following formulæ the proportions of phosphoric acid and phosphates correspond to those given by Mr. Carteighe:—

Liq. Ferri Phosphatis.

Sulphate of Iron	224	grains.
Phosphate of Soda	200	"
Acetate of Soda	74	"
Phosphoric Acid, sp. gr. 1·5.	7	fluid drachms.
Distilled Water	q. s.	

* *Pharmaceutical Journal*, 3rd series, i., 761.
† *Ibid.*, 2nd series, vol. xi., p. 138.

Dissolve the sulphate of iron in 1 oz., and the phosphate and acetate of soda in 2½ ozs. of warm distilled water. When quite cold, mix and well stir the two solutions, allow to remain for a few minutes and then wash the precipitate, by means of decantation, with distilled water. Collect the precipitate on a filter and allow to drain. Lastly, add it to the phosphoric acid and make up, with distilled water, to 2 fluid ounces. One fl. drachm is equivalent to 6 fl. drachms of syrup.

The tediousness of washing the precipitate as ordered in the B. P. is well known. I have not been able to find, but I have some recollection of a paper by Mr. Groves, suggesting, in order to obviate the difficulty, that after mixing the two solutions, the whole should be boiled for a few minutes, using one-fifth more of each ingredient to make up for the phosphate of iron dissolved in the process. That method appears to me unreliable and unnecessary. Would the quantity of phosphate dissolved be always the same? In the process I have given, the salts are dissolved in just sufficient water to yield nearly saturated solutions at a temperature of 60° F. Warm water is given merely to facilitate the dissolving. In this way the phosphate sinks rapidly, and is easily washed by decantation.

Liq. Ferri et Mang. Phosph.

Ferri Sulph.	168 grains.
Manganesii Sulph.	113 ,,
Sodæ Phos.	247 ,,
,, Acet.	93 ,,
Aquæ Destillatæ	q. s.
Acid. Phos. Glacial.	ʒvi.

Dissolve 150 grains phosphate and 56 grains acetate of soda in 2 ozs., and the sulphate iron in 6 drachms of warm distilled water, and allow to cool. Wash and collect the precipitate as directed in the last. Dissolve the sulphate of manganese in 6 drachms, and the remainder of the phosphate and acetate of soda in 10 drachms of warm distilled water. Mix the two solutions. Wash and collect the precipitate as the preceding ones. Add the glacial acid to the two moist precipitates, and when dissolved filter and add distilled water to 2 fluid ounces; 1 fluid drachm is equivalent to 6 fluid drachms of syrup. The syrup when made will contain ⅔ grain phosphate of iron and ⅓ grain phosphate of manganese in each fl. drachm.

Glacial acid has been used in this preparation, as directed in the *Pharmaceutical Journal*, vol. i., 3rd series, p. 288. It has kept admirably.

Liq. Ferri et Calcis Phosph.

Sulphate of Iron	224 grains.
Phosphate of Soda	200 ,,
Acetate of Soda	74 ,,
Phosphate of Soda	508 ,,
Chloride of Calcium	156 ,,
Phosphoric Acid, sp. gr. 1·5	8 fl. drachms.

The ferrous phosphate having been prepared as before directed, dissolve the remaining phosphate of soda in 5 ozs., and the chloride of calcium in 3 drachms, of warm distilled water. When cold, mix the two solutions, stir and wash. Collect the precipitate on a calico filter, after draining, press it firmly until the weight of the moist phosphate is reduced to 6 drachms. Dissolve the two precipitates in the acid and add distilled water, if necessary, to make 2 fluid ounces. One fluid drachm is equivalent to 6 fl. drachms of syrup, which when made, will contain 1 grain of phosphate of iron and 2 grains of phosphate lime in each fluid drachm.

Liq. Ferri et Strychniæ Phosph.

Sulphate of Iron	448 grains.
Phosphate of Soda	400 ,,
Acetate of Soda	148 ,,
Phosphoric Acid, sp. gr. 1·5	10 fl. drachms.
Strychnia in crystals	3 grains.
Distilled Water	q. s.

Dissolve the sulphate of iron in 2 oz., and the acetate and phosphate in 5 oz., warm distilled water. Wash and collect on a calico filter. After draining, press out some of the remaining water. Dissolve the precipitate and the strichnia in the acid, and add distilled water, if necessary, 2 fl. ounces. One fluid drachm diluted to six drachms with simple syrup will contain in each fluid drachm 2 grains phosphate of iron and $\frac{1}{32}$ of a grain of strychnia.

Liq. Ferri et Quinæ Phosph.

Sulphate of Iron	448 grains.
Phosphate of Soda	400 ,,
Acetate of Soda	148 ,,
Phosphate of Quinine	96 ,,
Distilled Water	q. s.
Phosphoric Acid, sp. gr. 1·5	9 fl. drachms.

Prepare the ferrous phosphate in the same manner as directed for liq. ferri et strychnia phosph., and dissolve it in the acid, and make up with water to 2 fl. ounces. The phosphate of quinine is best added when required.

Syr. Ferri et Quinæ et Strychniæ Phosph.

As has been pointed out, this preparation neither in solution nor in syrup will keep without becoming discoloured. It may be made by adding 6 gr. phosphate of quinine to each fl. drachm of the liquor, or 1 gr. to each fl. drachm of the Syr. Ferri et Strychniæ Phosph.

Liq. Zinci Phosph.

Most chemists keep phosphate of zinc, and, as its solubility is not impaired by keeping, it is best made direct in the manner directed by Mr. Carteighe.

Liq. Manganesii Phosph.

Sulphate of Manganese	226 grains.
Phosphate of Soda	194 ,,
Acetate of Soda	74 ,,
Phosphoric Acid (1·5)	7 fl. drachms.
Distilled Water	q. s.

Dissolve the sulphate of manganese in 1 oz., and the phosphate and acetate of soda in 2½ oz., of warm distilled water. Mix the two solutions. Wash by decantation. Collect on a fine calico filter, and, after draining, press out a portion of the remaining water. Dissolve the precipitate in the acid, and add distilled water, if necessary, to 2 fl. ounces.

One part made up to six with simple syrup will contain in each fl. drachm 1 grain of phosphate of manganese.

The PRESIDENT: Mr. Daniel's formulæ seem to be well thought out and well worked out, and perhaps will be useful to many of us. These syrups are often ordered, and what we want is a rapid mode of making them. The great obstacle to rapidity is the difficulty of washing the precipitate, and I prefer mixing the solutions hot and boiling them. I find that, if instead of using acetate of soda I use carbonate, I get a better result. I mix the phosphate of soda and sulphate of iron, and boil them rapidly; I get of course a precipitate, and a certain amount of phosphate dissolved. Then I put in carbonate of soda as long as effervescence ensues, and I get thrown down a granular precipitate, which is very easily washed. In this way I have been enabled to make syrup of phosphate of iron in about an hour. Omitting acetate of soda does not entirely prevent colouration, though it does so to some extent. I know some have said that the colouration of the syrup of phosphate of iron is due to the formation of peracetate of iron, but that is not so, because syrup made without acetate also colours, though it takes a longer time. I have now to ask you to pass a vote of thanks to Mr. Daniel.

The vote of thanks was passed unanimously.

Mr. EKIN: I have found that the acid solution of the precipitated phosphates will keep for years without the sugar, and the way I manage is to keep a quantity of that, and make the syrup in small quantities as it is wanted.

Mr. Umney: I can quite corroborate what Mr. Ekin has said, for I have for years made a solution of phosphate of iron which I have found to keep very well. There can be no question that the use of dilute phosphoric acid in pharmacy for the manufacture of these syrups will eventually be abandoned, and that the precipitated ferrous phosphate will be dissolved in a concentrated phosphoric acid (1·500 specific gravity containing about 49 per cent. of anhydrous acid, answers excellently). Such a solution will keep perfectly well, and may be added to the simple syrup when required. I have made a solution eight times the strength of the Pharmacopœia, which can be diluted when required by the addition of simple syrup, and in this way one can get a preparation equal, if not superior, to that of the Pharmacopœia.

Mr. Smith: I should like to ask these gentlemen if they do not find a small deposit at the bottom of the bottles of the acid solution. I have made the solution with strong phosphoric acid, and have sometimes found there has been a deposit.

Mr. Ekin: I did not use the strong phosphoric acid, but the dilute acid of the Pharmacopœia, and proceeded precisely the same as the Pharmacopœia orders. The solution thus made keeps, to my knowledge, for three or four years without the slightest change.

Mr. Giles: I should like to ask a question about the precipitation, which the writer seems to think the most tedious part of the process. The phosphate of iron, when first thrown out of solution, appears to subside very tardily, but after it has subsided, and you have decanted one lot, and added water, it precipitates very rapidly, so that you can speedily throw it on a calico filter and squeeze it dry. Finding the first subsidence is so tedious, it occurred to me, that perhaps if more water were used in the first place it would subside more quickly.

The President: Perhaps the hydrated phosphate breaks up and loses its water of hydration.

Professor Attfield then read the following paper by Mr. Heathfield:—

Notes on Extracts of Aconite, Belladonna, Hemlock, Henbane, and Colchicum.

BY W. E. HEATHFIELD, F.R.S.E., F.C.S.

The consideration of this question requires that a distinction should be made between the first four of this group and the last, for whereas in the former the fresh expressed juice contains the starch, albumen, and chlorophyll in a condition of assimilation, in the latter the starch separates at once from the cold liquor, and can be washed so as to leave it tasteless. Thus it is presumable that, in preparing the extract of colchicum, we may be allowed to separate the fœcal part in its natural state, before we deal with the clear expressed juice. Those excellent preparations introduced by Professor Bentley, under the name of expressed juices, and of which the late Dr. Pereira had so high an opinion, save that the large quantity of liquid along with them made them less facile in administration, are good examples of the value of processes undisturbed by heat, where heat, as in the case of these extracts, produces a decomposition. As we do not know, from a hygienic point of view, the exact part that the chlorophyllic and albumenoid substances act in the economy of the medicine, so should we be careful in dealing with separations necessarily accompanying the somewhat rude operations of inspissation. Dr. Pereira was of opinion that the albumen of conium juice, when coagulated, retains a portion of the active principle, mechanically or chemically combined. And the balance of affinities is so much upset by the action of heat that if one element is to be rejected it is difficult to tell where to cease. The chlorophyll separated, the albumen removed, the large proportion of chlorides freed, as it were, from their shackles, and no longer able to do their duty as solvents, the nature of the medicine has undergone so great a change that it is scarcely recognizable. If we are dependent in extract of aconite on aconitia; in that of belladonna on atropia; in hemlock on conia; and in henbane on hyosciamia, we are leaning on a broken reed; and in the able paper of your President on "The Assay of the Alkaloids in Medicinal Extracts," he has pointed out the unreliability of certain processes in reference to it, and I am not aware that any success has resulted from efforts to procure these alkaloids from pharmaceutical extracts. From four ounces of extract of conium, representing about five pounds of the fresh herb, prepared by one of the most respectable makers in London, Dr. Pereira was unable to obtain any sensible quantity of conia, and both Geiger and Dr. Christison have offered their opinion that this extract contains very little conia. Thus we may reason that there may be a medicinal quality so looped up in, and intermingled with, the juice of the plant, that in rejecting what seems superfluous, we may be losing a valuable ingredient. That the well-known Liq. Cinchonæ Cordifoliæ, as prepared by the late Mr. Battley (and which has been imitated at so humble a distance in the Extractum Cinchonæ Flavæ Liquidum of the Pharmacopœia), wherein most of the constituents of the bark were retained, could be taken by a patient with benefit when quinine produced headache, would indicate, as the sagacious introducer of this preparation suggested, that the natural condition, or as near to it as we can sail, is the proper one. And he held a similar opinion with regard to the narcotic juices. In an experiment with 84 lbs. of carefully plucked hemlock leaves, yielding about six gallons of juice, which was subjected to a temperature of little more than 100°, the collected chlorophyll amounted, when dried, to 5 oz. 1 dr. 36 grs. This was subjected to the action of spirits of wine, 56 over-proof, which yielded, on evaporation, 1 oz. 4 drs. 30 grs., having a highly resinoid character, of a beautiful green colour, and smelling very powerfully of the fresh herb. The six gallons of juice were then distilled; the first gallon was powerful of hemlock, and had a little oily substance on the surface. The remainder of the distilled liquid had but little flavour, and the final extract, being $1\frac{3}{4}$ lbs., had little smell or taste of conium. The heat it had been subjected to during the distillation had much injured the extract.

The observations I have now made in allusion to hemlock, are much in accordance with those referable to other narcotics in the green state; and when we consider how small a quantity of their alkaloids seems to exist in the completed extracts, we are, perhaps, entitled to look further for their efficacy. That the aconitia of aconite resides in the root, and the conia of hemlock chiefly in the fruit, has been pointed out by distinguished explorers in this field. From 6 lbs. of fresh, and 9 oz. of dried fruit of hemlock, about 1 oz. of conia was obtained by Geiger, whereas from 100 lbs. of the fresh herb, corresponding to $3\frac{1}{2}$ or 4 lbs. of extract, he got but one drachm. Nor could he get traces in the dried leaves, though from 9 oz. of the fruit which had been preserved not very carefully for about sixteen years, he procured 1 drachm. Dr. Christison produced from 40 lbs. of ripe but green seeds, $2\frac{1}{2}$ oz. of hydrated conia. Mr. Stoddart has pointed out the per-centage of hyoscyamia in the seeds as 3 per cent., but in that of the dried leaves but ·73 per cent. When we take into account the very small proportion of these alkaloids in the parts officinal which are ordered for extract, and further recognize the waste or decomposition they undergo when under the influence of the process, we should hesitate to select the chlorophyll and albumen or starch as victims, until we have established a more accurate discernment of their use and value.

In allusion to colchicum root, I may state that 42 lbs. of the fresh root having been expressed, there was a yield from the cold juice of $2\frac{1}{2}$ lbs. of well-edulcorated starch, the remaining supernatant liquor producing, on evaporation, about $1\frac{1}{2}$ lbs. of extract.

The President: You have heard Mr. Heathfield's paper, and I have no doubt you will accord him a vote of thanks. In one part of his paper he mentions the suggestion of Dr. Pereira, whether the active principle of conium might not be diminished or removed by coagulation, the alkaloid separating in combination with albumen. Now quite recently a French chemist has been examining that very question, and he proves that there is a definite series of combinations between albumen and the alkaloids. He has described his process, and given his formulæ, and there is no doubt about it, I think, that if we make a green infusion, boil and filter it, the coagulum will contain a notable quantity of alkaloid.

A vote of thanks to the author was passed unanimously.

Mr. Schacht: I feel that I owe an apology to the members of the Conference, inasmuch as, by some mistake of my own, my name has been published in the earlier editions of the programme as the contributor of a paper. The mistake arose from the fact that when the President asked me if I should be able to produce anything for this meeting, I told him I was working on a matter which might produce some results worthy of being brought before the Conference, on the subject of the succus and extract of conium. I may now say in what direction I have been working, rather than give the results, which at present are rather imperfect. The idea was suggested to me at the last year's Conference, when Mr. Ekin gave us some experiments on the hydration of extracts, and it occurred to me that that kind of investigation would have been a little more valuable, if he had been able to answer a question which I put, whether he thought anything but water had passed off during the inspissation. He replied that he had not investigated the matter, and I thought I would attempt to do so. In taking the special subject of conium, I thought the succus would be more satisfactory to work upon than the extract, because one finds opinions go generally in the direction of estimating the succus as being the more valuable medicinal material, and I thought it would be interesting to ascertain, if possible, whether, in the process of the reduction of the juice of the plant to the condition of the extract, a very large proportion of the nitrogenous matters were parted with that originally existed in the succus. I spoke of the matter to Mr. Siebold, and I do not think it is quite fair that I should assume the idea as original, for I almost think that in conversation he suggested to me the desirability of adopting the process of estimating it by the plan lately adopted for estimating nitrogenous matters in potable water, using those fine measurements which we are able to employ by the process of Neslerizing. Conium does not come to maturity until somewhat late in the season, and consequently my time has been rather short, and my results have as yet been imperfect. I have tried to satisfy myself of the exact quantity of nitrogenous matter of all sorts, volatile and non-volatile, which existed in a certain specimen of succus, and then I thought, by bringing the same sample into the condition of an extract, one could estimate the proportion of nitrogen then present by a similar process, and satisfy oneself if any large amount had been driven off. I have got through one-half of my task, and have satisfied myself pretty well of the per-centage of nitrogen which the succus contains. I have begun the other part of the work, and have gone so far that I feel quite sure it is considerably less, though I cannot yet venture to say the proportion which the extract bears to the succus, and I am not quite sure that the conclusions one would draw from such comparison would be very valuable. The difficulty is increased by the fact, given on the authority of Mr. Wanklyn, that all nitrogenous alkaloids do not equally yield their nitrogen to this process. I dare say, gentlemen, you are aware of the curious page in his book, in which he gives us two lists with the statement that a certain portion of the alkaloids yield all their nitrogen to this process, but that those in the other list yield only half. That is a very remarkable statement, and one which would not be accepted but on the very highest authority; possibly some gentleman here may be able to confirm it, and if it be so, one would have to ascertain, in the first place, whether the active principles of conium are to be included in the one list or in the other, in order to estimate with anything like accuracy the possibility of the difference in nitrogen being explainable by the passing off of the active principle of conium, conia. I hope at some future time to be able to indicate the results of my experience, in the meantime I can say that, as far as I can make out, the average quantity of ammonia obtained from the Succus conii is ·1776 per cent., corresponding to ·1460 per cent. of nitrogen.

Mr. Ekin: When I suggested last year that Mr. Wanklyn's mode of limited oxidation might be applied to the estimation of the alkaloids in vegetable extracts, I said I meant to work further on the subject. I cannot say that I have yet done so, though I have thought a great deal about it, and furnished myself with all the information I could obtain. I find, however, that the whole subject is in such a fog, that so little is known of the proteid constituents of plant juices, that I am not very sanguine that anything can be done in this direction. Even if it were possible to separate and remove all the vegetable albumen present in the plant juices or extract, there might, and probably would, still remain other vegetable proteids, and which would also yield ammonia. It would be necessary to get rid of these before one could say with certainty that the amount of ammonia yielded by a vegetable extract was due to any alkaloid it might contain. It seems impossible to do this. Also in the case of conium it would be necessary, in the first place, to know the proportion of its nitrogen which conia yields as ammonia when treated with an alkaline solution of potassium permanganate, and one great difficulty would be to get the pure alkaloid, to start with, to ascertain this. I am not sure whether the pure alkaloid can be obtained at all. Therefore, I almost despair of any result being arrived at in our present state of knowledge.

Mr. Schacht: My object would be to endeavour to ascertain whether there was any difference in the yield of the fresh juice and in the extract; if so, you would then be pretty clear that you had parted in the process with certain volatile organic matters.

Mr. Ekin: That is just the point. I do not see how you can be clear that you are parting with the volatile constituents. I think the only way, as you suggested to me some time ago, Mr. President, would be to try and find some precipitant of the alkaloids.

The President: As I understand Mr. Schacht, he takes two ounces of the juice of the plant, evaporates one to an extract, allows the other to remain in its natural state, and compares the two by Nesler's process.

Mr. Stoddart: I must say I think Mr. Schacht's idea is rather a good one. We know the peculiar mouse-like smell of conium, which the extract does not possess. I think it is not to be disputed, therefore, that ammonia is given off in some way or other, and this seems to me to be a very good way of answering the question, whether ammonia is given off in making the extract.

Mr. Schacht: I look upon it in this way that the Succus conii as freshly expressed would, of course, contain a certain mass of nitrogenous material. A portion of that would, of course, be albuminous, which would probably be non-volatile, and a portion of it probably would be conia. I suppose there is such a thing, and probably there might be other active materials, which would be volatile possibly, or possibly not. I should estimate the whole of the nitrogen by a per-centage process. If, after evaporating a portion of the juice to the consistence of an extract, I found that it yielded a certain lessened amount of nitrogen, I should infer that a portion of the nitrogen did really exist as a volatile organic base, and that it had passed off in the process of reduction to an extract. I quite admit that it would be a further question in what form that volatile organic matter had passed off, and that would be a more difficult question to answer than I had proposed to myself at present.

Mr. Williams: You must bear in mind that the bases do not exist in vegetables as such. The principle does not exist as conia until an alkali is added, when it is developed; and I should very much doubt if the salt of conia would be volatile, as you seem to think.

Mr. Schacht: That is the question I want to solve.

Mr. Catford: A few weeks ago I exhausted a residue of succus by distilling it in the usual way with water, supersaturated with acid, evaporating and distilling with caustic alkali, and I prepared about half a drachm of conia from the mass supposed to be exhausted. I should like to know whether the conia does all go out with the succus, or whether it may not exist in the solid form crystallized in the cells of the plant, and so require further treatment than mere mechanical expression. The sample was unfortunately lost, or I would have brought it.

Mr. Umney: I think Dr. Harley's experiments have quite set at rest any doubt we might have had as to the value of Succus conii. Speaking from memory, I believe that gentleman experimented on himself, and took Succus conii to the amount of ten or eleven drachms per day, until it had such an effect upon his legs that he could scarcely lift them. I have found since his paper was published that the consumption of extract of conium has been getting less and less every year, and that Succus conii has been gaining in favour. The president has referred to the experiment of a French chemist, showing a combination of albumen with alkaloids. It seems to me that a considerable quantity of albumen would be precipitated by the addition of the alcohol ordered in the B.P. process; Mr. Schacht therefore, I would suggest, must not lose sight of this point in continuing his experiments.

The President: I think the combination referred to was of the albumen coagulated by heat, which is not the same thing.

The next paper read was—

Notes upon Chinese Pharmacy in Hong Kong.

BY ARTHUR HUNT.

From the unpretending character of the establishments wherein the various articles of Chinese materia medica are stored and dispensed, European foot passengers would ordinarily pass them by; they have no bright coloured show-bottles in their windows (in fact their windows as a rule are quite guiltless of glazing), no attractive placards, none of the multitude of curious, pretty, and well-arranged articles which in England go to make up the usual well-known chemist's window; neither have they the familiar odour which greets us here as we pass the door. But the not unfrequent music of the pestle and mortar attracts the attention, and appears to invite a brother chip to enter. Before leaving the mixed crowd of odorous Chinese, if at sundown, the observer would be struck by the little brightly smouldering joss-sticks placed on a sort of altar in a small niche generally built exposed to the street on one side of the doorway. This sort of service to their good fortune the Chinese seldom if ever neglect. Perhaps it would be interesting to mention how the little joss or god sticks are manufactured. They are about ten inches long and about half the thickness of an ordinary tobacco-pipe stem, and for one-third their length have been rolled in a composition of well-kneaded cows-dung and sandal-wood powder; when finished and dried, they resemble bull-rushes in miniature, although not so dark. If lighted at the upper end, the composition continues to glow until it is all consumed, giving off a not unpleasant smoke, and leaving a whitish grey ash. The manufacture of these and others of various sizes gives employment to a great number of persons.

The internal arrangements of a Chinese pharmacy are very much as we might expect; a counter runs frequently on either side the store, as it does with us. An assortment of cheap, dark-glazed, and sometimes curiously-shaped jars serves to keep a variety of messes in, some of which, of a dark colour and apparently unfathomable nature, greatly offend the European by their abominable odour. A set of some two dozen drawers answers the purpose of keeping the retail and dispensing stock of cut and dried roots, herbs, &c. A few bottles may also be noticed, but no formidable show is made of them.

Passing by the retail counter with its dreamy assistants towards the little sanctum in the rear, one may catch a glimpse of the style in which the business is conducted. Here is one pigtailed, almond-eyed individual with shaven crown, dressed in blue, busy at the books. He holds his brush-like pen not in a sloping, but perfectly perpendicular manner, and ever and anon smears the point of his pen with ink from a small wet ink palette (in other words takes a fresh dip). The ink is solid, and is known here by the name of Indian ink; it lies near at hand, and to replenish his inkstand he merely rubs the ink stick a few times upon the ink palette moistened with a little water. Here is another cutting up roots; he slices them beautifully, for the Chinese are proverbially skilful at this branch of the pharmacist's art; when the required quantity is obtained, he places it upon a very shallow bamboo sieve or drying tray, and, adjourning to the back yard, or the top of the house, or the front street, exposes the slices to the heat of the sun, in some instances very cleverly and patiently tossing them about until sufficiently dried. A third, probably the dispensing assistant—the major associate—is conning a prescription, which is a curious and somewhat imposing-looking document, written in the vernacular upon a thin dirty-looking piece of paper. Having made himself master of its contents, he proceeds to dispense it. He places upon the counter a piece of coarse paper, and weighs in order, with his steelyard-like scales, the various drugs mentioned in the prescription, and on the weighing of the usual eight or twelve ingredients being completed, all the drugs are wrapped in one parcel, tied up with twisted paper or grass, and the direction either written upon the parcel or verbally given to the patient,—the latter on account of the inability of Chinese females to write or read. The majority of the prescriptions order only vegetable drugs, and very frequently the dispenser most carefully and neatly wraps each individual drug in separate papers, which in some cases are differently coloured. The scales above mentioned have only one pan and one sliding weight, the graduated rod or beam serving to mark very accurately the desired quantity; being, in fact, as nearly as possible like our own steelyards. The observer in a Chinese pharmacy would readily notice the entire absence of those neatly labelled and capped bottles of medicine, in all stages of their preparation, which is so characteristic of our own pharmacies.

The Chinese pharmacist, in common with nearly all traders, takes apprentices, who are bound for several years; they in turn taking their position as assistants or masters, as circumstances permit.

Going further, we reach a small room partitioned off from the shop by scroll or lattice-work, gaudily gilded and somewhat artistically decorated with gaping-mouthed dragons. In this little space of four or five feet square, a consulting room, in fact, which is always attached to a Chinese pharmacy, we may observe a blue-habited, venerable, bearded man. By the way, I am informed that the Chinese do not consider themselves entitled to wear the beard until they are grandfathers; which I am inclined to think is a polite way of saying they could not grow a respectable beard at an earlier period of their lives. The doctor sits by the side of a dark wood table with marble top, upon which a soft cushion is placed: this serves as a rest for the wrist of the small-footed lady who is seated opposite to him. The elderly Celestial is intent upon her pulse: he continues his observations for several minutes, chatting every now and then. Having made his diagnosis, which he does almost entirely by the pulse, he writes a prescription, and it is handed to the dispenser; the result is, the lady leaves the establishment with a parcel of drugs such as described above to infuse or boil.

In the Chinese pharmacies may be found very many carefully-dried herbs, roots, etc. Rhubarb, which they call "Wong Tai" or Great Yellow, and liquorice root, appear to be decided favourites in their prescriptions. Also the ginseng root, turmeric, salep, cubebs, camphor, Chinese cinnamon, coriander, fennel, assafœtida, yellow dog fern roots, and sea-horses, with many other bitter, astringent, laxative, and mucilaginous substances. Alum is largely used in one form or another. Lime, which they principally obtain from shells, is used by them in combination with other things as an outward application. Small pearls, when very finely powdered, are looked upon as very precious for their healing properties. The sea-horses mentioned above are very numerous in the China Sea, and are esteemed as a remedy in debility and consumption; when caught are pickled in salt and water until they become black, and when wanted are boiled, and the decoction reserved for use. The head of this singularly shaped fish greatly resembles that of a horse; they are from four to eight inches long, and two or three good specimens may be seen in the Crystal Palace Aquarium. Sandal-wood, which is very extensively used as incense and for the manufacture of carved and other ornamental boxes, is called by them "Tarn Heong," the oil from it "Tarn Heong Yow." This oil has some considerable reputation among them for its efficacy in restraining mucous discharges. Oil of peppermint, called "Pok Hoo Yow," and peppermint camphor, called "Pok Hoo Ping," are both used extensively, the former most so. The latter is a curious substance which separates from oil of peppermint under certain conditions. It is white, floats on water, is nearly transparent, and has a warm peppermint and camphoraceous taste, and it occurs in small, slender pieces, somewhat resembling large crystals of sulphate of magnesium.

Although these and some other essential oils may be noticed in the druggists' shops, very many distinct places for their sale may be found, separated from the regular pharmacies. The proprietor of an essential oil shop frequently shares it with another tradesman, which is one of the many curious features of Chinese trade; two or even three distinct trades may be observed in one small shop. The oils are put up in small very thick green glass bottles, holding from ten drops to an ounce or two, and enclosed in neat, attractive little boxes, with the invariable red label. The counter bills in a Chinese essential oil shop are generally printed in blue and red characters on thin white paper; the advertisement setting forth the numerous virtues of the Pok Hoo Yow is frequently embellished with a figure of a dragon on either side of an alembic.

Oil of peppermint is largely used and believed in by the Chinese as an outward application. In headache, for instance, a drop or two applied on either side the head, midway between the eye and ear, is said to relieve the pain. Another favourite remedy is a pitch plaster, the size of a sixpence, placed in the same position.

Besides the regular pharmacist whose establishment we have noticed, another and certainly more conspicuous (though not so numerous) set of druggists may be seen. They keep a sort of herbalist's shop, and supply many kinds of both fresh and dry herbs, roots, &c., and in some of these places a sort of herb poultice composed of bruised and chopped herbs, roots, with coarsely powdered mucilaginous seeds, may be obtained ready made. They also make to order what we should consider the most inelegant and disagreeable-looking plasters and poultices that one can conceive. Pharmacy has also its street representative in the quack, I suppose the respectable shopkeeper would call him. He carries his stock-in-trade about with him, by means of a couple of baskets or boxes, slung one at each end of a bamboo balanced on his shoulder, or he has a small stall like the quacks we see in our country market-places, and I believe is licensed by the Hong Kong government as a hawker; he takes his stand under the shade of a friendly tree, a verandah, or clump of bamboos, and soon gathers an admiring crowd, and here may be seen the most loathsome lepers and ulcer-eaten people, upon whom he has probably tried his remedies. The quack speedily puts his hearers into good humour, with his own, but the cash rolls in very slowly (for the Chinese among themselves do everything very cheaply). All the money that the quack takes probably consists of the coin known as cash, each piece being worth about the tenth part of a halfpenny. The Chinese are passionately fond of gambling, and seek it at every turn of their lives; therefore, it is not to be wondered at that they demand that the charm of gambling be added to the purchase of physic. This is very simply and quickly carried out by means of a number of strips of the never-failing bamboo painted all one colour at one end, the other end having a few prize colours interspersed with the blanks; the lower ends are concealed in a jar and the gambler draws a stick. If he is fortunate he may get the full value for his money, but the chances are much in favour of the banker.

The street hawker of medicines sometimes tries his hand, and I may say his nails (which all Chinese wear very long) at dentistry. I saw an old disciple of the above class extract a fine tooth by means of his very long thumb and finger nails; I watched the operation for at least twenty minutes, and it was described to me as elegant dentistry, and a painless extraction.

In regard to the powerful drug opium, which, by-the-bye, is not usually found in pharmacies, the widespread use of it among a certain class of Chinese has led the Hong Kong government to license a few retail shops, and to have them under control. These retail shops do a very brisk trade at all hours; they are supplied with the extract by the wholesale merchants, who manufacture it on a very large scale, adopting a very simple process. All the soluble portions of East Indian opium are extracted by water: by subsidence a clear solution is obtained, which is simply, though carefully, evaporated over wood and charcoal fires in brass pans of the capacity of three or four gallons; a series of these pans are kept fanned and stirred by several coolies; when finished, the extract presents the appearance of very thick dark-brown treacle. To smoke it, therefore, the opium-smoker takes a few grains upon his pipe or stick, and by a few dexterous turns in the flame of an oil lamp placed upon his bed for the purpose, he has the drug dry enough to fume for his most enervating and debasing debauch.

The PRESIDENT: Papers like this, if they are not very useful, tend to enliven our proceedings, and also convey some useful information, and I hope you will accord Mr. Hunt a vote of thanks.

Mr. HANBURY: There is not a great deal to be learned from the pharmacy of the Chinese, but there are one or two things they do to admiration. For instance, they appear to have some clever contrivance for slicing roots, and with their inexhaustible patience they produce a very beautiful article. Another thing I have had an opportunity of observing is the powder of substances, such as carbonate of lime, which, by the aid of elutriation, are obtained in a state of remarkable fineness.

The PRESIDENT: Mr. Hunt referred to the "odorous Chinese." I think I heard or read some time ago that they exhale an odour of musk, or something like that.

Mr. HUNT: They have a peculiar and characteristic oily smell, which it is impossible to describe.

Mr. GILES: It seems easy to believe that different races should be characterized by special odours; a more remarkable phenomenon is attested by persons connected with lunatic asylums, viz., that lunatics exhale a special and characteristic odour which is distinctly recognizable.

Mr. HUNT: Almost all the Easterns have a characteristic smell of their own. I found in travelling that if there were a number of different nationalities collected together, I could recognize a distinct odour to each.

Mr. FRAZER: I am not able to add anything to our scientific knowledge of Chinese pharmacy, but as a visitor to the British Museum I might give some information which even to some London gentlemen may be new. There is in the museum, under the charge of Mr. Carruthers, the contents of a Chinese apothecary's shop, at least 3,000 or 4,000 years old, and many of the roots and leaves are the very same as those now in use, and are in perfect preservation. I may add that Mr. Carruthers would be very glad if any gentleman acquainted with these things would pay him a visit, and assist him to arrange the articles.

(*To be continued.*)

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

"Sessional Prizes."

Sir,—Allow me to occupy a corner in your valuable columns to express the great pleasure with which I have read the letters in your Journal concerning the Sessional Prizes; and permit me, as a sufferer, to point out the manifest injustice of arrangements by which 'a Major man,' who can condescend to compete with a Minor, is enabled to do so, and, as a matter of course, thereby to deprive the latter of the only prize within his reach (the £2 Prize of Books), and that for which his efforts had been legitimately directed.

In days gone by, I am informed that, from motives of etiquette alone, a Major man would never think of competing for this prize; but such times being now unfortunately among the things of the past, should not the Council take steps to remedy the evil and bring back for associates and other beginners their former incentives to work?

A Sufferer.

"Scientific Atheism."

Sir,—Mr. Edwin B. Vizer has denounced in unmeasured terms Professor Tyndall's late address to the British Association, characterizing it as "the sad poison of scepticism," "the poison of rank atheism," which by insertion in it has "contaminated your Journal," and sums up by describing it as "profane and vain babbling, and science falsely so called."

Mr. Vizer's warrant for this wholesale condemnation is that he considers Professor Tyndall's teaching antagonistic to the teaching of Professor Tyndall's Bible. Does Mr. Vizer wish your readers to believe that whenever a declaration of science clashes with a declaration of Scripture, science must be wrong and Scripture must be right? Scripture asserts plainly, unequivocably, that this world, and not this world only, but the universe—the sun, moon, and stars, were created in six days, of twenty-four hours each. No one, who is not more or less a knave or a fool, would attempt to dispute so indisputable a fact. Science, on the other hand, declares that instead of six days, six millions of years would sink into insignificance compared with the utterly inconceivable period that has elapsed since creation's dawn. Scripture likewise declares that from the creation of the first man to the birth of Christ there were but sixty generations, and is so explicit on the point that the name of each individual comprising them is given, and the actual lapse of time deducible from the account is computed to be some 4000 years. Science is again at issue with Scripture, and asserts that the study of geology shows most certainly that it is only less difficult and presumptuous to endeavour to fix the time that has elapsed since man first dwelt on this earth, than it would be to attempt to fix the former period. Which of these utterly antagonistic teachings does Mr. Vizer believe? Possibly—I say *possibly*—he will answer, "that of Scripture;" and if so, will he arrogantly and uncharitably denounce the belief of those who cannot disbelieve the teaching of Science in the matter as "poisonous scepticism"—possibly "atheism"?

Robt. Chipperfield.

Southampton, Sept. 7, 1874.

Sir,—It was with much regret, not unmixed with a feeling of humiliation, that I read Mr. Vizer's letter in your last number on what he is pleased to call "Scientific Atheism."

We are all aware of the howl that has been raised again t Professor Tyndall by a certain section of the community. For that we were not altogether unprepared. We have heard the "pulpit drum ecclesiastic beat with fist instead of stick," but that a member of a scientific body, as we profess to be, should have joined in this outcry, is indeed lamentable.

Your correspondent talks of your columns being "unfortunately contaminated (Heaven save the mark!) with Professor Tyndall's oration." I contend, Sir, that if you had not inserted this magnificent address, you would have forfeited the confidence of the vast majority of the members, and have produced the impression that you had succumbed to a narrow spirit of bigotry, instead of being actuated by a laudable desire for the spread of scientific truth.

I will not be guilty of the presumption of defending the learned Professor, when the only argument Mr. Vizer has attempted to make use of in controverting this "Scientific Atheism," is a quotation from a letter written by Paul, some nineteen centuries ago, and a passage from one of the Psalms of David, which is about as applicable to Tyndall as it would be to the man in the moon.

The most charitable construction one can put upon Mr. Vizer's letter, is, that—like a certain distinguished prelate who raised the cry of heresy against a brother ecclesiastic on account of a work he had written, but was afterwards compelled to admit he had never read it—he has glanced at a few isolated passages and left the main portion unread.

In conclusion, I would advise every young man connected with our Society to read, mark, learn, and inwardly digest this eloquent address, and unless his brain is of a very flabby texture indeed, he will rise from its perusal with a more profound reverence for the great Creator of the universe—a deeper sense of his own ignorance, and a more earnest desire to emulate those distinguished men who, through good report and evil report, are striving manfully to dispel the thick clouds of darkness that for centuries have been hanging over us, and by unfolding those wondrous and unchangeable laws of nature which govern the material world, have invested scientific pursuits with a beauty and a grandeur hitherto unknown.

W. G. Hayward.

Reading, September 7th, 1874.

Sir,—It is not my intention to indulge in a theological argument, which, besides its inappropriateness, would overrun your whole space; neither would I oppose myself to a gentleman whose name I have always heard mentioned with the highest esteem by those who have the pleasure of his acquaintance. Still I can scarcely refrain from thanking you for your excellent report of an address, which is said to have "contaminated" your pages, but which I should have thought would have been hailed by Professor Tyndall's strongest opponents on account of the frank and important admission which he makes, that there is a part of man's nature which science cannot satisfy.

It has been remarked that when men of sense speak strongly there is a strong presumption that the "iron has entered their soul"; and when we hear only the vague (and let us hope, false) rumour that Professor Huxley is likely to quit England on account of the social ostracism which he suffers; when we note the pulpit arguments adduced to crush this moral poison, beginning and ending mostly in the improved *ipse dixit,* "a deceived heart has turned him aside," we cannot wonder at a little manifestation of human nature, but it is not necessary to add a word to Professor Huxley's justly scornful utterances at Birmingham on this point. We cannot but marvel, however, at the palpable tremor of men who profess to be placed on "a rock which cannot be moved" whenever "oppositions of science" dash the spray against its motionless base.

Professor Tyndall admits that there are *creative* as well as *knowing* faculties in man; but shutting himself out from the former, and following his own logical processes and scientific methods, he comes to the conclusion that "like a streak of morning cloud" he will "melt into the infinite azure of the past." His opponents exclude themselves from the latter faculties, and by processes of faith external to science believe that they will "shine as the stars for ever and ever." Both are figurative expressions of an anticipation incapable of accurate definition. Even the cloud that vanishes does not cease to be. Scientists would join issue on the turned leaves of Nature's or Revelation's Book. They boast of a text that is settled which they, *per tot discrimina*, strive to read; but their opponents have not yet settled their text, and should not lightly accuse them of misquotation. Ultimate exposition of either book is not yet rendered, but amongst the difficulties of interpreting Scripture might be found the attempt to establish a relationship between the *ψευδωνυμοι γνωσις* of the apostle and modern science.

As I said, argument is not my object, but a simple protest that on the platform of the "Journal" there is no need for ardent antagonism. Science is impassive—or expends its passion in search after *facts*.

I confess to too much of the emotional to be satisfied with the prospect of *having been* a streak upon an infinite azure (in which language there yet seems to perhaps a wishing ear, despite its sole, sad retrospection, an echo of the "longing after immortality"), but I am content to let my theology lie where the belligerent Scotch divine laid his coat, while I make way for the humane hope (which surely falls short of Infinite Goodness) that something better than ceaseless torture is reserved for those who honestly arrive at wrong conclusions.

HENRY H. POLLARD.

Ryde, I.W., September 7th, 1874.

Sir,—Mr. Edwin B. Vizer seems much exercised in mind as to the baneful effect which the "poison of rank atheism" may have on the readers of this Journal, unless he rushes forward to administer an antidote; not that he has any facts to establish, or arguments to set forth, but merely to guide and re-assure the doubting by reminding them how extremely finite is Professor Tyndall's intellect, compared to that of Job, and how inferior is his method of proceeding to that of the estimable, but somewhat obscure individuals, the Bereans.

The ignorance of Professor Tyndall concerning the First Cause, though not unparalleled, is, doubtless, very dense compared with Mr. Vizer's complacent wisdom; but I may call that gentleman's attention to the fact, that it is not so long ago that a faith as unhesitating and universal prevailed throughout the land as to the existence of witchcraft, and that men quoted in support of that belief, that same Bible that Mr. Vizer is so learned in.

Let me suggest further to him, that the readers of a scientific journal are in duty bound to ignore entirely teleological considerations in these supreme questions, and that there is no antidote to the "poison" which "contaminated" last week's Journal equal to a refutation which the world has yet to receive from Mr. Vizer.

I should also like to know whether he candidly believes that a faithful following out of the example of the Bereans would aid much in the elucidation of mysteries which probably were undreamt of by the men to whose guidance we are referred.

The inscription 'Αγνώστῳ Θεῷ is, *pace* Paul, as true now as it was when written on the Athenian altar, and the spectacle of Mr. Vizer scolding Professor Tyndall, only exemplifies the Greek saying—

Ενεστι κἂν μήρμηκι κἂν σέρφῳ χολή.

H. C. WEBB,

22, *Brook Street, W.*,
August 9th, 1874.

Sir,—I was much surprised on reading Mr. Vizer's letter in the last Journal. I fail to see any ground for his attack on Professor Tyndall.

From beginning to end the Professor studies to be offensive to no one. He states certain facts, draws his own conclusions, and leaves everyone else to do the same.

In both respects Mr. Vizer's letter stands out in ugly contrast. Unable to refute the facts, or explain them, he quotes wildly texts from Scripture, which have as much bearing on the subject as the Lay of the Last Minstrel.

Let him take his own advice to heart. First let him search whether those things are so; and secondly, when he quotes Scripture, let him do it correctly, and not insert in the middle of a sentence his own dogmatisms, and so give to it a meaning the text has not.

WM. G. TAPLIN.

London, Sept. 8th, 1874.

Sir,—With feelings of infinite disgust I read the letter of Mr. E. B. Vizer on Professor Tyndall's address, though why, I can scarcely say, for I think that these ignorant attacks upon Science, under the plea that it is atheism, cannot be treated with too great contempt. But what is there, what single expression is there in the whole of this comprehensive address, that gives Mr. Vizer the slightest reason for attempting to prove Professor Tyndall's disbelief in a Supreme and Omnipotent Being? He considers it atheism to say that "the whole process of evolution is the manifestation of a Power absolutely inscrutable to the intellect of man." Why, this sentence doubly emphasises the Professor's belief in a Supreme Being! Because this address details the formation of man, Mr. Vizer immediately supposes the author to deny the existence of a Divine Power! What must be his own idea of Omnipotence? It must be something like this: a Being possessed of great power, but having to labour, to work like a slave, in order to produce a creature not existing before. Is this grovelling idea comparable to the sublime belief, which no doubt Professor Tyndall holds, that our Maker can create Worlds, can launch forth Systems, by the Power of His Word alone? When Professor Tyndall expatiates on the "differentiation" of man, and so forth, why should this preclude the possibility of a Divine existence? It does not; on the contrary, it emphatically urges the necessity of such existence.

Before Mr. Vizer attempts the renewal of this foolish attack, let him read the concluding remarks of Professor Huxley's address at the same meeting, where these ridiculous fanatics are conspicuously mentioned; and although he can pretty accurately cite Scripture for his purpose,—we have heard of others who can—he forgets that at the very commencement of that Volume we are told, not that God laboured hard and made light, but that God *said*, "Let there be light," and there was light.

SYRUPUS.

September 8th, 1874.

Sir,—While allowing freely the inconvenience of introducing theological subjects or opinions into the columns of the Journal, I would, with due respect, protest, on the other hand, against the doctrine advocated by Mr. Vizer, that on account of what he considers the "poison of rank atheism," such an address as that of Professor Tyndall should be excluded from its pages. On the contrary, I am sure very many of your readers would join me in the expression of gratitude felt that the address was so fully reported.

Mr. Vizer and all who think with him may rest assured that truth cannot and will not suffer from all the philosophies, speculative or inductive, of our scientific teachers, however much these philosophies may play havoc with the non-essential surroundings of truth.

The experiences of the past should teach us to be careful not to do even our little to stifle scientific inquiry, where it is conducted with genuine love for and in pursuit of truth.

It is also painful to see quotations from Scripture, altogether inappropriate, used as the means of introducing harsh epithets and unkind suggestions.

A. P. B.

Bayswater, September 8th, 1874.

[*** The case of Sentiment *versus* Sense has been sufficiently represented by Mr. Vizer and our correspondents of this week, to render the publication of any further letters on this subject admissible. It is satisfactory to observe that the obligations of editorial duty have been recognized by some of the writers, though they do not appear to have been visible from Mr. Vizer's point of view.—ED. PHARM. JOURN.]

W. W.—We cannot recognize the drug, or suggest what plant it belongs to, nor have we been able to obtain any information respecting it.

An Enquirer should apply to the Secretary for a printed statement of the regulations. See also the official advertisement in the journal.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(Continued from p. 84.)

QUASSIÆ LIGNUM.—The tissues of which this wood is composed are somewhat thin-walled minutely pitted wood-cells of the parenchymatous-prosenchyma order, with, intermixed with them, sometimes arranged in bands, thicker-walled but still thin woody parenchyma cells, often containing single prismatic crystals. The medullary rays are composed of one, more frequently two to four, oblong porous cells. The ducts are generally in twos and threes, irregularly distributed, and generally occupying nearly the whole space (laterally) between the rays, their environment of woody parenchyma often pressing the rays out of their direct path. The porous cells round the duct very generally contain prismatic crystals.

As seen in longitudinal radial section, the appearance is as follows, with slight variations as regards their order in different specimens, as the woody parenchymatous bands are irregular in their distribution. *(a)* Bands of woody fibres, thin-walled, oblique, sometimes nearly square ends, minutely porous, and without spiral fibre or very obvious markings of any kind, the pits being very minute. These cells evidently are of the type I have called parenchymatous-prosenchyma, but resemble the prosenchymatous class more than the parenchymatous. *(b)* Ducts and their environment. The ducts are large, closely pitted with small oval pits, often light brown in colour, and square-ended, with frequent septa. They are usually 4 to 5 times as long as broad. The surrounding cells are short pitted cells with somewhat thick walls. *(c)* Bands of woody fibre. *(d)* Bands of woody parenchyma. These are long, thin-walled, porous cells, minutely pitted, and sometimes contain, with granular proteinaceous matter, small prismatic crystals, of which one crystal occupies the cross section of the cell. With these cells are small nearly square cells of the same class, of which each contains one crystal. Then follow bands of woody ducts, etc. It must be noted that this sequence is not invariable, but that the general character of the wood is that it is composed of thin-walled wood-cells with interspersed woody parenchyma, and ducts with crystal bearing cells.

The cells of the medullary rays are about five times as long as broad, are minutely pitted, and contain crystals of the same class as those found elsewhere, but smaller.

PTEROCARPI LIGNUM.—This is a very different type from the last. The cells generally are much more thickened, and their arrangement quite distinct. The structure is that of leguminous trees. Bands of woody parenchyma of considerable width are interspersed with bands of wood fibres. The ducts are single, round, or sometimes double, of moderate size, excepting near the annual rings, where they are very large, and charged with colouring matter. The rays are usually composed of one cell, sometimes of two, and, much less frequently in isolated rays, of 8 to 10 cells. The single celled rays are composed of rather larger cells than the others, and are arranged in perpendicular layers of seldom more than 8 to 10 cells. In other respects than of number the rays are of the same character. The wood-cells are long and narrow, considerably thickened, and minutely porous on the sides nearest the rays or woody parenchyma cells.

The woody parenchyma cells have many points of interest, and are very characteristic. They are of two kinds, one much longer than the other. Both are much thickened, and very distinctly pitted, the pits having very well defined borders. The pits are oblong, or oval and oblique to the length of the cell, and are very much more numerous on two opposite sides of the cells. Frequently on the other two sides, at right angles to the direction of the radius, the pits are nearly absent, and have no borders. This is particularly the case in those cells that approach to the wood-fibres most nearly in appearance. The shorter nearly square cells are the most distinctly pitted, but in other respects resemble the long ones.

The ducts are all porous, with well-defined bordered pits, similar to those of the cells last named. The smaller ducts are rather shorter than the larger, but are otherwise quite similar. The septa in both have frequently been destroyed, and annular *herniæ* show their position. The larger cells show traces of a disrupted spiral fibre, which is sometimes much thickened.

The cells of the medullary rays are generally much longer than broad, and have rounded ends. Some few are nearly circular, and in section parallel with the rays. The cross section of nearly all is oval or round.

GUAIACI LIGNUM.—This wood, as everybody knows, is characterized by its exceeding hardness and toughness. The latter characteristic is explained by the peculiar arrangement of its wood-fibres, which are much thickened, of the true prosenchymatous type, and interlace with each other in a somewhat anomalous fashion. The cross section appearance of the wood is as follows. The wood-cells are small, nearly wholly filled up, and divided into narrow radial bands by the medullary rays, which are usually composed of but one cell. The ducts are single, much thickened, and nearly circular. They are distributed irregularly, but are rather more numerous near the borders of the annual accretions. Examined in detail, the tissues are as follows. *(a)* Wood fibres.—These are long, tough liber-like fibres, distinctly porous, with spindle ends, and more or less curved (like a boomerang); successive formations of this tissue interweave themselves with the preceding, forming an interlaced tissue, which does not readily cleave in any direction. The fibres adhere exceedingly firmly to each other, and the use of strong nitric acid is necessary if we wish to isolate the cells sufficiently for exact examination of them. *(b)* Ducts.—The cells forming these were short, not much longer than broad, and minutely porous. They are much thickened, and coloured by the guaiacum, resin. *(c)* Medullary rays.—These, as has been said consist of one, rarely two cells superposed, in series of 5, rarely more, and are composed of oblong cells with thickened porous walls.

HÆMATOXYLI LIGNUM.—We have here, as in pterocarpus, the structure common to leguminous stems. The cross section is seen to be composed of bands of woody fibres, and woody parenchyma with ducts divided radially by well-developed medullary rays, of which some are much wider than others. In hæmatoxylon the rays generally are much wider than in pterocarpus, and some other stems of the order; and the alternating bands of woody fibres and woody parenchyma have a much more regular sequence in the former than in the latter stem. The minute structure of the various tissues can only be satisfactorily made out in carefully cut sections, after they have had the colouring matter removed. The wood-fibres are pro senchymatous. The cells composing the woody parenchyma are much longer than in pterocarpus, have thinner walls, and are not so conspicuously pitted, and the borders of the pits are smaller as compared with the pits themselves. The squarer cells of this tissue are much more pitted than the longer cells. The ducts are larger than in pterocarpus, they have Bordered pits smaller than in pterocarpus, and sometimes a spiral fibre, single or double, may be seen as a ternary deposit of later formation than the borders. The septa are much thickened, and often imperforate, when they might be mistaken for sclerenchyma cells within ducts. The cells of the medullary rays are unusually long, and have thick porous walls. The structure of the wood appears to be subject to rather fewer variations than pterocarpus.

(*To be continued.*)

AERATED WATER CONTAINING TRIBASIC PHOSPHATE OF LIME.*

BY M. CHEVRIER.

Various considerations led the author to consider the tribasic phosphate of lime to be the best suited for administration where the use of phosphate is indicated. He therefore sought a solvent in which it could be administered without altering its composition. This he thinks he has found in carbonic acid. In fact, he has ascertained by experiment that the bone phosphate dissolves in carbonic acid, and that its solubility augments with the pressure. In order to effect the solution easily and rapidly, it is necessary to use the phosphate in the gelatinous form. On the other hand, however, as aërated waters strongly charged with carbonic acid have a special medicinal action, and might in certain cases be contra-indicated or badly supported by the patients, the author proposes not to exceed the proportion of gas which will dissolve in water under the ordinary pressure of the atmosphere. Under these conditions, a glass of gaseous water will dissolve and retain twenty-five centigrams of tribàsic phosphate of lime, which would appear to be sufficient for a single dose that might be repeated several times a day.

The apparatus necessary for producing this gaseous phosphated water is very simple. Carbonic acid gas produced in the usual way and well washed, is allowed to bubble into a milk of gelatinous phosphate of lime contained in a reservoir. After the passage of the gas for some hours the current is stopped, the excess of phosphate of lime is allowed to deposit, and the clear solution is decanted into bottles similar to those used for natural mineral waters.

The water so obtained is limpid, colourless, and inodorous, and has a subacid flavour. Exposed during several hours to the air, it loses a portion of its carbonic acid and a pellicle forms on its surface. At a later period it becomes turbid. It is, therefore, important to keep bottles that are in use corked, and not to pour out the water long before drinking it.

The presence of basic phosphate of lime in this water may be easily recognized by the following reactions:—

(1.) The phosphated gaseous water is alkaline, a characteristic in which the author considers it differs from all the solutions and syrups hitherto recommended, they having a strong acid reaction.

(2.) Boiling, by driving off the gas causes the precipitation of the basic phosphate.

(3.) Nitrate of silver gives a yellow precipitate of phosphate of silver.

(4.) Ammonia precipitates basic phosphate of lime.

(5.) Ammoniacal sulphate of magnesia causes a precipitate of ammonio-magnesian phosphate.

(6.) Both acetate of urania and molybdate of ammonia give the yellow precipitates characteristic of the phosphates.

The author states that he is convinced that the water, of which the preparation and properties are described above really contains the tribasic phosphate without any mixture of other lime salts, and might be substituted advantageously for the syrups and solutions already in use. It mixes without decomposition with wine, beer, and milk, and consequently can be administered with food—a condition eminently favourable for assimilation.

* Abstracted from the *Répertoire de Pharmacie*, vol. ii., p. 455.

SOME RECENT EXPERIMENTS WITH A FIREMAN'S RESPIRATOR.*

BY JOHN TYNDALL, D.C.L., LL.D.

In vol. clx. of the 'Philosophical Transactions,' 1870, p. 337, I refer to certain experiments on the "floating matter of the air," which were afterwards considerably expanded, and in part described in my 'Fragments of Science.' These experiments, in which my object was to obtain optically pure air by filtration through cotton-wool, suggested to me the notion of a fireman's respirator. Cotton-wool had been previously employed by Schroeder and Pasteur in their experiments on spontaneous generation.

I had heard that smoke was a formidable obstacle to the fireman, and that cases of suffocation were not rare; hence the desire to construct a respirator. My first trials were made with cotton-wool alone. Associated with the respirator was a mouthpiece with two valves: through one the inhaled air reached the lungs, having first passed through the cotton-wool, while through the other the exhaled air was discharged directly into the atmosphere. The smoke was generated in small rooms, and in some experiments in a cupboard; but though the irritation of the smoke was greatly mitigated by the cotton-wool, it was unbearable for any considerable time.

The cotton-wool was next carefully moistened with glycerine, no clots which could intercept the air being permitted. The respirator was distinctly improved by the stickiness of the fibres of the wool; still, when the smoke was very dense, an amount of irritation continued, which materially interfered with the usefulness of the respirator. Thinking it certain that the mechanically suspended matter would be intercepted by the moistened wool, I concluded that this residual irritation was due to the vaporous hydrocarbons generated during combustion: hence the thought of associating with the cotton-wool Dr. Stenhouse's excellent device of a charcoal respirator. The experiment was successful. With this combination it was possible to remain with comparative comfort for half-an-hour, or even an hour, in atmospheres, a single inhalation of which, without the respirator, would be intolerably painful.

Captain Shaw, of the Metropolitan Fire Brigade, has worked energetically towards the completion of the respirator by associating with it a smoke-cap. Mr. Sinclair has done the same, and he informs me that the respirator is now in considerable demand.

Having heard from Captain Shaw that, in some recent very trying experiments, he had obtained the best effects from dry cotton-wool, and, thinking I could not have been mistaken in my first results, which proved the dry so much inferior to the moistened wool and its associated charcoal, I proposed to Captain Shaw to bring the matter to a test at his workshops in the City. He was good enough to accept my proposal, and thither I went on the 7th of May. The smoke was generated in a confined space from wet straw, and it was certainly very diabolical. At this season of the year I am usually somewhat shorn of vigour, and therefore not in the best condition for severe experiments; still, I wished to test the matter in my own person. With a respirator which had been in use some days previously, and which was not carefully packed, I followed a fireman into the smoke, he being provided with a dry wool respirator. I was compelled to quit the

* *Proceedings of the Royal Society*, vol. xii., p. 359.

place in about three minutes, while the fireman remained there for six or seven minutes.

I then tried his respirator upon myself, and found that with it I could not remain more than a minute in the smoke; in fact, the first inhalation provoked coughing.

Thinking that Captain Shaw himself might have lungs more like mine than those of his fireman, I proposed that he and I should try the respirators; but he informed me that his lungs were very strong. He was, however, good enough to accede to my request. Packing the respirator with greater care, I entered the den with Captain Shaw. I could hear him breathe long, slow inhalations; and after the lapse of seven minutes I heard him cough. In seven and a half minutes he had to quit the place, thus proving that his lungs were able to endure the irritation seven times as long as mine could bear it. I continued in the smoke with hardly any discomfort for sixteen minutes, and certainly could have remained in it much longer.

During this time I was in a condition to render very material assistance to a person in danger of suffocation.

The smoke-cap I wore was one made by Mr. Sinclair, which has a mouthpiece similar to that used in the inhalation of nitrous oxide. But, to show the care necessary in packing the respirator, it is only necessary to remark that, with the packing furnished to me by Mr. Sinclair, it was not possible for either myself or Mr. Cottrell to continue in a dense smoke for more than three minutes; and even these were minutes of laborious breathing. Flannel discs are employed in these respirators, but I cannot recommend them. Cotton-wool, carefully moistened and teased, is, in my opinion, much better.

It is always possible to associate fragments of lime with the respirator, thus, if necessary, intercepting a portion of the carbonic acid. But in most fires we have a more or less free circulation of air; and I venture to think that not in one case in a thousand of actual fires would the combination of smoke and carbonic acid be so noisome as it was in the experiments here described.

THE CARNIVOROUS HABITS OF SOME PLANTS.*

BY DR. HOOKER, C.B., D.C.L., PRES. R.S.

I have chosen for the subject of my address to you from the chair in which the Council of the British Association has done me the honour of placing me, the carnivorous habits of some of our brother-organisms—plants.

Various observers have described with more or less accuracy the habits of such vegetable sportsmen as the Sundew, the Venus fly-trap, and the Pitcher-plants, but few have inquired into their motives; and the views of those who have most accurately appreciated these have not met with that general acceptance which they deserved.

Quite recently the subject has acquired a new interest, from the researches of Mr. Darwin into the phenomena which accompany the placing albuminous substances on the leaves of Drosera and Pinguicula, and which, in the opinion of a very eminent physiologist, prove in the case of *Dionæa*, this plant digests exactly the same substances, and in exactly the same way that the human stomach does. With these researches Mr. Darwin is still actively engaged, and it has been with the view of rendering him such aid as my position and opportunities at Kew afforded me that I have, under his instructions, examined some other carnivorous plants.

In the course of my inquiries I have been led to look into the early history of the whole subject, which I find to be so little known and so interesting that I have thought that a sketch of it, up to the date of Mr. Darwin's investigations, might prove acceptable to the members of this Association. In drawing it up, I have been obliged to limit myself to the most important plants; and with regard to such of these as Mr. Darwin has studied, I leave it to him to announce the discoveries which, with his usual frankness, he has communicated to me and to other friends; whilst with regard to those which I have myself studied, Sarracenia and Nepenthes, I shall briefly detail such of my observations and experiments as seem to be the most suggestive.

Dionæa.—About 1768, Ellis, a well-known English naturalist, sent to Linnæus a drawing of a plant, to which he gave the poetical name of *Dionæa.* "In the year 1765," he writes, "our late worthy friend, Mr. Peter Collinson, sent me a dried specimen of this curious plant, which he had received from Mr. John Bartram of Philadelphia, botanist to the late king." Ellis flowered the plant in his chambers, having obtained living specimens from America. I will read the account which he gave of it to Linnæus, and which moved the great naturalist to declare that, though he had seen and examined no small number of plants, he had never met with so wonderful a phenomenon:—

"The plant, Linnæus says, shows that nature may have some views towards its nourishment, in forming the upper joint of its leaf like a machine to catch food; upon the middle of this lies the bait for the unhappy insect that becomes its prey. Many minute red glands that cover its surface, and which perhaps discharge sweet liquor, tempt the poor animal to taste them; and the instant these tender parts are irritated by its feet, the two lobes rise up, grasp it fast, lock the rows of spines together, and squeeze it to death. And further, lest the strong efforts for life in the creature just taken should serve to disengage it, three small erect spines are fixed near the middle of each lobe, among the glands, that effectually put an end to all its struggles. Nor do the lobes even open again while the dead animal continues there. But it is, nevertheless, certain, that the plant cannot distinguish an animal from a vegetable or mineral substance; for if we introduce a straw or pin between the lobes, it will grasp it full as fast as if it was an insect."

This account, which in its way is scarcely less horrible than the descriptions of those mediæval statues which opened to embrace and stab their victims, is substantially correct, but erroneous in some particulars. I prefer to trace out our knowledge of the facts in historical order, because it is extremely important to realize in so doing how much our appreciation of tolerably simple matters may be influenced by the prepossessions that occupy our mind.

We have a striking illustration of this in the statement published by Linnæus a few years afterwards. All the facts which I have detailed to you were in his possession; yet he was evidently unable to bring himself to believe that nature intended the plant—to use Ellis's words—"to receive some nourishment from the animals it seizes;" and he accordingly declared, that as soon as the insect ceased to struggle, the leaf opened and let them go. He only saw in these wonderful actions an extreme case of sensitiveness in the leaves, which caused them to fold up when irritated, just as the sensitive plant does; and he consequently regarded the capture of the disturbing insect as something merely accidental, and of no importance to the plant. He was, however, too sagacious to accept Ellis's sensational account of the *coup de grâce* which the insects received from the three stiff hairs in the centre of each lobe of the leaf.

Linnæus' authority overbore criticism, if any were offered; and his statements about the behaviour of the leaves were faithfully copied from book to book.

Broussonet (in 1784) attempted to explain the contraction of the leaves by supposing that the captured insect pricked them, and so let out the fluid which previously kept them turgid and expanded.

Dr. Darwin (1761) was contented to suppose that the *Dionæa* surrounded itself with insect traps to prevent depredations upon its flowers.

Sixty years after Linnæus wrote, however, an able botanist, the Rev. Dr. Curtis (dead but a few years since)

* Address to the department of Zoology and Botany of the British Association.

resided at Wilmington, in North Carolina, the head-quarters of this very local plant. In 1834 he published an account of it in the *Boston Journal of Natural History*, which is a model of accurate scientific observation. This is what he said :—"Each half of the leaf is a little concave on the inner side, where are placed three delicate hair-like organs, in such an order that an insect can hardly traverse it without interfering with one of them, when the two sides suddenly collapse and enclose the prey, with a force surpassing an insect's efforts to escape. The fringe of hairs on the opposite sides of a leaf interlace, like the fingers of two hands clasped together. The sensitiveness resides only in these hair-like processes on the inside, as the leaf may be touched or pressed in any other part without sensible effect. The little prisoner is not crushed and suddenly destroyed, as is sometimes supposed, for I have often liberated captive flies and spiders, which sped away as fast as fear or joy could carry them. At other times I have found them enveloped in a fluid of a mucilaginous consistence, which seems to act as a solvent, the insects being more or less consumed in it."

To Ellis belongs the credit of divining the purpose of the capture of insects by the *Dionœa*. But Curtis made out the details of the mechanism, by ascertaining the seat of the sensitiveness in the leaves ; and he also pointed out that the secretion was not a lure exuded before the capture, but a true digestive fluid poured out, like our own gastric juice after the ingestion of food.

For another generation the history of this wonderful plant stood still ; but in 1868 an American botanist, Mr. Canby, who is happily still engaged in botanical research, while staying in the *Dionœa* district, studied the habits of the plant pretty carefully, especially the points which Dr. Curtis had made out. His first idea was that "the leaf had the power of dissolving animal matter, which was then allowed to flow along the somewhat trough-like petiole to the root, thus furnishing the plant with highly nitrogenous food." By feeding the leaves with small pieces of beef, he found, however, that these were completely dissolved and absorbed ; the leaf opening again with a dry surface, and ready for another meal, though with an appetite somewhat jaded. He found that cheese disagreed horribly with the leaves, turning them black, and finally killing them. Finally, he details the useless struggles of a Curculio to escape, as thoroughly establishing the fact that the fluid already mentioned is actually secreted, and is not the result of the decomposition of the substance which the leaf has seized. This Curculio being of a resolute nature, attempted to eat his way out,—"when discovered he was still alive, and had made a small hole through the side of the leaf, but was evidently becoming very weak. On opening the leaf, the fluid was found in considerable quantity around him, and was without doubt gradually overcoming him. The leaf being again allowed to close upon him, he soon died."

At the meeting of this Association last year, Dr. Burdon Sanderson made a communication, which, from its remarkable character, was well worthy of the singular history of this plant ; one by no means closed yet, but in which his observations will head a most interesting chapter.

It is a generalization—now almost a household word—that all living things have a common bond of union in a substance—always present where life manifests itself—which underlies all their details of structure. This is called *protoplasm*. One of its most distinctive properties is its aptitude to contract ; and when in any given organism the particles of protoplasm are so arranged that they act as it were in concert, they produce a cumulative effect which is very manifest in its results. Such a manifestation is found in the contraction of muscle,—and such a manifestation we possibly have also in the contraction of the leaf of *Dionœa*.

The contraction of muscle is well known to be accompanied by certain electrical phenomena. When we place a fragment of muscle in connection with a delicate galvanometer, we find that between the outside surface and a cut surface there is a definite current, due to what is called the electro-motive force of the muscle. Now, when the muscle is made to contract this electro-motive force momentarily disappears. The needle of the galvanometer, deflected before, swings back towards the point of rest ; there is what is called a *negative variation*. All students of the vegetable side of organized nature were astonished to hear from Dr. Sanderson that certain experiments which, at the instigation of Mr. Darwin, he had made, proved to demonstration that when a leaf of *Dionœa* contracts, the effects produced are precisely similar to those which occur when muscle contracts.

Not merely then are the phenomena of digestion in this wonderful plant like those of animals ; but the phenomena of contractility agree with those of animals also.

Drosera.—Not confined to a single district in the New World, but distributed over the temperate parts of both hemispheres, in sandy and marshy places, are the curious plants called sundews—the species of the genus *Drosera*. They are now known to be near congeners of *Dionœa*—a fact which was little more than guessed at when the curious habits which I am about to describe were first discovered.

Within a year of each other two persons—one an Englishman, the other a German—observed that the curious hairs which every one notices on the leaf of *Drosera* were sensitive.

This is the account which Mr. Gardom, a Derbyshire botanist, gives of what his friend Mr. Whateley, "an eminent London surgeon," made out in 1780 :—"On inspecting some of the contracted leaves we observed a small insect or fly very closely imprisoned therein, which occasioned some astonishment as to how it happened to get into so confined a situation. Afterwards, on Mr. Whateley's centrically pressing with a pin other leaves yet in their natural and expanded form, we observed a remarkable sudden and elastic spring of the leaves, so as to become inverted upwards and, as it were, encircling the pin, which evidently showed the method by which the fly came into its embarrassing situation."

This must have been an account given from memory, and represents the movement of the hairs as much more rapid than it really is.

In July of the preceding year (though the account was not published till two years afterwards) Roth, in Germany, had remarked in *Drosera rotundifolia* and *longifolia* "that many leaves were folded together from the point towards the base, and that all the hairs were bent like a bow, but that there was no apparent change on the leaf stalk." Upon opening these leaves, he says, "I found in each a dead insect ; hence I imagined that this plant, which has some resemblance to the *Dionœa muscipula* might also have a similar moving power.

"With a pair of pliers I placed an ant upon the middle of the leaf of *D. rotundifolia*, but not so as to disturb the plant. The ant endeavoured to escape, but was held fast by the clammy juice at the points of the hairs, which was drawn out by its feet into fine threads. In some minutes the short hairs on the disk of the leaf began to bend, then the long hairs, and laid themselves upon the insect. After a while the leaf began to bend, and in some hours the end of the leaf was so bent inwards as to touch the base. The ant died in fifteen minutes, which was before all the hairs had bent themselves."

These facts, established nearly a century ago by the testimony of independent observers, have up to the present time been almost ignored ; and Trecul, writting in 1855, boldly asserted that the facts were not true.

More recently, however, they have been repeatedly verified :—in Germany by Mitschke, in 1860 :—in America by a Lady, Mrs. Treat of New Jersey, in 1871 :—in this country by Mr. Darwin, and also by Mr. A. W. Bennett.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 19, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROVINCIAL ASSOCIATIONS AND PHARMACEUTICAL EDUCATION.

THE presidential addresses delivered before our provincial associations are too often but indifferent productions, which, after the elimination of portions having only special local interest, contain little beyond platitudes to reward the general reader. Frequently, when a formidable roll of MS. is received, bearing the endorsement "President's Address," misgivings arise as to the wisdom of publishing it, and although, as a rule, for the sake of ventilating what might be presumed to be representative opinions, such addresses are placed on record in these columns, it is sometimes necessary to risk wounding the author's *amour propre* by a considerable condensation. It, therefore, is a source of great pleasure to be able to call attention to the address of Mr. W. B. CLARK to the Leicester Chemists' Assistants' and Apprentices' Association, printed in the Journal for last week, and the Report of the Council and Address of Mr. G. F. SCHACHT to the Bristol Pharmaceutical Association, printed at p. 226, this week, as valuable contributions to the history of pharmaceutical education in the provinces.

Whatever else may have been wanting towards the elucidation of the subject of provincial pharmaceutical education hitherto, schemes and suggestions have been put forward in abundance. But how was their practicability to be tested? "Ay, there's the rub!" As the Clothes' Philosopher, Herr TEUFELSDRÖCKH, wisely says, "Between vague wavering Capability "and fixed indubitable Performance, what a differ-"ence! A certain inarticulate Self-consciousness "dwells dimly in us, which only our Works can "render articulate and decisively discernible." Indeed "to render articulate and decisively discernible" the vague shadows set forth by more than one *soi-disant* pharmaceutical statesman would have required a sum of money compared with which the modest accumulated fund that has now and again brought reproach upon the Pharmaceutical Society would have been as the drop of a bucket. Some approach towards the solution of the problem would appear to have been made at Leicester and at Bristol; in the former case by a Society composed mainly of and managed by assistants and apprentices, in the latter by a Society in which the influence of the employers is more predominant. It is only fair to infer, therefore, what has been repeatedly urged in these columns, that it is upon local energy, liberality and tact, rather than to a system of subsidizing by the Pharmaceutical Society, that the future of provincial pharmaceutical education depends. And the Leicester Association affords an illustration of a money grant from the Pharmaceutical Society wisely and readily given and profitably applied.

Although making no pretension to literary merit, the simple narrative of the President of the Leicester Association is full of interest. From the commencement of the Association, in 1869, it seems to have been managed with singular ability and zeal. Although the charm to juniors of managing their own affairs has apparently been now and then broken by inseparable consequent misunderstandings, and perhaps jealousies, there has always been tact and good feeling sufficient to weave the spell again. The consequence has been, that the object for which the Association was established—namely, to help persons employed in the drug trade in Leicester in their preparation to pass the pharmaceutical examinations —has been accomplished, as many as eleven examinations having been passed by members during one half-yearly session; and now, in 1874, the Association boasts the largest number of members it ever had. Moreover, the grant from the Pharmaceutical Society, instead of being dribbled away in current expenses, has been capitalized in the form of a materia medica cabinet. And yet the balance is on the right side of the balance-sheet.

We are glad to believe that the Leicester Association is not alone in its good fortune, but that in other places, and especially at Northampton, a similar success has been attained.

The Bristol Pharmaceutical Association needs no commendation here. Fortunate in possessing among its members pharmacists so distinguished as Messrs. SCHACHT, STODDART, and GILES, and a Secretary so indefatigable as Mr. PITMAN, its evening meetings have acquired a reputation at least equal to those of any held in Great Britain. The same enthusiasm which has marked the catering for these meetings has also attended the educational arrangements made more specially in the interest of the juniors; and, although these arrangements have more of a paternal character than those which obtain at Leicester, the common object has been attained, as is evident from the details given in the report. For instance, seventeen students of the Association entered for the course of lectures on Inorganic Chemistry. Of these, fifteen presented themselves at the end of last session for the Government examination in connection with the Science and Art Department. Thirteen passed, and, in addition, ten succeeded in satisfying Dr. FRANKLAND as to their knowledge of laboratory practice.

These lines have not been written for the special glorification of the societies referred to, but rather to give prominence to the fact that the success of efforts for the diffusion of pharmaceutical education in the provinces cannot be purchased either by local subscriptions or grants of money by a central society alone. A wise discrimination in the selection of proffered services, a persistent personal interest on the part of the members, and the application of the same rules which bring success in ordinary business, each form part of the price that must be paid. It is with regret that we notice that, apparently from overlooking this fact, more than one local Association which once stood in the van remains stationary, or shows signs of decadence, whilst in other quarters where something more than a "vague wavering capability" was felt—or at least asserted—"indubitable performance" is still lacking.

MANCHESTER SCHOOL OF PHARMACY.

We have received a programme of the arrangements, for the session 1874-5, of the Manchester School of Pharmacy, in connection with the Manchester Chemists' Association. There will be a course of thirty lectures on Chemistry, including the elements of physics, delivered by Mr. L. Siebold, on Friday evenings, commencing October 9. Fee 30*s*. A course of twenty-five lectures on Materia Medica and Pharmacy, also by Mr. Siebold, will be delivered on Tuesday evenings, commencing October 6. Fee 25*s*. Mr. Leo H. Grindon will deliver a course of fifteen lectures on Botany, on Friday evenings, commencing October 16. Fee 15*s*. Composition fee, admitting the student to the three courses, £3 3*s*. Application for tickets must be made not later than the 30th inst. In addition, Mr. Siebold will conduct a Laboratory course at his private laboratory, 225, Oxford Street, Manchester. Students wishing to attend this course must communicate with Mr. Siebold before the 20th inst. Further information may be obtained from the Honorary Secretary, Mr. F. Baden Benger, 7, Exchange Street.

LANCASTER MAGISTRATES ON THE APPOINTMENT OF ANALYSTS.

In a report which has been prepared by a Committee for presentation at the next meeting of the Court of Annual General Session for the county of Lancaster, the Adulteration Acts have been considered, especially in relation to the diversity of practice in respect to the remuneration of analysts, and the advisability of making fresh appointments during the present unsettled state of the law. The report recommends a delay. Should it, however, be considered by the court to be inexpedient to delay the appointment of analysts, the Committee advises the appointment of one fully competent analyst for each of the four Quarter Sessional Divisions of the county, exclusive of the boroughs having separate quarter sessions, viz.: Manchester, Liverpool, Bolton, and Wigan, these towns having already exercised their privileges, and appointed analysts of their own. The Committee also recommends that the mode of remuneration should be by a fixed salary or retaining fee to cover laboratory expenses, etc., supplemented by fees for each analysis. If the analyst be required to give evidence in person, the Committee thinks an additional allowance as a witness and a mileage for travelling expenses should be granted, at any rate whenever he is required to give evidence at a distance from his usual place of residence.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The annual general meeting was held, on the evening of the 7th September, at the Museum and Library, Bristol.

The President, Mr. Schacht, briefly opened the proceedings. He said they would in part be necessarily formal, but that one portion, at any rate, namely the distribution of the prizes to those who had so well earned them, he should be unable to regard simply as a formality. He must commence, however, with the more formal part of his duty, and request their honorary Secretary, Mr. Pitman, to read the report.

The Treasurer, Mr. Boorne, would also read the statement of accounts.

Report of Council for Year ending July 31st, 1874.

The Council of the Bristol Pharmaceutical Association have the pleasure to submit their report of the past year's proceedings.

The plan pursued in previous sessions of arranging a series of evening lectures upon scientific topics of interest to pharmacists was again adopted, and the Association was favoured with some excellent discourses by Mr. Siebold, Dr. Porter Smith, Dr. Watts, Mr. Wills, and Professor Redwood. Your Council are glad to be able to record that this portion of their scheme proved itself as before thoroughly successful.

The evening devoted to reading and discussing original papers was well occupied with good practical matter, and one of the papers, that, namely, by Mr. Towerzey upon Hydrocyanic Acid, has since received a large share of notice in other quarters.

The systematic courses of lectures upon Chemistry and Botany, by Mr. Coomber and Mr. Leipner, were once more repeated with the following results:—

For the course on Inorganic Chemistry, seventeen students of the Association entered, and fifteen presented themselves for the Government Examination at the end of the session. The following thirteen passed:—

Mr. Thos. W. Hall ...	Advanced Grade ...	1st Class.
Mr. Thos. S. Stubbs...	" " ...	2nd "
Mr. C. M. Luxmoore...	Elementary Grade...	1st "
Mr. John Q. Morris...	" " ...	1st "
Mr. Alfred H. Higgs...	" " ...	1st "
Mr. Cuthbert Powell...	" " ...	1st "
Mr. Chas. E. Tritton...	" " ...	1st "
Mr. Walter Powell ...	" " ...	2nd "
Mr. James Lacey	" " ...	2nd "
Mr. John F. Savory...	" " ...	2nd "
Mr. Chas. D. Barker...	" " ...	2nd "
Mr. G. F. Matthews...	" " ...	2nd "
Mr. John H. Hugill...	" " ...	2nd "

The foregoing results relate to the ordinary examinations in Chemistry. The following also succeeded in satisfying Dr. Frankland, the examiner, as to their knowledge of laboratory practice:—

Mr. Thos. W. Hall ...	Advanced Grade ...	1st Class.
Mr. Thos. S. Stubbs...	" " ...	2nd "
Mr. C. M. Luxmoore...	Elementary Grade...	1st "
Mr. John Q. Morris...	" " ...	1st "
Mr. Alfred H. Higgs...	" " ...	1st "
Mr. Cuthbert Powell...	" " ...	1st "
Mr. Chas. E. Tritton...	" " ...	1st "
Mr. John F. Savory...	" " ...	2nd "
Mr. G. F. Matthews...	" " ...	2nd "
Mr. John H. Hugill...	" " ...	2nd "

For the course on Organic Chemistry seven entered, and three presented themselves for and passed the examination:—

Mr. C. M. Luxmoore...	Elementary Grade...	1st Class.
Mr. Thos. W. Hall ...	" " ...	2nd "
Mr. John Q. Morris...	" " ...	2nd "

Mr. Charles M. Luxmoore also passed in laboratory practice.

For the lectures on Botany *eleven* students of the Association entered, and *nine* of these presented themselves for examination. The following passed :—

Mr. Fred. Stamps	......Elementary Grade	...1st Class.
Mr. Charles J. Miles ...	" "	...1st "
Mr. Arthur H. Baldwin	" "	...2nd "

Mr. Stoddart also again gathered together a class for the study of materia medica, and, with the thoroughness that distinguishes him, finished his excellent course of instruction with an examination at which eight of the twelve members of his class competed. The examination papers were kindly supplied and adjudicated upon by Professor Bentley, in whose report, two students, Mr. Cuthbert Powell and Mr. Alfred Higgs, are specially commended. The fees derived from these lectures (twelve guineas) Mr. Stoddart has generously added to the Museum and Library fund, thus making over £37 contributed by him towards this object. These facts speak for themselves; and will elicit, as they deserve, the esteem and gratitude of every member of the Association.

The Council, at the commencement of the session, announced a series of prizes for award to those students who should pass the best examinations in the above-mentioned subjects. They have now the pleasure to state that the following gentlemen have become entitled to these prizes, and they congratulate them heartily upon the distinction they have thus gained.

Mr. Charles M. Luxmoore, for Elementary Inorganic Chemistry.

Mr. Thos. W. Hall, for Advanced Inorganic Chemistry.

Mr. Charles M. Luxmoore, for Elementary Organic Chemistry.

Mr. Frederick Stamps, 1st for Elementary Botany.

Mr. Charles J. Miles, 2nd for Elementary Botany.

Mr. Cuthbert Powell, 1st in Materia Medica.

Mr. Alfred H. Higgs, 2nd in Materia Medica.

The Council have to record and to acknowledge with gratitude an act of great kindness, on the part of a gentleman whose warm interest in the cause of pharmaceutical education is being constantly manifested. Mr. Thomas Hyde Hills, the President of the Pharmaceutical Society, has placed the sum of ten guineas at the disposal of your Council for prizes to be distributed in the manner they think best calculated to promote the educational work of the Association. The decision will be shortly announced, and it is hoped that this sign of sympathy on the part of Mr. Hills with an effort so far removed from his own observation as our school is, will work all the good he so wisely aims to produce.

Your Council cannot pass without notice the recent projection of a scheme for the institution of a College of Science for Bristol and the West of England. The object of your association, namely, the promotion of scientific pharmacy, appeared to your Council to be so closely related to that indicated in the college programme that they did not hesitate to express their cordial sympathy with the effort, and they sincerely hope the course ultimately taken by the new organization will be such as this Association can practically support. Your Council are of opinion that the system of instruction to be offered by this College may be so framed as to include the highest requirements of the student pharmacist.

THE TREASURER IN ACCOUNT WITH THE BRISTOL PHARMACEUTICAL ASSOCIATION, 1873-4.

Dr.	£ s. d.
To Balance from last year ...	10 4 3
" 56 Members' Subscriptions at 10*s*. 6*d*. ...	29 8 0
" 32 Associates' Subscriptions at 5*s*...	8 0 0
" Lecture Fees ...	6 15 0
" Balance due to Treasurer ...	2 12 1
	£56 19 4

Cr.	£ s. d.	£ s. d.
By Lecture Fees, viz.—		
Mr. Coomber ...	7 7 0	
Mr. Leipner ...	7 7 0	
		14 14
" Expenses Incidental to Monthly Lectures, viz.—		
" Lecturers' Expenses ...	11 12 0	
" Carriage of Apparatus ...	0 15 3	
" Mr. Westaway ...	2 11 0	
		14 18 3
" Printing and Stationery ...		7 1 0
" Miscellaneous Expenses ...		3 18 7
" Prizes ...		6 7 6
" Treasurer of Bristol Museum and Library, for use of offices, etc., for Meetings and Lectures ...		10 0 0
		£56 19 4

MUSEUM ACCOUNT.—1873-4.

1873.	£ s. d.
To Balance from last year ...	25 4 0
" Cash from twelve students who attended Mr. Stoddart's Lectures ...	12 12 0
	£37 16 0

HILL'S PRIZE FUND.

Received from Thomas Hyde Hills, Esq ...	10 10 0

Examined and found correct,

WILLIAM HENRY COLLINGS.

The President then said it became his duty to move the adoption of the report, which he hoped the members would agree with him in considering fairly satisfactory. They all knew, as he endeavoured to remind them on the occasion of his address at the commencement of their session, that the prime object of the Association was the education of the junior members of their body; and if that purpose had been accomplished to an extent commensurate with their opportunities they were justified in being tolerably content. Referring to the attendance of students at the various courses of lectures, he said that although the list was not quite so large as on some previous occasions, the falling off was but small. He owned he should have preferred to see the numbers increasing rather than diminishing: he must also be allowed to say he should like to see every student who entered for a course of instruction pursuing it earnestly to the very end, and going in, as a matter of course, for the examinations and for the prizes; this would be one of the very best methods his young friends could adopt to show their teachers and the Council that they were as much in earnest as their seniors, and that they appreciated all that was aimed at in their behalf. However, in none of these matters had he any complaint to make, his object was rather to encourage to even greater success in the future than had yet been attained. As regarded one section of their work, namely, the study of botany, he thought it would be the duty of the incoming Council to endeavour to arrange that it should occupy if possible the spring and summer months. He ought not perhaps to be quite silent upon a subject which was not this time mentioned in the report, namely, their being still without a library and museum. The old difficulty, the want of proper premises, still existed, but he was happy to say the extension of the building they were then in had really commenced, and he hoped they might before long see their way to the proper employment of the fund Mr. Stoddart had so laboriously accumulated for this purpose. In the meantime, he would remind them that the Pharmaceutical Society of Great Britain possessed an excellent lending library, a catalogue of which could be had for the asking, and was quite willing to pay the carriage one way of all books that were borrowed by its members and associates. He hoped also they would allow him to say a few words upon a matter which, though alluded to in the report, he did not like to pass in silence; he meant that very kind act of Mr. Hills—the donation of ten guineas towards their prize fund. It was a very rare thing, indeed, to find a gentleman so far removed from personal association with a locality as Mr. Hills was from Bristol, take so warm an interest in that locality's good; it showed a largeness of sympathy as generous as it was rare, and ought to attach every member of their Association to Mr. Hills as a personal friend. He was sorry to have to conclude this portion of his remarks with a shrug, but he must remind them that the balance of their accounts was unfortunately on the wrong side. It was, however, but a small balance, and if each gentleman present would remind his friends that a few more subscriptions would suffice to rectify the blemish, no doubt all would soon be set right; but they must not forget that the effort must be made. In conclusion he begged to move the adoption of the report and the statement of accounts.

Mr. Samson had great pleasure in seconding the motion, which was then carried.

The President then distributed the prizes to the successful candidates, and in doing so remarked that as they were not of very great money value, he hoped those who had earned them would not estimate them solely from that point of view. The purpose of these prizes was to show that the Council took interest in and welcomed their efforts to improve; and they gave them, not so much as rewards for diligence—which might be right when managing children, but wrong when dealing with young men—as signs of the hope that in the successes they were destined to achieve in after-life they would always be able to look back to the studies of the present time with gratification and pleasure.

CHEMISTRY.

Inorganic.—Elementary Grade.—C. M. Luxmoore, 'Attfield's Chemistry,' 'Squire's Companion.'

Advanced Grade.—Thos. Hall, 'Royle's Materia Medica,' 'Bentley's Botany.'

Organic.—Elementary Grade.—C. M. Luxmoore, 'Royle's Materia Medica,' 'Bentley's Botany.'

BOTANY.

First.—Fredk. Stamps, 'Pereira's Materia Medica.'

Second.—Chas. J. Miles, 'Tyndall's Fragments of Science for Unscientific People.'

MATERIA MEDICA.

First.—Cuthbert Powell, 'Cooley's Practical Receipts.'

Second.—Alfred H. Higgs, 'Ganot's Physics.'

Mr. Stoddart supplemented the donations of the Council by some further gifts of his own, and explained that he had not examined his class himself, but had requested Professor Bentley to supply a list of questions, and the papers of the candidates had been afterwards sent to him for estimation. He also bore warm testimony to the attention and courteous bearing of every member of his class, and said he rejoiced in the thought that he had secured them all as personal friends.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A meeting of the above Association was held on Monday, September 14th, for the election of officers for the ensuing session, which resulted as follows:—

President, Mr. C. Hester; Vice-President, Mr. J. Osborne; Secretary and Treasurer, Mr. J. C. Druce; Members of the Council, Messrs. Kemp, Princep, and W. J. Mayger, the latter representing the apprentices. The class conductors chosen were Mr. O. Wallis (Botany and Prescriptions), Mr. J. Druce (Chemistry), Mr. Princep (Materia Medica), and Mr. Osborne (Pharmacy and Latin).

A paper on "Specific Gravity" was sent by Mr. W. Stott, of Leeds, which detailed with great minuteness the different methods of taking the specific gravity of liquids and solids.

Mr. Hester proposed a hearty vote of thanks to Mr. H. J. Masters, who at a former meeting had sent in his resignation as president on account of his leaving the town, for the energy with which he had worked for the Association. Mr. Kemp seconded the vote, and the meeting carried it with much applause.

Mr. Druce then, in the name of the members, thanked Mr. Masters for his services in connection with the Association since its commencement, and expressed their regret at parting with him. He also presented to Mr. Masters a very handsomely illuminated copy of Byron's 'Prisoner of Chillon,' which had been purchased by all the members of the Association.

Mr. Masters warmly thanked the members for their handsome present, which he said he valued not only for its worth and beauty, but also as an expression of good feeling, which he fully appreciated and should always highly esteem. Having thanked the mover and seconder of the vote of thanks for their kind expressions, he referred to the quiet manner in which the Secretary had managed the presentation, as he had not the slightest idea what was going on till the book itself was placed in his hands. He hoped that their next botanical ramble would be near Bedford, so that he might in some way repay the kindness with which he had been treated.

The title-page bore a fitting inscription, and the signatures of all the members of the Association.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Concluded from p.* 219.)

SUGGESTIONS RESPECTING THE OFFICIAL AND OTHER CONFECTIONS.

BY T. HAFFENDEN.

Confections are very old preparations. Under the names of electuaries and conserves, this mode of preserving and presenting medicines has maintained a firm position amongst compound remedial agents.

If the confections of the present Pharmacopœia are compared with those of any previous era, I think they will show a decided advance on the crude notions that so long prevailed. Sir Walter Raleigh's confection contained shavings of hartshorn, viper's flesh with hearts and livers, flowers of borage, rosemary, marigolds, sundew and red elder, leaves of scordium, carduus benedictus, baum, cretic dittany, mint, marjoram, betony, juice of kermes, greater cardamom seeds and cubebs, of juniper berries, mace, nutmegs, cloves and saffron, cinnamon, sassafras bark, yellow peel of citron and oranges, aloes wood and sassafras wood, roots of angelica, wild valerian, fraxinella or white dittany, Virginia snake root, zedoary, tormentil, bistort, long and round birthwort, gentian and masterwort; upwards of forty ingredients. This is very far behind our confection of senna, the most complex of our modern confections. Still it is considered that confections need criticism, and I would suggest that the list might be extended.

Confectio Opii.—Is it worth while to class this among the confections? it will not keep any length of time when made. Why not relegate it to the list of powders, as the Pulv. amygd. co., formerly known as Confect. amygd.?

Confectio Piperis.—A substitute for Ward's paste. It seems a useful simple remedy.

Confectio Rosæ Caninæ; Confectio Rosæ Gallicæ.—These are very nice when fresh, but likely to crystallize by keeping; a great disadvantage, as they are very largely used for pill excipients. A sufficient quantity to make a mass is the way they are frequently ordered in prescriptions, the consequence being that according to the age and consistence of the conserve, so is the size of the pills. It has occurred to me whether the addition of a small portion of glycerine in the manufacture of these conserves would tend to prevent crystallization. A great deal of trouble is frequently given to the dispenser by having to incorporate "essential oils" in the masses; the pills sweat and are troublesome to coat. Would it not be worth while to prepare conserves to take to some extent the place of essential oils, in pills; as, for instance, a conserve of lavender, prepared with lavender flowers, sugar, and glycerine, would be a very elegant form of exhibiting a well-known carminative, and the most fastidious lady would not object to swallowing lavender pilules, or a confection of orange would be a very nice form for exhibiting quinine as an electuary, and might even be mistaken for marmalade spread on bread and butter, and given to patients.

With reference to the conserves as excipients, I have not tried the qualities of a proportion of glycerine in arresting crystallization; it seems to me, if we can only manage that matter, it will be better for us, and there will not be the liability, as there is now, to make pills of various sizes in different pharmacies, according to the bias or inclination of the dispenser.

Confectio Scammonii.—This, with confection of senna, is not simple enough for the present time. I would suggest the advisability of having for this class of confections a standard *simple confection*, as a basis for incorporating the active ingredients, in the same way that we have simple ointment amongst the ointments. The composition need only to be extremely simple, the pulp of tamarinds, or prunes with sugar and glycerine, if that proves of any service. Then we might have confections of jalap, scammony, senna, etc. I should imagine a nice aperient confection for children could be made of simple confection, jalap, senna, and ginger combined.

Confectio Sennæ.—The remarks on previous confections apply to this, the more so as this is now frequently in practice made the basis of compound electuaries, containing jalap, sulphur, cream of tartar, etc.

Confectio Sulphuris.—This is a very elegant preparation when fresh made, but apt soon to become disagreeable from pellicles of sugar crystallizing on the surface. This might be advantageously made with simple confection as suggested. In this connection, however, is it wise to ignoref the old family brimstone and treacle? is it quite out o place to give this a standing among recognized formulæ? We are often applied to as to the proper strength to mix this valuable household remedy, and in practice I have found it vary from 1 ounce to 8 ounces to the pound of treacle in different parts of the country.

Confectio. Terebinthinæ.—The last of the authorized confections is, in my opinion, the best. The liquorice disguises the taste of the turpentine most effectually; here it appears to me my proposed Conf. lavand., used instead of the honey, would still more effectually disguise the smell of turpentine, and make a more elegant preparation than it is now.

In conclusion, there are one or two remedies that are found very useful in their action, which are too bulky to be taken in sufficiently large quantity in the form of pills, and yet it is very difficult to exhibit them elegantly in the form of mixtures; such as cinchona, carbonate of iron, guaiacum, etc. These I would suggest might be advantageously exhibited with the simple confection, and find a place in the Pharmacopœia; there is an old form containing guaiacum, called the Chelsea Pensioner, that has been very much used; then there is no Conf. cubebæ; this is very generally in use; in our Brighton Hospital it is used very largely. We make it of powdered cubebs, carbonate of soda, balsam copaiba, and syrup, and find it most useful. I need not reiterate the advantages of having a standard authorized formula for all well-known and largely-used preparations.

A vote of thanks was accorded to Mr. Haffenden.

Mr. Muir's paper on "Potable Water and its Contamination in House Cisterns" was taken as read.

On the Influence of the Means of Supply upon Water used for Domestic Purposes.

BY M. M. PATTISON MUIR, F.R.S.E.

Last year, I communicated to the Conference the results of certain measurements of the action of sewer gases upon water supplied for domestic purposes; from these measurements I inferred that water which comes through the ordinary dwelling-house cistern contains a considerably larger amount of nitrates than water which is supplied directly from the main pipe. As this inference was drawn from an examination of but two samples of water, I have deemed it proper to extend the investigation so as to arrive at results which may be of more general application. The samples have been so selected as to secure the examination of typical waters; some of these samples have been taken from large and well situated dwelling-houses, others from middle-class houses, while others have been supplied to me—through the kindness of the sanitary inspector of Glasgow—from houses occupied chiefly by the lower classes, and situated in the more crowded parts of the town.

The results of the examination are given in the form of a table; all the quantities being stated in *parts per million* of water, which is equal to *milligrams per litre.*

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.	No. 10.	No. 11.	No. 12.
Free ammonia..	·005	·085	·023	—	·015	·015	·010	·035	·015	·075	·20	·045
Albumenoid ammonia...	·092	·120	·080	·082	·090	·080	·085	·085	·070	·065	·370	·090
Nitrogen as nitrates and nitrites ...	·309	·463	—	·321	·360	·20	·258	—	·284	·306	·414	—

No. 1. From main pipe. No. 2. From cistern in same house; in this house the cistern water is very little used. No. 3. From cistern in house similar to No. 2, but water generally used. No. 4. From pipe leading directly out of the bottom of cistern in well situated dwelling-house. No. 5. From cistern in smaller dwelling-house. No. 6. From small cistern supplying part of a house only. No. 7. From public well, supplied with Loch Katrine water from a wooden cistern closed at the top. No. 8. From cistern situated just under the slates in a house in a lower locality than the preceding houses. No. 9. From cistern over water-closet in a dwelling-house. No. 10. From cistern similar with last. No. 11. Taken from same cistern as No. 9, but after stirring up the muddy deposit at the bottom. No. 12. From cistern near the slates, in a house where there had been two cases of fever, and where the water was complained of.

Omitting for the present No. 11, it is found that No. 2 sample shows the highest numbers for free and for albumenoid ammonia, also for nitrates. Now this sample of water was taken from the cistern of a house in which the pipes have been recently entirely renewed, and in which the pipe leading from the water-closet to the main drain is thoroughly ventilated. The water in this cistern is, however, very rarely used; for all domestic purposes, a supply is obtained directly from the main; it would, therefore, appear that sewer gases are slowly absorbed by water stored in such a cistern.

That this absorptive action must take place slowly is evident, if we look at the results obtained from the other waters. Although many of these waters were taken from badly situated cisterns, yet, in none of them, can the influence of sewer gases be distinctly traced. We must, therefore, conclude that the rapidity with which the water in the cisterns has been changed has prevented any appreciable action of the gases upon these waters. There are, it is true, slight variations in the numbers obtained, but in no case do we find a notable increase as compared with water from the main pipe. The general conclusion to be drawn, therefore, is, that cistern waters are not, under ordinary circumstances, contaminated with sewer gases, but that if the water remains undisturbed for a considerable length of time in the cistern, it may become so contaminated; but that, even in such a case, the amount of contamination is inconsiderable.

House cisterns certainly soon become dirty, and when they have been used for some time, a deposit of mud or slimy matter is found at the bottom.

The amount of ammonia, etc., obtained from a sample of this slimy matter (diluted with the water itself), No 11, indicated that a great part of the ammonium salts, etc., is concentrated therein; this matter may, therefore, perhaps exercise a certain beneficial effect upon the water.

It may be objected to these results that a greater or less amount of free and albumenoid ammonia is not proof of the absorption of sewage gases by water, and that even if these gases are absorbed, their presence will not be indicated by a variation in the amounts of the two ammonias.

In order to test the accuracy of such an objection, the following experiment was performed. A quantity of distilled water, free from ammonia, was placed in a porcelain basin, which was covered with porous paper, and suspended at a short distance above the liquid in a sewer.

Through the kindness of the master of works of Glasgow, I was enabled to conduct this experiment in a sewer which receives the refuse of a very large area chiefly occupied by dwelling-houses. The basin was suspended during 96 hours, after which time the free and albumenoid ammonia in the water was estimated, with the following results.

Free ammonia	= ·60 milligrams per litre	= parts per million.
Albumenoid	= ·54 " "	= " "

Such a water as this would be at once condemned as largely contaminated with sewage. These results show, therefore, that the water has absorbed a large amount of nitrogenous organic matter; and, further, that the exposure of water to the action of sewer gases does very decidedly alter the amount of free and albumenoid ammonia obtained in the analysis of the water.

The conclusions to which these measurements lead me are, therefore, these:—

1. That sewer gases are absorbed by water, and that their presence is rendered evident by an increase in the amount of free and albumenoid ammonia, and also of nitrates, obtained from that water.
2. That this absorption takes place slowly.
3. And that in ordinary cisterns the water is not contaminated to any extent with sewer gases, probably because of the short time during which this water is allowed to remain in the cistern, and also perhaps because of the deposition of part of the impurities in the muddy substance which settles at the bottom of the cistern.

———

Professor Attfield: I may state that this paper of Mr. Muir's is a continuation of the one he read last year. If you remember, he found that water kept in the cistern of a house contained a considerably larger quantity of nitrates than water taken from the main of the same house, and he explained that result on the assumption that the water had absorbed large quantities of sewer gas, which had become oxidized, and so yielded nitrates. In the paper he has now sent, he states that that conclusion was the result of only two experiments, that he has since made ten or a dozen, and he finds that the increase in the quantity of nitrogenous nitrates, caused by possible oxidation of sewer gas, is much less than those two experiments had led him to suppose.

The next paper read was:—

Note on some Indigenous Tuscan Remedies.

BY HENRY GROVES, FLORENCE.

Herbalism in Tuscany is by no means rampant, nor has it been so for two or three centuries. This is to be attributed to the early establishment of hospitals, some of which were kept by monks. Now, these good friars, wise in their generation, knowing with what tenacity the sons of the soil hold fast to their coin, even the smallest, fostered the habit of taking their contributions in kind, and made yearly quests of wine, oil, and corn; so the countryman became identified with his hospital, and left herbs to take care of themselves.

To do justice to the contadino, he is not altogether an apostate from the ancient state of things, for he is withal a practical man, and seeks, therefore, to heal lesser ailments by wedding the curative with the culinary art; so he prepares numerous salads and fried meats with several of the *Cichoraceæ* which he finds on his own grounds, and which are reputed to be useful for this or that disease. There are, however, a few simples to be found in the cupboard of every housewife; for what could be done without the capitula of *Matricaria Chamomilla*, which are used as a calming antispasmodic, and also applied hot externally as a means of relieving pain? Then there are the flowers of mallow, violet, lime, orange, and elder; the leaves of mallow, orange, walnut, and myrtle; with the soboles of couch grass and the roots of marshmallow, and a few others, varying in different districts. But with the foregoing enumeration we have by no means got to the end of our tether. For if housewives in general refuse to enlarge their indigenous remedies, and trust to tamarind for diarrhœa, tamarind for constipation, and tamarind for every other ailment,—tracing all disease to "riscaldimento" or heat, in the same way as we English ascribe not a few disorders to "bile," and the French to "glaires,"—there nevertheless are people who have a much more extensive materia medica, either obtained by observation or handed down to them as the shreds of an almost extinct herb-wisdom which flourished under the worthies of the fourteenth and fifteenth centuries, when medical practitioners identified themselves with research on indigenous remedies more than is the fashion in our day. A custom very prevalent in Tuscany is the administration of herb juice in the spring. It is prepared daily by many herbalists, and is also ordered by the faculty, and thus comes under the notice of pharmacists. The recipes that have come under my notice are varied, but two of the favourites are the following:—

℞. Beccabunga (Veronica).	℞. Ortica.
Nasturtio acquatico.	Bardana.
Fumaria.	Fumaria.
Cochlearia (officinalis).	Gallio (Salium).

Simple chicory juice is frequently used, and that of the nettle is highly esteemed. To all these succi it is usual to add a grain or two of Ferri amm. chlor. or a few grains of sulphate of soda, and sometimes a drachm or two of compound syrup of rhubarb. The treatment is usually continued for a month, and the quantity taken is from three to four ounces of juice per diem. Of the herb-lore of the people, alas! little else than the monsters and griffins of the plant-world remain. The story of the mandrake still opens the eyes of little and big children, as some wise one tells of the dreadful power of the *Mandragora superiora*, of its long and slow growth, and of its deadly power over those who seek to uproot it. An old herb-collector whom I employ, thanks God that when he discovered a mandrake it proved to be a false one, or he should have been a dead man!

In continuing this paper, I shall arrange such simples as I am aware of in their natural orders, so as to get them in some sort of shape. But before proceeding with the plants, let me observe that viper-broth is gone out of fashion, and the pharmacist is spared keeping those reptiles, and the pincers with which they were handled. Snail poultices are still used in the country. The snails are applied alive, the shell being crushed, or partially removed, and the snails set upside down on a piece of coarse paper; they are then sprinkled with a little vinegar, and applied at once to the soles of the feet, on which they produce an irritation greater than mustard, and which is supposed to be efficacious in some cases of fever.

To continue with the herbs, I will begin with the *Ranunculaceæ*, where we have *Aquilegia vulgaris*, used as a diaphoretic in doses of two to four grains, *Pæonia officinalis* as antispasmodic, *Ranunculus sceleratus*, when bruised, as a blistering agent. The hellebores are gone out of fashion, and *Aconitum Napellus* is supplied by the gardens—our indigenous aconites, *A. Lycoctonum* and *A. Cernuum*, not being used to my knowledge.

The *Nymphæaceæ* give a remedy for piles in the root of *Nymphæa alba*, but the difficulty is, that you must first get at the root, although the plant is extremely common in all our marshes. The remedy is used both as an electuary and an ointment.

Papaveraceæ yield *Papaver Rhœas*, called "rosalacci," used in lozenges and syrup for coughs. *Chelidonium majus*, L., is used for wart curing, by means of its acrid juice. The root is also a drastic purgative.

Fumariaceæ give us *Fumaria officinalis*, L., very much employed for making herb-juice and syrup, which are supposed to be of service as depuratives.

The *Cruciferæ* give us several remedies, not the least used being *Nasturtium officinale* R.B., known as "crescione," which enters into the composition of herb-juice, with *Cochlearia officinalis*, which is cultivated for that purpose, although indigenous. *Cochlearia Armoracia* is also used, like the two foregoing, as an antiscorbutic remedy, in the form of syrup. *Bunias Erucago*, L., *Lepidium latifolium*, L., have also been used as purifiers of the blood. *Cheiranthus Cheiri*, known as "Viole gialle," or yellow violets, are employed to make an oil, by simply boiling the flowers in olive oil, and is much used for enemata.

The *Violaceæ* give us two plants very much used, the first being the flowers of *Viola odorata*, called "mammole," which make an excellent expectorant infusion, and the second the *Viola tricolor*, called "pacea," which is used as a gentle cathartic in cases of infants' milk crusts. Its root, like that of the odorous violet, possesses emetic properties.

The *Polygalaceæ* yield us *Polygala amara*, used as an expectorant and tonic in chest diseases, and is prescribed by physicians.

The *Linaceæ* yield us *Linum usitatissimum*, now naturalized; from the seeds of which is prepared freshly an oil which is used as a laxative in many diseases of the liver, in cases of gout, worms, etc. When freshly prepared it is used in North Italy for salad dressing.

The *Malvaceæ* have always been a favourite order with herbalists. The decoction of fresh and dried mallow-leaves (*Malva sylvestris*) being used most frequently, as also poultices of the leaves themselves. *Althæa officinalis*, L., *Lavatera arborea*, L., with *Hibiscus roseus*, Thor., and *Sida Abutilon*, Bert., are all employed in a similar way as demulcents, but more locally.

Tiliaceæ yield the famous lime-flowers, which are the produce of *Tilia Europæa*, Vitm. The warm infusion of these flowers being very useful as a sudorific; moreover the taste is very agreeable, and it has been given to children instead of tea. The distilled water of lime-flowers is also extensively used as a vehicle for other medicines.

The *Aurantiaceæ*, although not indigenous, are now so extensively cultivated in most parts of Italy that they cannot be passed over without notice. In Tuscany, with the exception of the bitter orange (*Citrus vulgaris*), which is more hardy, the different species are cultivated in large vases, which in winter are kept in "stanzoni" or large sheds, to protect them from the frost. The distilled waters of the fruits of *Citrus medica*, or cedro, as well as *Citrus Limonum*, are much used as sedatives, and the leaves of *C. vulgaris* and *E. aurantium* are much employed in infusion, the taste of which is very agreeable, and which is reckoned to be tonic and calming. The flowers of both the bitter and sweet orange, and the distilled waters from them, are all used extensively as sedatives.

The *Hypericaceæ* have their representative in *Hypericum perforatum*, from which an oil is prepared by boiling in olive oil, and which is used externally for worms.

The *Ampelideæ* yield us the vine, from the young shoots of which the tears are collected, and used as eye-lotion. The taste is almost imperceptibly astringent.

The *Rutaceæ* have at least two representatives, *Ruta graveolens*, Sav., and *R. angustifolia*, Pers., which are used internally for worms. The latter species, which grows on barren hills, especially near the coast, is the one more generally employed.

The *Rhamnaceæ* give us the jujube (*Zizyphus sativa*, or *Singiolo*), now naturalized in some places. The fruit is used for demulcent decoctions, and enters into the much-used "Siroppo Inglese" or English syrup, which is used for children's coughs. The berries of *Rhamnus catharticus* are used for preparing a syrup for dogs, but in many districts is unknown.

The *Anacardiaceæ* yield us *Pistacia Lentiscus*, L., from the berries of which an oil is prepared which is used for frictions, but also as a simple burning oil.

The *Leguminosæ* yield but few medicinal plants in comparison with their numbers, which in Tuscany is very great. *Lupinus albus*, L., yields seed which, when ground, is used for poultices, also internally for worms; it is also used to wash with, as a cosmetic. *Melilotus officinalis* is used as an anodyne. The roots of *Ononis spinosa* are diuretic and officinal. I cannot find that *Colutea arborescens*, L., or *Galega officinalis*, is now used medicinally. The meal of *Trigonella Fœnum Græcum* seed is used as a resolvent poultice. In former times it was much employed in oil (Olio di mucillaggini), and ointment (Unguento d'Arceô).

The *Rosaceæ* have many remedial representatives. *Prunus Lauro-cerasus* takes first place, the distilled water being very much employed, chiefly for internal use. The flowers of *Amygdalus Persica*, L., are used for preparing a syrup which, if prepared by a cold process, possesses sedative properties, and has the taste of the syrup of Virginian cherry bark. The fruit stalks of the cherry are used as a diuretic. The roots of *Geum urbanum*, called "Gariofilata," are used as a febrifuge and astringent. The fruits of *Rubus Idæus*, which grows in mountain woods, but is not cultivated, are used for a flavouring syrup; but blackberries, called "More di Macchia," yielded chiefly by *Rubus discolor*, Weih and Nees, are employed more than any other remedy as a syrup. It is very useful for gargles and mouth-washes. The leaves of the bramble are used in decoction for relaxed sore-throats. *Potentilla reptans*, L., called "Pentafillo," and *P. Tormentilla*, are used for staunching blood. The decoction of *Poterium Sanguisorba* is used for washing wounds. The flowers of *Spiræa Ulmaria*, a rare plant in Tuscany, have been used as a diuretic in dropsy.

The *Granateæ* give us the useful *Punica granatum*; the rind of its fruit, and more especially the bark of its root, are used for tape-worm, and with very great success. The bark of the root should be fresh to produce effect. A syrup is also made of the fruit, but it is seldom used.

The *Myrtaceæ* yield us *Myrtus communis*, a very common plant on stony ground, especially near the coast. Its leaves are used in powder as an astringent for dusting babies. The distilled water of the leaves and flowers is sold at the cheap rate of 5*d.* per half-gallon flask, and is much used as a corroborative lotion for the toilet of ladies.

Of the *Cucurbitaceæ*, *Ecbalium elaterium* Reich. takes first place. It is common enough in waste places, near the shores of lakes or by the sea, but in Italy its use is very slight. The seeds of *Cucurbita maxima* and *C. Pepo*, which are extensively cultivated but not indigenous, are used for expelling tape-worms, and to my knowledge are effectual in doses of not less than four or five ounces of the peeled seed. A dose of castor-oil is given prior and subsequent to the dose of seed.

In the *Crassulaceæ* the juice of *Sempervivum tectorum* found in mountain rocks, and cultivated on tiles, is used for aphtha. It has also been employed for epilepsy in the same way as another of this order, *Cotyledon umbilicus*, Dec., has been used in England.

The *Umbelliferæ*, which in southern climates have so many vigorous and striking members, yield a fair share of remedies, *Conium maculatum* being one of the principal. Its extract is used in ointment for the reduction of hard swellings, and is frequently united with iodide of potassium. The leaves are used with good effect as a poultice, and now and then conia is prescribed. *Crithmum maritimum* is used as a diuretic. *Œnanthe Phellandrium*, Lam., yields fruits which have been much lauded for pulmonary complaints; they have a very strong and distinct smell, and possess sedative and carminative properties. The preparations are the tincture and the infusion. Dose of the seed, from five to ten grains. *Fœniculum officinale*, All., with its two varieties "*piperitum*" and "*dulce*" are used as stomachics; the green fruits of the latter are much eaten with bread as a condiment. *Fœniculum dulce* is only found in gardens, whereas *F. officinale* grows on dry hills in many parts of Tuscany. These two varieties require study and experimental cultivation, being so different from the mother plant as to suggest two different species. *Opoponax Chironium*, Koch, which is found in several parts of Tuscany, is said by Savi to yield gum at Piombino.

In the *Loranthaceæ*, both *Viscum album*, L., or ("Visco") and *Loranthus Europæus* or "Visco quercino" are sparingly employed as demulcent decoctions.

In the *Caprifoliaceæ* both the fruit and flowers of *Sambucus nigra* and *S. Ebulus* have been used as sudorifics, drunk in warm infusion.

Of the *Rubiaceæ*, two or three species of *Galium* are employed, such as *G. verum*, L., called "Gallio" or "Caglialatte," from its property of turning milk, used as an antispasmodic and diaphoretic. *Galium Mollugo*, L., for the gout. *G. cruciata*, Scop., called "valanzia," is used as a depurative in herb juice, although the earlier and similar *G. vernum*, Scop., is most frequently used instead.

The *Valerianaceæ* yield us the root of *Valeriana officinalis*. Some of the mountain valerians, such as *V. montana*, L., *V. saxatilis*, L., and *V. Saliunca*, Ten., have roots possessing great strength of odour, and probably have the same value as the officinal plant, but are unused.

The *Compositæ* of course give many remedies. Our old friends, *Tussilago Farfara*, *Inula Helenium* and *Arctium Lappa* are used for the same purposes as in England. The tops of *Achillæa millefolium* are used as a stomachic, and, in some places, both *A. Ageratum* and *A. tomentosum* are used for the same purposes. *Santolina pinnata*, the prettiest of all our santolinas, an exclusive habitant of our Carrara Mountains, is used by the quarrymen as a vulnerary, in the form of oil, poultice, etc. *Matricaria chamomilla*, L., is the camomile employed by the Italians, and to them indispensable. It is used as a carminative in infusion, and the flowers are frequently sprinkled over charcoal pans for the purpose of giving a grateful odour throughout the house. *Artemisia Absinthium* is frequently used as a bitter, *A. camphorata* as a stomachic, and *A. vulgaris* as an alterative. *Tanacetum vulgare* is used, in infusion, for worms. The seeds of *Cnicus benedictus*, L., have been used as an emetic. The leaves of *Cichorium Intybus*, L., are much used for herb juice, and the wild plant is one of those which enters into the "field salad" together with the tender plants of *Zacintha verrucosa*, *Hyoseris radiata*, *Taraxacum officinale*, *Picris hieracioides*, and several species of *Crepis*, and on the sea-coasts, *Picridium vulgare*. The leaves of *Leontodon Taraxacum* are used, but the root is not employed by the Italians; it may be on account of the difficulty of obtaining them, as the herb-gatherers have a decided preference to things growing above ground, and thus more easily obtained.

The *Vacciniece* furnish us with *Vaccinium Myrtillus*, L., *V. uliginosum*, L., and *V. Vitis-idæa*, L., the leaves of all of which have been used for the same purposes as *Uva ursi*, which in Tuscany is extremely rare.

The *Ericaceæ* give us *Arbutus Unedo*, called "albatro," from the ripe fruit of which a spirit called "Corbezzoli" is distilled, and also vinegar is made.

The *Jasmineæ*, with the olive and manna ash, are too well known to require description. but it yields other medicinal plants. The bark and young shoots of *Phillyrea vulgaris*, Caruel, called "Lillatro," which grows plentifully in our fever-stricken maremma, are used as a febrifuge, and its alkaloid phillyrine is also employed in doses double that of quinine. The plant is supposed to increase the quantity and quality of milk when eaten by cattle. Excellent sweet oil can be prepared from the ripe berries of privet, but a friend of mine who experimented upon them told me that they did not pay the expense of collecting.

In the *Apocyneæ*, the leaves of *Vinca minor*, *V. media*, and *V. major* have been used as diaphoretics and astringents.

The *Asclepiadaceæ* yields the once famous *Vincetoxicum officinale*, now almost disused.

The *Gentianeæ* of our Tuscan mountains do not reckon amongst them *Gentiana lutea*, although I have found it much further south in the Abruzzi. In the herb-shops of the "Semplicisti" one finds the so-called lesser gentian, which is yielded by *G. Asclepiadea*, and also probably by *G. cruciata*, both of which have large roots, and are of frequent occurrence in our mountain pastures. *Erythræa Centaurium* and *Menyanthes trifoliata* are both used as bitters; the latter is a rare plant with us.

In the *Convolvulaceæ* the root of the *Convolvulus Soldanella* has been employed as a purgative.

The *Boragineæ* supply us with *Borago officinalis*, now used more as a potherb than as a remedy. The root of *Symphytum officinale* is used as a tonic, and as a cooling application to wounds. *Pulmonaria officinalis* is used for its mucilaginous properties. *Cynoglossum officinale* gives its name to a famous pill-mass, which contains the powdered root and extract of opium, in the proportion of a tenth of each, besides other ingredients.

The *Solanaceæ* yield us *Henbane*, *Belladonna*, *Dulcamara*, and *Stramonium*. From the green leaves of the two former an oil is made by boiling in olive oil until the leaves become crisp. These oils are much used for frictions.

In the *Scrophulariaceæ* we use the flowers of *Verbascum Thapsus* and allied species, for making expectorant infusions. *Scrophularia nodosa* and *S. peregrina* have been used for scrofula, but have few believers now. *Gratiola officinalis* is now very rarely employed as a purgative for worms. Our supply of digitalis leaves is derived from cultivated plants, as *Digitalis purpurea* is not indigenous. The so-called lesser digitalis, or *D. lutea*, is a very common plant, and is sometimes employed. *Veronica Beccabunga* is one of the favourite plants for herb-juice, and frequently *V. Anagallis* is mixed with it.

The *Acanthaceæ* yield us *Acanthus mollis*, which, when more plentiful than it is now, was much used as an emollient for clysters. The leaves and root were both employed. Now the plant has become rare.

In the *Verbenaceæ*, *Verbena officinalis*, called "Erba Santa," is used boiled in vinegar, as a poultice for liver complaints. It is also taken internally for the same purpose, and for dropsy. The seeds of *Vitex agnus castus*, slyly called "Pepe pei Monaci," are supposed to have cooling properties.

The *Labiatæ* contain a host of aromatic plants, which give a distinct odour to our barren hills, especially under the fierce sun of summer. The following are used as carminatives:— *Mentha rotundifolia*, *M. Pulegium*, *Origanum vulgare*, *Thymus Serpyllum*, *Satureja hortensis*, *S. montana*, *Micromeria græca*, *Calamintha parviflora*, *C. arvensis* and *C. Elinopodium*, with *Melissa officinalis*. *Salvia officinalis* makes a very useful decoction for sore throats. The leaves of rosemary, with cypress cones, are boiled in wine, and used for washing weakly children. *Nepeta Glechoma* is used as a strengthening and alterative infusion, *Teucrium Marum* as an emmenagogue, *Marrubium vulgare* for coughs, and *Ajuga Chamæpitys* as a tonic.

The *Plantagineæ* give us *Plantago lanceolata*, which is used for making a distilled water used for the eyes. This water had a reputation for staunching blood. *En passant* I may mention that there is a water distilled wholly from herbs, according to its author, Dr. Capodieci, of Naples, which possesses the property of coagulating blood in a greater degree than Ferri perchloridum. I have seen it employed with the best success, and it has also been extensively used by Professor Schiff, who reports it as a wonderful and most useful invention. What can it be?

The *Thymeleæ* have as representatives *Daphne Laureola*, *D. Gnidium*, and *D. Mezereum*, all of which have been employed for blistering purposes, the bark being macerated in vinegar. *Daphne Mezereum* alone is used internally in weak infusion for syphilitic complaints.

In the *Aristolochiaceæ*, *Asarum Europæum*, *Aristolochia Clematitis*, with *A. rotunda* and *A. pallida*, have all been used as emmenagogues, but now very rarely employed.

The *Urticaceæ* yield us hemp, the seeds of which are employed in emulsion for irritation of the bladder. The leaves and shoots of *Humulus Lupulus* are reputed to be an alterative tonic. Two or three species of *Urtica* are used for making herb-juice, such as *Urtica membranacea*, *U. urens*, and *U. dioica*; the first is the most employed, as the mania for herb-juice takes us in early spring, when the first mentioned is in full flavour. The fruits of *Ulmus campestris* at the latter part of June are filled with a mucilaginous fluid, sought after by the country people as a vulnerary. The leaves of *Juglans regia* are extensively employed in Tuscany, frequently for making astringent injections, or as extract taken in pills as a tonic and depurative.

In the *Amentaceæ* the bark of *Salix alba* is used in decoction, but more frequently its alkaloid is prescribed. The buds of *Populus nigra* are used to make Unguentum populeum, used for piles. This ointment keeps very well for years, thanks to the preservative quality of the balsam contained in the poplar shoots, which moreover have been used in decoction for coughs.

In the *Coniferæ*, *Taxus baccata* has been employed instead of digitalis, in doses of eight to sixteen grains, but I have never seen it prescribed. The fruits of *Juniperus communis* are much used in extract, which frequently enters into the composition of tonic elixirs. The country people make a decoction of the berries in wine for colds and rheumatism. The cones of *Cupressus sempervirens*, as mentioned before, are boiled in wine for making a strengthening application for children. *Pinus pinea*, L., of which large tracts exist in Tuscany, mixed with *Pinus pinaster*, yields the little almond-like seed called "Pinocchio," which is sometimes emulsed as the almond.

In the *Amaryllideæ*, *Narcissus pseudo-narcissus* has been used as an antispasmodic, the bulb and the seed being little employed, but a syrup is made of the flowers. In large doses it is emetic, and even poisonous.

The *Asparageæ* yield us several medicinal plants: first, *Smilax aspera*, or native sarsaparilla, which grows abundantly on stony hills. The roots of *Ruscus aculeatus* are used as a diuretic, as also those of *Asparagus officinalis*. The asparagus roots found in the shops are nearly always those of *Asparagus tenuifolius*, Lam., a beautiful little species growing plentifully in moist woods round Florence, and possessing the same properties as *A. officinalis*.

In the *Liliaceæ* we have *Urginea Scilla*, which grows here and there on the sea-coast, especially of the islands of the Tuscan archipelago. From the tuberous roots of *Asphodelus macrocarpus*, Viv., called "Porraccio," is made the asphodel spirit in the Maremma.

In the *Colchicaceæ*, *Colchicum autumnale* is very common, and the tincture is sometimes used externally.

The *Aroideæ* give us *Arisarum vulgare*, Pal., the tuberous root being used as an emetic instead of ipecacuanha. The leaves of *Arisarum italicum*, Mill., called "Gicheri," are used for dressing blisters. The roots are eaten by pigs, and, according to Orosi, contain 71 per cent. of starch.

The *Cyperaceæ* yield us *Cyperus aureus*, var. *esculentus*, the tubers of which, called "bacicci," were used for demulcent decoctions. They are no longer cultivated in Tuscany.

The *Graminaceæ* give us *Arundo Donax*, the handsome flag one sees everywhere in Italy, and which supplies us with blinds, fishing-rods, fences, laths, etc., etc. The root of this is much used for removing milk. The infusion of the sobules of *Triticum repens* is also much employed as a diuretic, and an extract made of the same is used as a simple extract for pill masses.

The *Filices* have several representatives, all used more or less for the expulsion of worms. For this purpose *Osmunda regalis*, or "Felce florida," has been used, as well as for a tonic for children. *Ceterach officinarum* and *Polypodium vulgare* have also been tried as vermifuges, but with so little success that they are now out of use. *Adiantum capillus-veneris* is much used in syrup for coughs, and possesses the advantage of an agreeable taste. *Aspidium filix-mas* holds its own here, as everywhere, and its rhizome is frequently used in powder.

In conclusion, I may say that the collection of herbs generally takes place, not at some phase of the moon, but on some saint's day. Every plant is supposed to possess its full virtue at that certain epoch, but this does not prevent herb-collectors from securing a good gathering whenever they get the chance, and the saint kicks the beam when weighed against a few centimes.

The PRESIDENT: I am afraid you will consider me a somewhat prejudiced estimator of the value of this paper, the writer being my brother, but still I think I may ask you to pass him a cordial vote of thanks.

The vote was carried unanimously.

Professor ATTFIELD then read a paper—

ON THE ESSENTIAL OILS OF WORMWOOD, CITRONELLA AND CAJEPUT.

BY C. R. A. WRIGHT, D.SC., LOND.,

Lecturer on Chemistry in St. Mary's Hospital Medical School.

I.—Essential oil of wormwood (*Artemisia Absinthium*, L.)—A sample of pure oil yielded the following results on fractional distillation:—

a.—About 1 per cent. was a terpene, boiling at about 150°.

b.—A somewhat smaller quantity was another terpene boiling between 170° and 180°.

c.—The majority was the oxidized body of formula $C_{10}H_{16}O$ (isomeric with camphor and with myristicol from nutmeg oil), termed by Gladstone *Absinthol*. This product was first obtained by Leblanc, and stated by him to boil at 204°; Gladstone subsequently gave the boiling point 217°; the substance examined by the writer boiled at 200° to 201° (corrected); whilst Beilstein and Kupffer have stated, in a paper published whilst these experiments were in progress, that the boiling point is 195°.

d.—A few per cents. were the "blue oils," boiling at 300° and upwards, together with a little of a resinous substance not volatile at 350°.

Absinthol differs from its isomeride myristicol (which boils about 12° or 15° higher) in that it is not appreciably altered in any way by repeated distillation; like this substance it splits up into water and cymene by the action of zinc chloride.

$$C_{10}H_{16}O = H_2O + C_{10}H_{14}.$$

Phosphorus pentasulphide similarly abstracts the elements of water (evolving sulphuretted hydrogen), and produces cymene: simultaneously some cymyl-sulphhydrate, $C_{10}H_{13}.SH$, is formed, apparently identical with that obtained from camphor by a similar reaction.

II.—Essential oil of citronella (*Andropogon Schœnanthus*).—This oil mainly consists of an oxidized substance boiling near 210°, but altered by continual heating, becoming partially resinized, and losing partially the elements of water; this substance gave numbers agreeing with the formula $C_{10}H_{18}O$, which is corroborated by its behaviour with bromine, zinc chloride, etc. Gladstone, however, obtained from this oil a body boiling at 199°—205°, and giving numbers agreeing with the formula $C_{10}H_{16}O$; whence it seems probable that the constituents of an essential oil from a given plant may be subject to variation according to the season, age of plant, soil, etc., etc.

This oxidized product, *Citronellol*, unites with bromine energetically; the resulting dibromide breaks up on heating into water, hydrobromic acid, and cymene.

$$C_{10}H_{18}O + Br_2 = C_{10}H_{18}Br_2O.$$
$$C_{10}H_{18}Br_2O = H_2O + 2HBr + C_{10}H_{14}.$$

Zinc chloride removes the elements of water, forming a terpene, mixed, however, with other hydrocarbons.

Phosphorus pentachloride acts in accordance with the following equation:—

$$C_{10}H_{18}O + PCl_5 = HCl + POCl_3 + C_{10}H_{17}Cl.$$

The resulting chlorinated product breaking up on heating into hydrochloric acid and a terpene together with polymerides of the latter.

$$C_{10}H_{17}Cl = HCl + C_{10}H_{16}.$$

Phosphorus pentasulphide first removes the elements of water, forming a terpene, and then acts on the nascent terpene, converting it into cymene, and evolving sulphuretted hydrogen:—

$$C_{10}H_{18}O + S = H_2O + H_2S + C_{10}H_{14}.$$

Just in the same way, the terpenes of orange peel oil (*Hesperidene*) and of oil of turpentine are converted into cymene by phosphorus pentasulphide, sulphuretted hydrogen being evolved.

$$C_{10}H_{16} + S = H_2S + C_{10}H_{14}.$$

III.—Essential oil of cajeput (*Melaleuca Leucodendron*)—Schmidt has shown that the chief constituent of this oil is a body of formula, $C_{10}H_{18}O$, boiling at about 177°, and hence isomeric with citronellol, which boils about 30° to 35° higher; the product isolated by fractional distillation boiled at 176° to 179°, and gave, with various reagents, results closely analogous to those obtained with citronellol; thus, with bromine, it forms a dibromide, splitting up into water, hydrobromic acid, and cymene on heating; a much larger yield is, however, obtained with oil of cajeput than with citronella oil.

Phosphorus pentasulphide similarly forms, firstly, a terpene, and by further action cymene.

During the above experiments, and those brought before the Conference in former years, sixteen different specimens of cymene have been obtained by one or other process from different substances, all constituents of essential oils, and all either members of the class of terpenes, or closely related to them. The specific gravity, specific refractive energy, and specific dispersion of them have been taken by Dr. Gladstone, all the specimens being found to agree closely together: the boiling point of each specimen has been found to be very close to 176·5° and in every case the action of potassium dichromate and sulphuric acid was the same, viz., the production of terephthalic acid (about 40 per cent. on an average) free from isophthalic acid, and of acetic acid free from all trace of higher homologues. From these results, it is concluded, firstly, that the cymene thus producible is in every case the same body; and secondly, that the terpenes and their derivatives of formulæ, $C_{10}H_{16}O$ and $C_{10}H_{18}O$, are closely related to this hydrocarbon, which may, indeed, be looked upon as the central form of matter from which all these classes of substances are derived.

The President: Dr. Wright's paper is, as usual, of a highly scientific character, and worthy of being termed classical. I am afraid it is above the reach of our criticism, and that we must content ourselves with passing him a vote of thanks.

The vote of thanks having been carried,

Professor Attfield read the next paper, also by Professor Wright:—

New Derivatives from the Opium Alkaloids.

BY C. R. A. WRIGHT, D.SC., LOND.,

Lecturer on Chemistry in St. Mary's Hospital Medical School.

During the past year the following results have been obtained:—

The first product of the action of zinc chloride on codeine was stated by Matthiessen and Burnside to be formed by the abstraction of the elements of water from codeine, and was hence termed "Apocodeine." This observation has, however, been found to be partly incorrect: the first products of the action of zinc chloride are the codeine polymerides described in a paper read before the Conference in 1872, viz., *Tricodeine and Tetracodeine*, the former predominating. Zinc chloride alone does not seem to exert any dehydrating effect on tricodeine; but when heated with hydrochloric acid, this base forms a product apparently identical with "apocodeine," which is, therefore, really a secondary product formed from tricodeine by the removal of six proportions of water.

$$\bar{C}_3 = 6H_2O + (\bar{C} - 6H_2O)$$

may consequently be termed *Hexapotricodeine.*

Experiments on narceine have been commenced; this alkaloid, although so feebly basic that its salts are partially decomposed by water, has nevertheless a strong attraction for a small quantity of hydrochloric acid. When the hydrochloride is crystallized from a liquor containing 8—10 equivalents of hydrochloric acid to 1 of narceine, crystals are formed, of composition $C_{23}H_{29}NO_9,HCl,3H_2O$; the water of crystallization is mostly lost on standing over sulphuric acid (all save about 1 per cent.); on the other hand, the salt dehydrated at 100° gains about 1 per cent. in weight, but no more over sulphuric acid: when dissolved in 50 parts of boiling water, crystals form on cooling, having the composition $6C_{23}H_{29}NO_9 + HCl$; these lose part of the associated hydrochloric acid by long-continued digestion with water; but the whole cannot be thus removed, nor can the base be obtained wholly free from hydrochloric acid, even by precipitation by sodium carbonate, and three successive crystallizations from boiling alcohol; the basic hydrochlorides, $5\ C_{23}H_{29}NO_9 + HCl$ and $10\ C_{23}H_{29}NO_9 + HCl$, recently described by Petit, do not appear to be definite compounds, nor does the last formula indicate the end product of the action of water on narceine hydrochloride, as stated by Petit.

When narceine is heated with excess of strong hydrochloric acid to 100° for an hour, the elements of water are abstracted and a new base formed; this is non-crystalline and yields non-crystalline salts, the hydrochloride being precipitated from aqueous solution in amorphous flakes, by addition of strong hydrochloric acid; physiologically this new product appears to be almost inert, no appreciable symptoms following the subcutaneous injection into dogs and cats of quantities up to two decigrammes; its mode of formation is indicated by the equation—

$$C_{23}H_{29}NO_9 = H_2O + C_{23}H_{27}NO_8$$

the empirical formulæ of narceine and the new product being employed.

The actions of organic acids and their anhydrides on the opium (and other) alkaloids are now under investigation; the following points have been made out:—When codeine is heated with twice its weight of glacial acetic acid, to boiling, for eight to ten hours, an inverted condenser being attached, the majority is converted into *diacetyl codeine*, thus,—

$$C_{36}H_{42}N_2O_6 + 2C_2H_3O.OH = 2H_2O + C_{36}H_{40}(C_2H_3O)_2N_2O_6.$$

This new product is crystallizable from alcohol, ether, benzol, and chloroform, in which it is readily soluble, and from boiling water, in which it is sparingly soluble; a minute amount of codeine is, however, re-formed by the action of the water, by the reversal of the above equation; this action takes place completely when the base is heated to 150° in a sealed tube, containing just enough potash to saturate the acetic acid liberated. The crystallized hydrochloride of this base contains $C_{36}H_{40}(C_2H_3O)_2N_2O_6, 2HCl, 4H_2O$.

When acetic anhydride acts on codeine either at the ordinary temperature for two or three weeks or for an hour or more at 100° or 130°, the same product is formed, no more highly acetylated substance being in any case producible.

Boiling acetic acid acts in the same way on morphine.

$$C_{34}H_{38}N_2O_6 + 2\,C_2H_3O.OH = 2\,H_2O + C_{34}H_{36}(C_2H_3O)_2N_2O_6\,;$$

the base thus formed is termed *α diacetyl morphine* to distinguish it from another isomeride obtained by the action of acetic anhydride on morphine; it is soluble in ether, but cannot be crystallized from ether, alcohol, or benzol, appearing only as a gum or varnish; when precipitated by ammonia or sodium carbonate it is also amorphous; excess of ammonia, potash, or sodium carbonate readily dissolves it. Its hydrochloride is crystalline, and but sparingly soluble in water, as is also the nitrate; the former salt contains $C_{34}H_{36}(C_2H_3O)_2N_2O_6, 2\,HCl, 6\,H_2O$; it gives no colour reaction with ferric chloride.

Excess of acetic anhydride, either at the ordinary temperature or at 100° or 130°, converts morphine into *tetracetyl morphine*, thus—

$$C_{34}H_{38}N_2O_6 + 4(C_2H_3O)_2O = C_{34}H_{34}(C_2H_3O)_4N_2O_6 + 4C_2H_3O.OH.$$

This base resembles diacetyl codeine, being readily crystallizable from alcohol, ether, or benzol, and being but sparingly soluble in excess of ammonia or sodium carbonate; caustic potash, however, dissolves it readily; its hydrochloride is excessively soluble in water, but can be obtained in crystals. Boiling water acts on tetracetyl morphine, forming α diacetyl morphine acetate, thus—

$$C_{34}H_{34}(C_2H_3O)_4N_2O_6 + 2\,H_2O = C_{34}H_{36}(C_2H_3O)_2N_2O_6, 2\,C_2H_3O.OH\,;$$

in sealed tubes at 150° the action goes further, morphine being reproduced.

When morphine is heated to 100° for an hour with just the quantity of acetic anhydride required for the equation,

$$C_{34}H_{38}N_2O_6 + 2(C_2H_3O)_2O = C_{34}H_{36}(C_2H_3O)_2N_2O_6 + 2C_2H_3O.OH,$$

the reaction thus indicated takes place; the main product, however, is not α diacetyl morphine, but an isomeric substance (termed *β diacetyl morphine*) differing from the α base in that it yields a blue colour with ferric chloride, and that its hydrochloride is excessively soluble in water and is non-crystalline, its solutions drying up to a gum over sulphuric acid. The ammoniacal solution of the β base deposits morphine on standing; and the hydrochloride deposits crystals of morphine hydrochloride on standing in contact with excess of hydrochloric acid; the base itself is non-crystalline, and is readily decomposed by boiling water, producing morphine. It is especially noteworthy that although both diacetyl morphines are produced by the action of acetic anhydride not in excess, and of acetic acid on morphine, the β base very greatly predominates in the first case, the α base in the second. Butyric acid seems to give a similar pair of butyryl derivatives; these and analogous substances from strychnine, quinine, etc., are now undergoing investigation, as are also many other points suggested by these experiments.

When only a small quantity of acetic anhydride is used, the product is *monoacetyl morphine*—

$$C_{34}H_{38}N_2O_6 + (C_2H_3O)_2O = C_{34}H_{37}(C_2H_3O)N_2O_6 + C_2H_3O.OH;$$

this body very closely resembles β diacetyl morphine; its production affords another proof of the necessity of writing the formulæ of morphine and codeine, $C_{34}H_{38}N_2O_6$ and $C_{36}H_{42}N_2O_6$, instead of $C_{17}H_{19}NO_3$ and $C_{18}H_{21}NO_3$ respectively.

The PRESIDENT: Dr. Wright has been working away for some time at these morphia derivatives, and has achieved many interesting results. I fully expect that in course of time he will light on facts that will lead to very startling conclusions. The amount of labour he spends on these researches is something marvellous. We are all indebted to him for sending his papers to us.

A vote of thanks was passed.

The PRESIDENT read the following paper on "The Preparation of Trimethylamine."

TRIMETHYLAMINE FROM SKATE.

BY T. B. GROVES.

The skate (*Raia Batis*) is a fish endowed with many peculiarities both of shape and substance. It is largely consumed by the poor on the south coast, and in the form of crimped skate is sometimes met with at the table of the rich.

I once, when they were particularly cheap, endeavoured to cure some as Finnan haddocks are preserved. For the first week or so they were well appreciated, but afterwards they acquired an ammoniacal flavour so very pronounced that it was impossible to proceed with them. There was no putridity whatever apparent. On mentioning this to my porter he at once said it was nothing new, they had simply become . . . . . here he used a vernacular expression impossible to ears polite, in which the letters "p" and "s" figured prominently.

On further inquiry I was informed that this peculiarity was regarded by some low-lived gourmets as its crowning excellence; so much so, that it was never eaten until it had been hung up and could be smelt from one end of the ship to the other—"De gustibus non est disputandum."

Having never met with a fish that behaved so singularly, I determined some day to make experiment with it. I was reminded of the circumstance by the introduction of trimethylamine or propylamine, as it has been erroneously termed, into medical practice.

Early in June this year, I received two skate weighing together about eleven pounds. I kept them three or four days till they smelt strongly, then cut them up, and put them into a copper still, with a little water and a lump (about six ounces) of washing soda. (The use of a copper still was of course not advisable, but I had no other that was convenient.) On passing in steam, I obtained a strong smelling distillate, blue in colour, from dissolved copper. This was collected so long as it was worth anything, then neutralized with hydrochloric acid, and evaporated to one pint. The copper was now removed with sulphuretted hydrogen, and the liquid, then further reduced in volume, was redistilled with caustic soda, the vapours evolved being condensed in hydrochloric acid, the recipient being well shaken. The solution, evaporated to dryness to expel excess of acid, was treated with rectified spirit. The muriate of trimethylamine passed into solution, leaving the muriate of ammonia that accompanied it undissolved; of the former I thus obtained six drachms, of the latter about double that quantity. This, considering all things, is, I believe, a good yield, and the relative quantities of the two substances not so disproportionate as they commonly are.

I would caution any one anxious to repeat my experiment, to avoid wearing his ordinary habiliments on the occasion, or he will find his friends strangely indifferent to his acquaintance, and undesirous of his proximity, for a month or two after.

Mr. HANBURY proposed a vote of thanks to the President for his paper, which was at once carried.

Mr. WILLIAMS: I have listened with a good deal of pleasure to this paper, because I have had considerable experience in preparing trimethylamine. I generally prepare it from herring-brine, but sometimes that source is not available, so that last winter I had to prepare a considerable quantity from sprats. I have also used fresh herrings themselves. Of course the trimethylamine produced is more brown when you distil the fish itself, than when you distil the brine. I do not know whether you, Sir, found much impurity when using skate in this way, or whether the distillate came over at first very brown, and had to be purified several times. I found, when using herrings or sprats, that the distillate contained a great deal of tarry animal oil, which gave us some trouble to separate; but that is not the case when using brine.

The PRESIDENT: There was no tarry oil, but there was a small quantity of oil floating, which I separated readily by the filter. The trimethylamine has been re-distilled.

Mr. WILLIAMS: I suppose you find the hydrochlorate of trimethylamine made in this way is not quite solid.

The PRESIDENT: No, not quite. I evaporated it as far as it would go until it lost no further weight, and then poured it into a bottle while hot, and it set into a semi-solid mass, which by shaking I find has become liquid.

Mr. WILLIAMS: By leaving in 10 per cent. of chloride of ammonium you can make it sufficiently solid to dispense and manipulate.

The PRESIDENT: I think I understood you to say you are in the habit of obtaining a much larger yield of ammonia in company with the trimethylamine; it is not so here. Did you use caustic soda?

Mr. WILLIAMS: No; I used caustic lime.

The PRESIDENT: No doubt it was its action upon the albumenoids which produced the excess of ammonia.

Mr. WILLIAMS: I do not know whether you came to the conclusion that the trimethylamine exists not in the flesh of the fish itself, which was my first idea, but I have now come to the conclusion that it probably entirely resides under the scales.

The PRESIDENT: I have not arrived at any conclusion on that point.

This concluded the reading of papers.

PLACE OF MEETING IN 1875.

It was resolved unanimously that the invitation to meet next year at Bristol be accepted.

ELECTION OF OFFICERS.

Professor ATTFIELD then read the following list of officers proposed for the next year. The gentlemen nominated were unanimously elected by the meeting.

President.

THOMAS B. GROVES, F.C.S., Weymouth.

Vice-Presidents who have filled the office of President.

Professor BENTLEY, F.L.S., M.R.C.S., London.
D. HANBURY, F.R.S., London.
W. W. STODDART, F.C.S., F.G.S., Bristol.
H. B. BRADY, F.R.S., Newcastle on-Tyne.

Vice-Presidents.

T. H. HILLS, F.C.S., London.
R. REYNOLDS, F.C.S., Leeds.
CHARLES BOURNE, Bristol.
PETER SQUIRE, London.

Treasurer.

G. F. SCHACHT, F.C.S., Clifton, Bristol.

General Secretaries.

Professor ATTFIELD, Ph.D., F.C.S., 17, Bloomsbury Square, London, W.C.
F. BADEN BENGER, 7, Exchange Street, Manchester.

Assistant Secretary.

R. H. DAVIES, F.C.S.

Local Secretary.

JOHN PITMAN, Redcliff Hill, Bristol.

Editor of the Year-book.

LOUIS SIEBOLD.

Editor of the Transactions.

Professor ATTFIELD.

Other Members of the Executive Committee, 1874-5.

M. CARTEIGHE, London.
R. W. GILES, Clifton.
W. A. TILDEN, Clifton.
C. EKIN, F.C.S., Bath.
T. GREENISH, F.C.S., London.
W. MARTINDALE, F.C.S., London.
F. M. RIMMINGTON, F.C.S., Bradford.
C. TOWNSEND, Bristol.
C. UMNEY, F.C.S., London.

Auditors.

F. ANDREWS, London.
E. SMITH, Torquay.

The PRESIDENT: On behalf of myself I have to thank you for your renewed confidence. It is very complimentary indeed that I should for two years fill the office of President. I assure you I have had a great fight to get out of it, not because I find the duties too onerous, but to give a chance to others who I think ought to aspire to fill the chair, and who I know would fill it much better than I can. However, my proposition was voted revolutionary; it was decided I should remain here, and therefore I can only assure you I will do my utmost to fill the post with something like efficiency.

Mr. SCHACHT: I rise to fulfil a very pleasing duty indeed. Meeting in this house, as we have done on this occasion, it has perhaps appeared to some that we were taking things as a matter of course, and that all the arrangements were the result of the organization belonging to this establishment. For all that, we are very grateful, and we shall express our thanks in a formal manner for the use of this establishment presently. But I must caution you against thinking that there ends our obligation. It is also due to another set of gentlemen who have laboured very hard indeed for our benefit. I allude to the local committee, whose labours have been very arduous, extending over a long time. During the last few days we have all witnessed with what energy they have worked to carry out the arrangements of this meeting. For the splendid hospitality which has been offered us, and which is proposed still further for our acceptance, we must, I am sure, all feel very grateful indeed, and you will therefore allow me to propose:—

"That the best thanks of this meeting be given to Mr. Carteighe, Professor Attfield, and the other members of the local committee for their efforts in organizing the present meeting."

Mr. BENGER: I am very glad to have the opportunity of seconding this resolution. The success of our Conference has always been very largely due to the efforts of the local committees in the towns we have visited, and never have we had greater cause for thankfulness than on this occasion. In coming to the house of the Pharmaceutical Society, surrounded by so many pleasant associations, we expected to have a pleasant meeting; but I am sure we are indebted to the local committee for adding very much to what we expected to find here, and for their thoughtfulness in promoting, in many ways, our comfort and convenience. Although we have come to the end of the business to-day, we have not yet come to the end of the kind offices of the Committee. As you are aware, to-morrow we are still to reap their kindness, and our gratitude is therefore due not only for what is past, but is certainly a "lively anticipation of favours to come."

The resolution having been carried unanimously,

Mr. CARTEIGHE acknowledged the vote of thanks, and took the opportunity to bear testimony to the continued and unwearied exertions of Professor Attfield from the foundation of the Conference to make it successful in every respect. He did really deserve the best thanks of the Conference on that account, for he (Mr. Carteighe) certainly did not know any man who would have worked for ten years in its behalf, as Professor Attfield had done.

The PRESIDENT: The next resolution is:—

"That the most cordial thanks of the Conference be given to the President and Council of the Pharmaceutical Society, for the use of their lecture theatre and other rooms for this meeting, and for the cordiality with which they have welcomed the Conference."

Seeing the manner in which we have been received by the Council and President of the Society, I know you will accord to them a very sincere vote of thanks for giving us the use of this excellent hall, and for all their other kindness. This is, of course, a memorable occasion, for possibly the Conference may never meet here again, seeing that we generally follow about our elder sister, the British Association. It is, therefore, a great occasion, but the President and Council of the Pharmaceutical Society have risen to its level.

The vote was passed unanimously.

Mr. T. H. Hills: On the part of the Council and the members of the Pharmaceutical Society, I may say that they are most pleased to be able to afford you its rooms and to welcome you here. It has been a bright time for the Society to welcome the Conference—a time which perhaps none of us may live to see again. But I can only say, that should anything happen to prevent you carrying out your original design of going to the localities where the British Association meets, the Council and members of the Society will be only too glad to welcome you here.

Mr. Giles: It is now my pleasing duty and privilege to propose a resolution which will give the *coup de grâce* to this meeting. I am about to ask you who have sat with so much pleasure under the presidency of Mr. Groves to express to him, insufficiently as it must necessarily be in any words I can command, your great respect for him and your high appreciation of the excellent manner in which he has conducted the business of this Conference. We all know the high qualifications which he brings to the chair, and we have also seen that he has brought those smaller qualifications which are nevertheless important to the conduct of a meeting, and which have enabled this meeting to pass off, I venture to say, with great *éclat*. He has known how to sit still and courteously listen, and he has known how to give that fillip to the discussion which is occasionally necessary to keep it going. It has been to all of us a source of very great satisfaction to hear that he has consented again to fill the chair; it was a source of great anxiety to me to know what would be the result of the re-appointment of the officers, and whether we should again have the advantage of Mr. Groves's presidency. I am glad to find, however, that he has acceded to the wishes of those who must be allowed to know better than a single individual can what is best for the welfare of the Conference, and I am pleased to think that, when we in Bristol have the pleasure of entertaining the Conference to the best of our humble ability, it will be presided over by one whom we so highly regard and respect. I have to ask you to pass a cordial vote of thanks to the President for the able manner in which he has conducted the business of the Conference.

Mr. Mackay in seconding the motion said, it is not necessary that I should add anything to the clear, comprehensive, and truthful manner in which Mr. Giles has expressed himself in proposing this vote of thanks. Most truly we can all say, if ever there was the right man in the right place, Mr. Groves has been in that position. It is sometimes not an easy thing to gather up the reins of a series of meetings in connection with a scientific society, and it is yet more difficult to do so and guide with the reins the various forces as Mr. Groves has done during the last two days. That he has done so efficiently and well, we all know, and I especially coincide with what Mr. Giles has said with regard to the future, for I consider our Bristol friends are happy indeed in the prospect of Mr. Groves continuing to be President at the meeting there.

Professor Bentley: As the senior Vice-President, it devolves upon me to put this motion to the meeting, which I do most cordially, entirely endorsing everything which has been said by the proposer and seconder.

The resolution passed unanimously, and being briefly acknowledged by the President, the proceedings terminated.

Parliamentary and Law Proceedings.

Fraudulent Use of a Patent Medicine Stamp.

On Wednesday, Sept. 9, Mr. George Herbert Clarke, stated to be "Dr." Clarke, carrying on business in High Street, Shoreditch, vendor of a medicine called "Dr. Clarke's Blood Renovator," attended, at the Worship Street Police Court, upon a summons taken out by the authority of the Inland Revenue Commissioners, Somerset-house, charging him in three counts, set out at considerable length, firstly, with having fraudulently removed a stamp from a bottle of patent medicine after the same had been sold; secondly, with affixing the said stamp, after it had been once used, to another bottle of medicine; and thirdly, with uttering and exposing for sale the said bottle of medicine, with the duty stamp cut from another bottle of medicine after it had been sold and disposed of. Mr. Tillesley, on behalf of the Commissioners of Inland Revenue, supported the summons; the defendant was not represented. Mr. Flowers asked if it was proposed to prosecute upon all three counts, each count representing an offence punishable by a fine of £20. Mr. Tillesley said he was willing to make it one offence, the three offences being committed to one end. The defendant being here asked if he admitted the complaint against him, replied in the affirmative. He knew, he said, that the facts set out in the summons were true, but in explanation said that some time ago a fire occurred on the premises where the medicines in question (from which the label was alleged to have been taken) was sold. Among the bottles destroyed was the bottle from which he admitted the label was subsequently taken. He denied that the bottle was sold, and said that the stamp being intact had been removed to put on a bottle of his own medicine, for which the same duty (3*d.*) as represented by the stamp would have had to be paid. Mr. Tillesley explained the facts of the case. He said that the defendant prepared a medicine known as "Dr. Clarke's Blood Renovator," and a Mr. Clarke, of Lincolnshire, prepared a medicine known as "Clarke's world-famed Blood Mixture." Mr. Clarke, of Lincolnshire, put his name on the Government stamp of his bottles, and the defendant had, in the one instance before the Court, removed the old stamp from a bottle and affixed it to a bottle of his own medicine. Two bottles, stated to have been purchased of the defendant, were then handed up for the magistrate's inspection. One bore a duty stamp as a patent medicine, to which the magistrate's attention was called as the fraudulent using complained of. It was also said that the signature was so imitated as to be a fraud by the defendant. Mr. Flowers observed that the letters were printed alike in blue in each case. The defendant said the stamp taken from the bottle had been erased by his writing over it. Mr. Clarke, of Lincolnshire, was called into the witness-box, and examined the label, which he said had a name written over to imitate his, letters being formed with exact similarity. Mr. Flowers said that as the defendant had pleaded guilty he would mitigate the fine, but he was not allowed to do so beyond a half. He ordered the defendant to pay £10.—*Times.*

A Child Poisoned by Opium.

An inquest has been held at Accrington touching the death of a child named Sarah Ellen Wittam, 16 days old, daughter of John Wittam, labourer. It appeared that the mother after her confinement took some opiate pills to allay the pain, and the baby being unwell, she thought that as the pills had done her good they must have a similar effect on the child. She gave it half a pill containing opium. The effect was to poison the child, which died the following morning. The jury returned a verdict of "Died through the unintentional administration of poison."

Poisoning by Spirit of Salt.

Mr. F. Price, borough coroner, has held an inquest at Salford, touching the death of Anthony Davies. It appeared by the evidence that the deceased was a dealer in old bottles, and was in the habit of purchasing small quantities of spirit of salt for the purpose of cleaning the bottles. Between ten and eleven o'clock, after he and his wife had been drinking, he opened the bedroom window, and shouted to the neighbours to fetch him some water. A neighbour took him some water, and afterwards, hearing the deceased moaning, entered the house and found him on his knees in the bedroom. Deceased told him he had taken some spirit of salt, adding that he should not have taken it if he had known that "it burned so." He was subsequently taken to the Salford Hospital, where he was attended to by Mr. J. H. Morris, the house surgeon, who prescribed the usual remedies. The deceased was then quite sensible and able to walk, but died about five o'clock in the evening. He told Mr. Morris that he took the spirit of salt in mistake, thinking it was whisky. Mr. Morris said that he had ascertained that deceased had taken above an ounce of the spirit of salt, and he had no doubt that death was caused by the dose. The jury returned a verdict of "Death from misadventure, while under the influence of drink."—*Manchester Courier.*

Prosecution for Embezzlement.

At the Liverpool police court, on August 27, two young men were sent to prison—one for six months, and the other for one month—for embezzling money belonging to their late employers, Messrs. Evans, Sons, and Company, wholesale chemists. The embezzled money had been received from Mr. J. Thompson, dealer in patent medicines. It was stated that for trade reasons Messrs. Evans had prohibited their servants selling goods to Thompson; but that he had succeeded in inducing the prisoners to supply him without the knowledge of their employers, and the sale of the things was entered in the books under feigned names. Mr. Mansfield, who heard the case, severely censured Thompson, who, he said, had thrown the greatest temptation in the way of the prisoners, and been guilty of conduct which was "utterly unpardonable."

Review.

The Essentials of Materia Medica and Therapeutics. By Alfred Baring Garrod, M.D., F.R.S., etc. Fourth Edition, Revised and Edited, under the Supervision of the Author, by E. Buchanan Baxter, M.D. Lond., etc. London: Longmans, Green and Co. 1874.

We have before us the first, third, and fourth editions of this work. The first, published in 1855, contains 282 pages. The third, 479; and the fourth, just received, notwithstanding the omission of notices of about a score of obsolete drugs, such as black hellebore, Winter's bark, simaruba bark, carrot, tormentil, elecampane, wintergreen and bayberry, has 517 pages. Enriched, as the work is, by the author's practical experience in therapeutics, this enlargement shows the labour and pains he has taken in furnishing trustworthy information on what is essential for the medical student to know of materia medica and the outlines of therapeutics. The appreciation by the medical profession of its high value as a text-book places it on a level with Erichsen's 'Surgery,' and Ellis's 'Anatomy.' In the present edition, the "Additions to the British Pharmacopœia," recently published, meet with their share of attention, as well as other new remedies lately brought under medical notice, such as croton-chloral hydrate, sulphocarbolate of soda, guarana, coca, tea, *Eucalyptus globulus*, yellow jasmine, condurango, and trimethylamine. Among new remedies, oleic acid and its combinations (excepting oleate of mercury, which is simply mentioned) are conspicuous by their absence. The chemistry and therapeutics of the opium products are brought down to the present time. The results of the investigations—physiological and therapeutical—of Fraser, Crum Brown, and Ringer, on the action of atropine and strychnine are also given.

The therapeutics of the new edition seems to have received special attention, while its materia medica, chemistry, and pharmacy have been neglected; in these subjects it bears the evidence of incompleteness, and a number of errors are carried forward which a careful revision should have checked. For example, in the process given for the making of green extracts, it is stated that "the juice . . . . is first heated to 130° in order to coagulate the green colouring matter, filtered and heated to 200°, at which temperature the albumen is coagulated. After being again filtered to remove the albumen, the juice is evaporated *at a temperature not exceeding* 140°, *to the consistence of a thin syrup*, and the colouring matter, previously separated by the first coagulation, is added, and the whole evaporated to the proper consistence of an extract." The Pharmacopœia permits the full heat of a water-bath to be applied after the separation of the albumen; it is only limited to 140° when the colouring matter is again added, to prevent the decomposition of the latter. Under the head of liniments also, Linimentum iodi is not an exception, but does contain camphor.

Liebig's mode of testing the strength of hydrocyanic acid is erroneously explained in both the third and fourth editions. In the fourth, although some attempt has been made at correction, it is further wrong than ever. On the addition of the silver solution to the acid, rendered alkaline by an excess of soda, a double cyanide of silver and soda is formed, which is precipitated at first, but redissolves on agitation. When all the hydrocyanic acid is withdrawn in the formation of this double cyanide, it is stated: "nitrate of silver gives rise to a precipitate no longer soluble; the appearance of that permanent precipitate of oxide of silver is an indication that all the cyanogen is exhausted. The changes may be exhibited in the formulæ—

$$(AgNO_3 + 2\,NaCy = NaNO_3 + NaAgCy_2)$$

and when no more cyanide is present—

$$(2\,AgNO_3 + 2\,NaHO = 2\,NaNO_3 + Ag_2O + H_2O)"$$

Whereas the first permanent precipitate is white, and is not the oxide of silver, but the true insoluble cyanide of silver. On the addition of more silver solution than will form the soluble double salt, the following equation represents the decomposition:— ($NaAgCy_2 + AgNO_3 = 2\,AgCy + NaNO_3$). If much excess of soda be present, the oxide of silver will also be precipitated, if a considerable quantity of silver solution be used, or added carelessly, but not until all the cyanogen has combined with the silver to form the true cyanide, and any chlorine as well has become converted into chloride of silver, the latter being generally present in hydrocyanic acid as hydrochloric acid, an intentional impurity, which it is thought prevents the decomposition of hydrocyanic acid. The beauty of the B.P. test consists in its not estimating this hydrochloric acid as hydrocyanic acid.

Under the head of tartarated antimony, it is stated that a "watery solution gives a white precipitate of *acid tartrate of potash* with hydrochloric acid, which is not formed if tartaric acid be previously added, as that salt is *soluble* in it." The precipitate is not acid tartrate of potash, but oxychloride of antimony. A question in the second M.B. examination at the London University two or three years ago depended on this test, and the explanation given by Dr. Garrod puzzled a number of the candidates not a little, both before and after the examination. It ought now to have been corrected. Nitrate of silver is directed to be made into a pill with "crumb of bread or some ingredient which does not decompose the salt." As bread-crumb always contains common salt, a more incompatible excipient could hardly have been suggested. Calomel, it is stated, "is blackened when treated with potash, from precipitation of *mercury*." In making ammoniated mercury, the perchloride of mercury is directed to be dissolved in the water, by the aid of heat; "*to* the solution, when it has cooled, *add* the ammonia, frequently shaking it." This will not form the Pharmacopœia white precipitate.

Light oxide of magnesia is a misnomer which has passed two revisions. The following short and simple process and explanation of it is given as that of the B.P. for making chlorate of potash:—"By passing a stream of chlorine gas through a mixture of carbonate of potash and slaked lime; when saturation has taken place, chlorate of potash, chloride of calcium and carbonate of lime are formed; after the carbonate has been removed by filtration, the less sparingly soluble chlorate crystallizes on evaporating the solution ($K_2CO_3 + 6\,CaH_2O_2 + 6\,Cl_2 = 2\,KClO_3 + 5\,Ca\,Cl_2 + CaCO_3 + 6\,H_2O$)." The specific gravity of Liquor sodæ chloratæ in one part is given as 1·06, and below, on the same page as 1·103; this has been overlooked twice. The fresh—not the dried petals, as stated—of *Papaver Rhœas* are official in the British Pharmacopœia. Senna is the leaflet, not the leaf, of *Cassia lanceolata*, etc. The dried as well as the fresh root of *Taraxacum* is official. The botanical source of our rhubarb root is not now undetermined. Castor, it is stated, "contains *volatile oil*, uric, phosphoric, and benzoic acids, combined with potash, soda, and lime; also carbonate of ammonia, *salicine*, *carbolic acid*, and a peculiar principle *castorin*." The italics are not ours, but we are surprised to find that castor contains *salicine* and *carbolic acid*, and wonder how they have been isolated and identified. *Vinum opii* is prepared from the extract now, and, therefore, "1 gr. of opium is contained in 14½ min. of *Vinum opii*," is not correct. Opium lozenges also are prepared from the extract, not from powdered opium. Some corrections, we notice, have been made, but in a text-book a student should have facts. Some of the errors we have mentioned are trivial enough, others, are likely to bring doubt into the mind of the student.

In these days, when it is expected that a medical student can get up all the 'ologies in the short space of our years, this work of Garrod's is perhaps the best published, and specially adapted for the student's use who aspires no higher than "College and Hall." But, shade of Pereira and Christison! We should hope that our Universities require more from their candidates for their M.D. degree than an ex-examiner in materia medica and pharmaceutical chemistry metes out to them—one who disparages arnica, broom, and the sweet influences of tobacco, and cannot find space for a few medicinal dietetic articles, such as arrowroot, tapioca, sago, and tous-les-mois, but yet gives a place to condurango. It is enough to make us turn homœopaths at once. A Huxley may despise materia medica while he is solving biological problems, but the physician must know and have proved the efficacy of his remedies as much as the surgeon the sharpness of his knife. Should, for example, his prescription, on which depends the life or death of his patient, contain, as many do, the vague term Liquor cinchonæ, his patient may get a medicine rich in quinine or entirely devoid of it. The short space which students are required to devote to the study of materia medica and pharmacy—three months to each—may account for the small amount of careful therapeutical as distinct from physiological research done of late years. The Pharmacopœia wants weeding. Our humble opinion is that there are drugs in it less efficacious than arnica, and a redundancy of preparations of others which fill their place in our pharmacies until, when they are wanted, they are found to be effete, and require renewal. Surely there is work for the therapeutist here, if it be only to obtain negative results, to place a number of the above in the Index Expurgatorius, as we hope may be the case in the next edition of our National Pharmacopœia. In conclusion, pharmacists would have to beware if Dr. Garrod had the wielding of the Adulteration Act. "A trace of sulphurous acid" in sublimed sulphur is an adulteration; so is "a little red iodide of mercury" in Hydrargyri iodidum viride; and lime water is "apt to contain carbonic acid"! In fact all impurities according to him are adulterations.

BOOKS RECEIVED.

An Introduction to Pharmaceutical and Medical Chemistry (Theoretical and Practical). Arranged on the Principle of the Course of Lectures on Chemistry as delivered at the South London School of Pharmacy. By John Muter, M.A., F.C.S., etc. London: W. Baxter. 1874. From the Author.

An Elementary Treatise on Practical Chemistry, and Qualitative Inorganic Analysis. Specially adapted for use in the Laboratories of Schools and Colleges, and by beginners. By Frank Clowes, B.Sc., etc. London: J. and A. Churchill. 1874. From the Publishers.

Obituary.

GEORGE EDWARDS.

It is with deep regret that we record the death, on Sunday last, of another old and valuable member of the Pharmaceutical Society, Mr. George Edwards, of Dartford. The connection of Mr. Edwards with the Society dates from 1842, and during twenty-five years of the intervening time he was a member of its Council, having been elected in May, 1847. He was chosen Vice-President in 1855-6, and again in 1871-2. He was also a member of the Board of Examiners for several years. Mr. Edwards was born in February, 1808. He lived at Dartford forty-five years, during nearly the whole of which time he was in business on his own account. For many years he took a prominent part in local matters of various kinds that affected the interests of the town and people of Dartford. He was a leading member of the Wesleyan Society, and a man deeply interested in every good movement. For several years he had been in failing health, and for a year or more quite unable to carry on business, from which he retired some few months since. After a gradual loss both of bodily and mental vigour, he breathed his last early on Sunday morning last, having been seized with apoplexy about three hours previously. The funeral was to take place at Dartford, on Thursday, at three o'clock.

CHARLES SAVORY.

Our obituary for this week has also to include another name well known in the pharmaceutical world, that of Mr. Charles Harley Savory, of the firm of Savory and Moore. The cause of Mr. Savory's death is stated to have been a cystic growth in the brain, from which he had suffered for several months. He died at his residence, Lancaster Gate, on Thursday, August 27, aged 44.

In mentioning the death of this accomplished gentleman, one circumstance must be related to his honour. Though taking no prominent part in the public affairs of the Society, he was ready to render efficient aid whenever his services were required. When it was in contemplation to arrange a series of autograph prescriptions for the use of the Board of Examiners, he at once placed the whole of his transcribed manuscript formulæ at their disposal. It being represented that *copies* were inadmissible, he handed over his private collection, which now forms one of the volumes employed during the examinations. The whole contents of the book were contributed by himself, but the name of the donor was withdrawn at his request.

Notice has been received of the death of the following:—

On the 17th August, 1874, Mr. George Morgan, Chemist and Druggist of Redditch. Mr. Morgan had been a member of the Pharmaceutical Society since 1869.

On the 11th August, 1874, Mr. David Benjamin Jones, Chemist and Druggist, of Cardiff.

On the 23rd August, 1874, Mr. Samuel Smith Chapman, Chemist and Druggist, of South Hackney.

On the 15th July, 1874, Mr. George McIsaac, Chemist and Druggist, of Edgbaston.

On the 31st August, 1874, Mr. Richard Jefferson, Chemist and Druggist, of Malton, Yorkshire.

On the 27th August, 1874, Mr. Edwin Thomas Weaver, Chemist and Druggist, of Kandy, Ceylon. Mr. Weaver had been an Associate of the Society since 1869.

On the 3rd September, 1874, Mr. James Ward, Pharmaceutical Chemist, of Falkingham. Mr. Ward was one of the founders of the Pharmaceutical Society.

On the 2nd September, 1874, Mr. William Freeman Hopkins, Chemist and Druggist, of Henley-in-Arden.

On the 29th August, 1874, Mr. Richardson Appleby, Chemist and Druggist, of North Shields.

At Pwllheli, on the 14th inst., Mr. John Evans, for nearly thirty years the esteemed representative of Messrs. Evans, Sons, & Co., Liverpool.

Correspondence.

*** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Recent Discussion on Milk.

Sir,—In justice to Mr. Stoddart allow me to remark that from having occasionally met with samples of milk of unusual richness, I had provided against it in page 7 of my pamphlet, where I say that sometimes as much as four or five lines of butter oil may be obtained from 250 grains of milk, but it came from Alderney cows.

Mr. Stoddart in the outset stated as much, for I particularly examined his specimens in the Society's rooms, and observed that his No. 1 tube with four lines of butter oil from 250 grains of milk, was duly marked "Alderney cow's."

The mistake, however, of parties in raising the question was taking 6·64 grains as the average of milk, which Mr. Stoddart never gave.

Now, I have been quoted as giving 3·32 per cent. from two lines of butter oil as the average, but Mr. Stoddart's sample from being so much richer, was just the multiple of mine.

Consequently 1000 grains of milk from Alderney cow, of 20 per cent. cream, will give 66 grains of solid butter, as against 33 from good ordinary milk of 10 per cent. of cream, or just twice the quantity, which confirms Mr. Stoddart's statement.

John Horsley, F.C.S.
Analyst to the County of Gloucester.

Cheltenham, September 14th, 1874.

The Official Plasters.

Sir,—Having read your report of the discussion upon Mr. Gerrard's paper on the "official plasters," perhaps I may be allowed, as a medical plaster manufacturer, to observe that my experience leads me to agree with Mr. Umney in considering the P.L. form for Emp. Plumbi preferable to that of the B.P.

This branch of pharmaceutical preparations does not appear to have engaged the attention of pharmacists in any great degree; consequently, there is not that precision in the formulæ which might be desired, and although with plasters, as with many other of our official preparations for external use, it may be said with truth, that a given formula may be placed in the hands of different manipulators, and as many products varying in appearance, etc., may be the result, yet, *cœteris paribus* the proportions mentioned by Mr. Umney, viz., five litharge to nine of olive oil, and the B.P. form of four parts litharge and nine of oil, give rise to products varying in character both as to keeping and adhesive qualities, and, as I said before—keeping both these points in view, my experience confirms the truth of Mr. Umney's remarks. My desire is to elicit truth, or further discussion, and not to advertize, therefore I sign myself

"One in the Trade."

September 15th, 1874.

Toothache Pencils.

Sir,—Will you allow me through the Journal to call the attention of the trade to the sale of non-stamped toothache pencils. As they are clearly liable to the stamp duty, every chemist having them in stock is liable to a fine.

M. P. S.

W. Symons.—We have received your communication, but feel compelled to adhere, without exception, to the announced determination not to continue the controversy in these columns.

C. H.—All candidates for the Minor Examination will, after October 1, be examined under the new regulations.

W. D. (who should have sent his name and address) will find an article on the subject in the *Pharmaceutical Journal* for March 30 last, p. 953.

A. Ronca.—You would have to wait until you are twenty-one years of age.

J. Mayne.—(1) We are not acquainted with any such process. (2) Wanklyn's 'Water Analysis,' published by Trübner.

"*Libra*" and "*Inquirer*" will find the desired information respecting the metric system of weights and measures in any good modern work on arithmetic.

H. H.—Several formula for lime juice and glycerine have already appeared in the present series of this Journal. See vol. i., pp. 658 and 716.

"*Inquirer.*"—The injustice which you denounce in anticipation will not exist. The phrase, "*the last* three years," is one of your own coining, since the words in italics do not occur in the bye-law. The candidate will simply have to satisfy the examiners that he has been at some previous time for three years practically engaged in the translation and dispensing of prescriptions.

"*Rustic.*"—We think the label would require a stamp, since it implies that the preparation is made according to a secret formula, and also recommends it for various ailments.

Epergne.—Yes.

Errata.—In the report of the meeting of the Leicester Chemists' Assistants and Apprentices' Association, printed on p. 206, *for* "Mr. E. J. Butter" *read* "Mr. E. J. Butler," and *for* "Mr. John Young" *read* "Mr. Joseph Young."

F. J. Attenburrow.—*Artemisia vulgaris.*

G.—*Mentha rotundifolia* and *Aconitum paniculatum.*

E. P.—The plant is *Euphorbia lathyrus.* We should recommend you to send some of the wheat ears to the editor of 'Grevillea.'

J. F. Matthews.—We do not clearly understand your questions. Candidates will be examined in the first four rules of arithmetic, simple and compound, vulgar fractions and decimals, and have to show a thorough knowledge of the British and Metrical systems of weights and measures.

J. Goodwin.—It cannot in any way be considered to be a medicine, and therefore would not be exempt from the regulations applying to Part 1 of the poison schedule.

"*Quintus.*"—The proportion of sulphuric acid allowed by law is as you state. We suppose the prosecutions have been for exceeding that quantity.

G. C.—It would be difficult, if not impossible, to determine satisfactorily the presence or absence of the substances you mention. In any case it would be necessary to submit the mixture to a preliminary chemical examination.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

Communications, Letters, etc., have been received from Mr. W. G. Taplin, Mr. C. Ekins, Mr. Clark, Mr. G. Broom, Dr. W. H. Griffiths, Mr. S. M. Challinor, W. D., R. K. K., "Libra," "A Father," "A Victim."

ON THE CAUSE OF DECOMPOSITION OF TINCTURE OF ACETATE OF IRON, B.P.

BY G. WELBORN.

It is well known, to the cost of many pharmacists, that it is utterly impossible to make tincture of acetate of iron by the process given in the Pharmacopœia, so as to obtain a preparation possessing the necessary qualities of definite composition and stability; and, having frequently experienced the difficulty of procuring tincture of ferric acetate, which would retain indefinitely those essential characters, it appeared that a considerable amount of time and attention might be given with advantage in endeavouring to elucidate the cause of decomposition, and the nature of the resulting new products.

It was found that the tincture, prepared strictly according to the Pharmacopœia, remained bright from two to three weeks, or longer, according to the temperature and other causes, of which more will be said below; it then began to assume a gelatinous condition, still, however, retaining its transparency. After this first evidence of change, decomposition was more rapid, and in four or five days more the tincture became opaque and semi-fluid, owing to the separation of a large quantity of a reddish-brown gelatinous precipitate. In this condition it is almost needless to remark that it is quite unfit for dispensing purposes.

With the object, therefore, of discovering the cause or causes of the above changes in the tincture, the following experiments were performed:—

The first step was to make solution of persulphate of iron by the Pharmacopœia formula and process—half the quantities being taken. The colour of the liquid did not change from black to dark brown (after the addition of nitric acid), accompanied with violent ebullition and evolution of ruddy fumes, until its volume was diminished by evaporation to 3 fl. oz.

A drop of the above syrupy persulphate solution was diluted with water, and a little of this diluted solution being tested with ferricyanide of potassium on a white slab, showed that the conversion into the ferric state was complete. The whole was then diluted with water until it measured 5½ fl. oz.

On dilution the colour of the liquid changed from dark brown to ruby red.

A portion of the above solution of ferric sulphate was converted into tincture of ferric acetate; the B. P. process being slightly modified, as follows:—

Seventy-five minims of solution of ferric sulphate, B.P., were mixed with fl. ʒiv. of rectified spirit, and 60 gr. of potassic acetate were added to fl. ʒv. of rectified spirit. As the whole of the acetate did not dissolve in the spirit, a few drops of concentrated acetic acid were added, but the solution still remained alkaline, yet it was rendered perceptibly clearer by the addition of the acid.

The iron and potash solutions were mixed in the usual manner, and the whole thrown on a filter. The liquid ceased to drop when fl. ʒviss had passed through. Rectified spirit was then percolated through the precipitated potassic sulphate until the percolate measured ʒx.

The tincture thus obtained was set aside in a stoppered bottle. In five days a reddish-brown, pulverulent precipitate began to appear, and gradually increased for the next twelve days, when its formation appeared to be arrested. It resembled the hydrated peroxide of iron in colour; but, unlike it, was readily soluble in cold dilute hydrochloric acid. The hydrochloric acid solution gave a blue precipitate with potassic ferrocyanide, and a green colouration only with the ferricyanide. There was not the least appearance of gelatinization in the tincture, and at the expiration of 34 days it presented the characters of a bright, deep ruby-coloured liquid. On the 38th day it had let fall a copious gelatinous precipitate.

A second quantity of 5½ fl. oz. of solution of ferric sulphate was made; but, in this instance, it was evaporated to dryness in a porcelain basin on a sand-bath. During the evaporation dense white suffocating fumes were evolved, having a strongly acid reaction on litmus. When almost dry, and at a temperature approaching that of a red heat, the fumes coming off were unmistakably those of nitric acid. Just previous to this point of the heating process the persulphate was so exceedingly tough and plastic as to be stirred only by the exertion of a considerable amount of force. It was carefully kept under a red heat, as it undergoes decomposition at that temperature. When the salt had ceased to give off any vapours, it presented the characters of a whitish, amorphous residue, with a slight tinge of buff in some of the fragments.

The dry residue was moistened with water, when considerable heat was evolved. About ℥x. of water were subsequently added: it was then placed aside for three hours, and, as scarcely any portion appeared to be dissolved, it was gently heated for three hours longer, when the whole had undergone solution. The solution now measured ℥x.: it was reduced to fl. ℥vss by evaporation.

Seventy-five minims of the latter solution were converted into tincture of ferric acetate, and set aside, as in the former experiment. On the seventh day there was a perceptible reddish-brown precipitate, which slowly increased for seven days, when all further change appeared to cease. The precipitate formed in the latter experiment was about one-fourth that of the previous one, and of similar appearance, neither did the supernatant liquid gelatinize or show any other sign of change in thirty days, but retained the bright, deep-red colour of a good specimen of the tincture. (On the 36th day, however, a bulky gelatinous precipitate separated.) One drop of concentrated nitric acid was added to about ʒj of the latter tincture (free from any precipitate). There was no perceptible change until the seventeenth day, when it had become somewhat gelatinous, and opaque by reflected, but still remained transparent to transmitted light. On the twentieth day about one-half had become a reddish brown, opaque jelly. At this stage it had developed a powerful ethereal odour resembling that of acetic ether. It was treated with a slight excess of solution of potassic hydrate, and set aside for twenty-four hours, filtered, the filtrate evaporated almost to dryness to expel the spirit, the residue diluted with with water, and a portion treated with solution of potassic permanganate, acidified with sulphuric acid. The permanganate solution was completely decolorized.

A second portion of the above potassic hydrate residue was treated with dilute sulphuric acid, which caused a brisk effervescence: the evolved gas had the odour of nitrogen tetroxide. From the fact of the reduction of the permanganate may be inferred the formation of potassium nitrite, and necessarily also, previously that of nitrous ether, or nitrous acid, produced by the gradual decomposition of the nitric acid by the alcohol of the tincture.

A further cause of failure in the Pharmacopœia process arises from the fact of the fused potassic acetate, commonly met with in pharmacy, not being a neutral compound. It was found to be strongly alkaline, both in its aqueous and spirituous solution, owing to the unavoidable expulsion of acetic acid during the process of fusion. Two ounces of potassic acetate, added to fl. ℥x of rectified spirit, yielded an insoluble residue, which was estimated at about 20 grains in weight. A little concentrated acetic acid was introduced through the spirituous solution of acetate, and delivered upon the insoluble matter by means of a pipette, when there was an immediate effervescence. The clear liquid portion was then poured carefully off, and concentrated acetic acid added to the residue until the whole was dissolved, and the acid in slight excess. The alcoholic solution was next returned to the acid liquid, but the whole was observed to become again alkaline, by the bit of reddened litmus paper left in the acid liquid suddenly changing from red to blue.

Now, as potassic carbonate is insoluble in rectified spirit, the alkalinity could not possibly arise from the presence of carbonate, but must necessarily be due to that of hydrate, which is soluble in that menstruum. At least fl. ʒiv of concentrated acetic acid were added before the reaction became faintly acid to litmus paper.

It was also discovered that litmus paper moistened with solution of potassic acetate, then made distinctly red with dilute acetic acid, and exposed to the air for about an hour, changed in colour from red to blue. If the paper be then dropped into dilute acetic acid, bubbles of gas are evolved. It may, therefore, be inferred that potassic acetate in solution is decomposed by the carbonic anhydride in the atmosphere, and converted into carbonate.

The gelatinous precipitate from B.P. tincture of ferric acetate was spread on bibulous paper, pressed, and exposed for ten days to the air in a warm place. It shrank to an exceedingly small bulk compared with that it originally occupied, and was easily rubbed to powder under a knife. The dry precipitate was very slowly soluble in concentrated acetic acid, readily soluble in cold dilute hydrochloric acid to a yellow solution, very slightly soluble in water, imparting a pale, reddish-brown colour, acid reaction, and slightly astringent taste to the liquid. The acetic acid solution gave a green colouration with ferricyanide, and dark-blue with ferrocyanide of potassium. The aqueous solution gave a brownish precipitate and yellow colouration to the liquid with ferricyanide, and a dark-green colouration with ferrocyanide, which immediately changed to dark-blue on the addition of acetic, or the dilute mineral acids.

A little clear tincture of ferric acetate was agitated with a small quantity of well-washed and freshly-prepared ferric hydrate, and set aside for a day. The excess of hydrate did not subside, and the liquid was not obtained in a bright condition after being filtered three times. The ferric hydrate appeared to be held in an imperfect state of solution, which was bright by transmitted, and opaque reddish-brown by reflected light. This condition was only slightly changed on standing seven days, by the gradual deposition of a reddish-brown precipitate. On the thirty-seventh day it had become almost entirely gelatinized, and, as nitric acid was supposed to be entirely eliminated from the tincture, it was clear that the cause of decomposition must be sought elsewhere.

A quantity of tincture of ferric acetate was accordingly prepared by dissolving the requisite amount of ferric hydrate in acetic acid and adding alcohol so as to obtain a tincture of the B.P. strength. By this process the absence of free nitric acid was ensured.

The tincture thus obtained was divided into three portions. Concentrated nitric acid was added to one in the proportion of ♏ 3 to each fl. ʒj. On the fifty-seventh day it remained perfectly transparent, but there was a development of a powerful odour of acetic ether.

The second portion was agitated with washed ferric hydrate, and, after standing eight hours, filtered: the filtrate was bright between the eye and the light, but opaque sideways. On the fourteenth day a reddish-brown precipitate began to appear, slowly increasing, and turning gelatinous, up to the forty-fourth day. In the latter case the odour was merely that of a mixture of acetic acid and alcohol.

The third portion had no addition made to it, and remained perfectly unchanged.

It is evident, from the above experiments, that the introduction of ferric hydrate completely upsets the equilibrium of the compound by the formation of a basic and unstable acetate; and, as the presence of potassic hydrate and carbonate in the potassic acetate produces ferric hydrate, instead of acetate, when the iron and potash solutions are mixed together in preparing tincture of ferric acetate, the effect is the formation of a basic and unstable tincture.

There appears sufficient reason to infer that the ferric hydrate produced by following the B.P. process is at first held in solution, partly by the free nitric acid, and partly by its solution in the tincture, and that by the gradual loss of nitric acid from its decomposition by the alcohol the iron is gradually deposited as one of the hydrated oxides.

This view is supported by the fact that a pint of tincture, made from solution of ferric sulphate, free from nitric acid, and potassic acetate, slightly acidified with acetic acid, has produced a tincture which, after the expiration of eighty-five days, shows no sign of decomposition whatever.

A portion of tincture which had been agitated with ferric hydrate was diluted with water, and treated with ferri- and ferro-cyanide of iron, when it behaved precisely in the same manner with those re-agents as the aqueous solution of the dried precipitate from decomposed tincture, that is, the indications obtained belonged to neither the ferrous nor ferric states, but to some other modified condition of the metal.

The rectified spirit used to displace the tincture in the percolator may be advantageously recovered by distillation where large quantities are prepared. On distilling the precipitate from a pint of the tincture ℥ij. and ♏ 80 of spirit were obtained without carrying the distillation to actual dryness.

The Dispensary, Grantham.

THE COHESION FIGURES OF OILS AS TESTS FOR THEIR IDENTITY AND PURITY.*

BY MISS KATE CRANE.

Becoming interested, from articles in the *Chemical News* of 1869, in the cohesion figures of oils as tests for their

* From the *American Journal of Pharmacy.*

identity and purity, I was led a few weeks ago to experiment with some varieties, and upon the suggestion of a friend I submit an account of some of my work to the readers of the *American Journal of Pharmacy*.

With the comparatively few trials I have made I am convinced that a little patient practice will teach the eye in a short time to detect the characteristic differences of the figures. To make these perfect it is necessary to observe the time in forming, for at *different periods* some varieties form figures very like, but with this precaution each is entirely characteristic. It is essential that the dish used, etc., be perfectly clean, so that when filled with water no dust or lint floats upon the surface, as this materially interferes with the perfect formation of the figure.

A single drop is let fall from a burette or glass rod, held steadily about four inches above the water, upon the centre of the surface.

I experimented with a number of volatile oils, by themselves, and mixed in different proportions with *oil of turpentine*.

The last-named oil, by itself, spreads instantly to the whole size of the plate, a common soup plate, and almost immediately the edge begins to break into irregular shapes, when a rapid motion takes place over the whole surface of the film, and there seems to be a contest between the cohesion of the oil particles and the adhesion between them and the water. The oil makes repeated efforts to gather itself closer together, when the water instantly reacts, giving a wavy appearance to the whole figure. The play of colours at this point is beautiful, and serves to bring out the lines more perfectly. In a few seconds innumerable little holes appear over the surface, which soon are separated only by threaded lines, and the figure is like the most exquisitely fine lace.

Oil of cinnamon forms a figure not more than half the size of the last named. In a few seconds small portions are detached, and shortly separate into distinct drops, four or five larger and a number of smaller ones, scattered about. With mixtures in different proportions of *oil of turpentine*, the figures formed differently, taking more the characteristics of the adulterant as it predominated.

Oil of nutmeg forms a large figure instantly, the edge showing a beaded line. It gathers itself together and spreads again, very like oil of turpentine, but the surface presents more the appearance of watered silk. Within 60 seconds some holes appear, and in 80 more the surface is covered with them; these scarcely spread to more than a sixteenth of an inch in diameter, but from the first each is bordered with a dotted edge. The figure lasts some time without changing materially, except the openings lengthen out into an oblong shape, remaining entirely distinct. The play of colours is very fine. With the addition of one-third the volume of *oil of turpentine*, the first spreading is little different, but openings appear in half the time, and the dotted border does not come as soon; in about four minutes the figure is most characteristically marked, and soon breaks up entirely, this being the distinctive difference between the pure oil and the mixture.

Oil of peppermint spreads instantly to a large figure, and in ten or fifteen seconds openings appear, which increase rapidly in size; at first they look somewhat like the last named, but are not nearly so numerous, and the border soon is more like tiny drops. In one and a half or two minutes they begin to run together, and the figure breaks up. With the addition of *turpentine oil* the figure forms more slowly, and the breaking up is less rapid, but in five minutes the outlines only remain.

Oil of bergamot spreads instantly; in 30 seconds tiny openings appear, not very abundant, and increase in size slowly; in five minutes they are not larger than oil of nutmeg at one and a half minutes. At first they have a dotted border, but as they increase in size this changes to a scalloped film, which spreads until, in eight or ten minutes, they are joined together over the whole surface.

This, with *turpentine oil*, gives a watered surface in spreading, much more marked and with a finer play of colours.

Experiments with fixed oils are as follows: *poppy-seed oil* spreads instantly to a large figure, retaining an entire outline, and for a few seconds the surface is unbroken, except the bare intimation of a beaded edge. In a few moments little holes appear around the edge, and soon the whole surface is broken in like manner; these increase in size very slowly. In fifteen minutes the edge begins to open, forming indentations, which gradually work their way across the figure. As they increase in length these begin to curve, and in three-quarters of an hour have doubled themselves two or three times.

Cod liver oil spreads in a large film; a little way from the edge a row of small holes appear, and in a minute or two the surface is covered with them; these gradually enlarge, assuming irregular shapes, soon separated by branching lines.

Cod liver oil with *lard oil* spreads very like the former, but in a few moments the edge opens and the film separates partly across; in a moment one of the projecting points begins to curve itself towards the centre, bending more and more until it forms a coil. Meanwhile a few holes have appeared, which spread irregularly, throwing out projecting points.

Castor oil spreads instantly, the edge remaining entire; openings appear thickly in thirty seconds, and increase gradually, but unevenly, those nearer the edge being larger, and lengthening out irregularly as they spread. The figure lasts some time. *Castor* with a little *lard oil* makes a smaller figure, and not nearly so much broken; in five minutes the holes open into each other and the figure breaks up from the edge.

A mixture of *castor* and *poppy-seed oils* spreads to form a lacework border, but smoothes out to an entire edge soon, and within a few seconds openings appear. The figure in size and general appearance is more like castor oil alone, but the holes spread less uniformly in a given time, a few being larger, but the greater portion much smaller. In fifteen minutes there is a general tendency to break up.

Castor with a little *croton oil* throws out a spray, which in a few moments unites into a thin film. The spray, as it spreads, draws out the inner portion into radiate points, which open into a beautiful network, the centre cohering closely.

Croton oil throws out, in spreading, a fine spray in advance of the more closely cohering portion, which follows quickly. The outer edge breaks up unevenly into little indentations, the border of the inside portion being quite broken, but gradually becomes nearly entire. The surface, too, has openings, which increase quite rapidly in size, the outer ones being much the larger. In the final breaking up, before the holes open one into another, the outlines are beautifully fringed.

I experimented with the varieties of *olive oil*, alone, and with mixtures of the varieties, and with the addition of other oils; but I did not get the perfectly formed figures in so short a time as Dr. Moffat mentions.* My material, probably, had either been adulterated, or was not fresh, which last, I think, would make quite a difference. However, with each variety and mixture the figure was different. If the impurities were the same that Dr. Moffat used, it appears that differences in proportion are capable of detection. Indeed, in several instances I decided that an approximate calculation of the amount of adulteration is quite satisfactorily shown by the figures formed.

Of many of the fixed oil figures I obtained very nice patterns by Dr. Moffat's method—dropping thin glazed paper upon the perfectly formed figure for an instant, then pressing between blotting paper to absorb the surplus oil; or, to bring out the pattern more clearly, floating the paper upon a coloured liquid for a moment or two before pressing.

* *Chemical News*, xviii., No. 473.

No written description can give any idea of the beauty of these figures, many of the formations being very delicately and peculiarly marked; while more beautiful than the form, and often equally characteristic, is the exquisite play of colours upon the surface.

University of Michigan, July, 1874.

RESINA PODOPHYLLI.*

BY FREDERICK B. POWER, G.P.

Eight troy ounces of powdered podophyllum were treated as per formula for Resina podophylli, U. S. P., 1870, until the alcoholic percolate ceased to cause a precipitate when dropped into water, and passed perfectly colourless; the residue contained in the percolator was dried and found to weigh seven troy ounces and two drachms, the amount of moisture in the powder having been previously ascertained and found to be 5 per cent., leaving the amount of soluble matter abstracted by the alcoholic menstruum about 4 per cent.

The precipitated resin was allowed to drain, and washed with successive portions of cold water until freed from acid, and the washings upon evaporation left no residue; the yield of resin thus obtained after careful drying was two drachms, or 3 per cent.; it was of a light yellowish brown colour, and presented a marked contrast with some of the commercial specimens examined. The percentage of resin seeming small, a larger quantity of selected rhizomes was operated upon, but the percentage in both instances was the same; the rhizomes, however, had been previously deprived of the radicles, and it being known that these are at least quite as rich in resin, the operation might have led to different results had they not been detached.

The mother liquor remaining after the precipitation of the resin, together with the washings therefrom, was concentrated by evaporation, when a portion of resinous matter separated, which was found to be entirely soluble in alcohol, being precipitated by water; but by treatment with ether was divided into two portions, soluble and insoluble, therein maintaining about the same degree of solubility as the precipitated resin. The exact amount of this substance was not ascertained, but must be at least 10 per cent. of that originally obtained by precipitation. The portion of alcoholic resin insoluble in ether thus separated by the concentration of the mother liquor, was taken in doses of five grains, producing only a slight cathartic action, attended by no unpleasant effects, while the ethereal resin taken in the same amount proved to be an active emeto-cathartic, very violent in its action, producing vomiting and purging, attended with severe griping, sense of dryness in the throat and dilatation of the pupils, the effects lasting for about twenty-four hours; the latter effect I have never seen recorded, and may possibly only be produced by an excessive dose; but it was plainly marked in this instance, affording conclusive evidence that the substance thus separated is identical with the precipitated resin, at the same time establishing the fact that *the so-called resin of podophyllum is not a true resin*, which term, as applied by the older chemists in its widest sense, distinguishes those substances insoluble in water, generally soluble in alcohol, for the most part uncrystallizable, and melting when warmed; it might with some degree of propriety be called a resinoid, from its resemblance to a resin; but this in turn is so vague in its meaning, that the nomenclature adopted by our Pharmacopœia may be more conveniently used until its true composition is more definitely determined.

The concentrated mother liquor when filtered was of a yellowish red colour, possessing a slight bitter taste and strong acid reaction; no precipitate was produced by iodohydrargyrate of potassium, tannic acid, mercuric chloride, or tincture of iodine, indicating the absence of any organic alkali; the statement of berberina having been separated from this liquid must have been applied with reference to the former officinal resin, precipitated without the agency of hydrochloric acid, as in the present process it was found to have been entirely precipitated.

The liquid, however, when quite dilute, frothed strongly upon agitation; the colour was rendered much brighter upon the addition of alkalies. Ferric chloride coloured it olive green, baryta water produced a dense precipitate, but it was not precipitated by a solution of gelatin; when mixed with an anhydrous alcohol, a perfect solution was formed, which, however, did not froth; added to an alkaline solution of cupric oxid, it became of a bluish green colour, forming upon standing a slight flocculent precipitate, which upon boiling turned to reddish brown. The liquid, when freed as much as possible of colouring matter by ether, was precipitated by barium hydrate, the precipitate collected and washed with a solution of the same, dissolved in a small portion of water and the barium removed by CO_2; the resulting solution upon evaporation possessed the peculiar odour of saponin, tending to convey the statement of Professor Mayer as to the presence of this substance, to which is no doubt partially due the extremely irritating effect upon the eyes and skin, experienced by those engaged in the manufacture of the resin on a large scale.

The residue contained in the percolator, after exhaustion by alcohol, was macerated with cold water for five days, filtered and evaporated to the consistence of an extract, possessing a sweetish odour, in colour and taste closely resembling the English extract of taraxacum. This was taken in doses of from ten to twenty grains, producing only slightly laxative but decided tonic effects. Although proving that the rhizome after exhaustion by alcohol is almost entirely destitute of cathartic properties, yet the extract thus obtained may, upon trial, merit some application.

This extract was again liquefied and treated with purified animal charcoal, which nearly deprived it of colour; the solution gave a dense precipitate upon the addition of alcohol, which, when separated, by treatment with ferric chloride and solution of borax, was found to consist principally of gum. The solutions, after the removal of the gum, contained extractive matter with some sugar; the latter, after separation by ether, was indicated by Trommer's test, and upon evaporating the solution and heating, the odour of caramel was evolved. The charcoal was then exhausted with boiling alcohol; this liquid, however, upon evaporation, left but a slight amorphous residue.

Upon the officinal resin, as previously obtained, sulphuric and hydrochloric acids produce no change of colour in the cold; nitric acid colours it deep yellowish brown; when heated with concentrated sulphuric acid it is partially dissolved, forming at first a yellowish solution, which soon changes to a deep blood red, and upon dilution with water separates flocks of a brownish-red colour. The portion undissolved by the concentrated acid is dissolved by alcohol with the formation of the same blood-red colour. The resin, when boiled with diluted sulphuric acid, is also partially dissolved, forming a red solution, though more slowly, and the filtered liquid is not capable of reducing cupric oxide in alkaline solution.

The resin fuses at 220° F., which was ascertained by placing a portion upon the surface of mercury, with a thermometer immersed in the liquid, and applying a carefully regulated heat; when heated on platinum foil it melts to a brownish liquid, and upon increasing the heat takes fire and burns with a bright sooty flame, with considerable empyreuma, leaving light porous charcoal. Two grams of the resin were boiled with a fluid ounce of water, imparting thereto a light yellow colour, while the resin ran together, forming a soft brownish mass, becoming brittle on cooling. The liquid was filtered while hot, by means of an arrangement for hot filtration; it was transparent while hot, but became turbid upon cooling, and upon evaporation of the liquid separated resinous flocks. Upon weighing the resin after this treatment it was found

* From the *American Journal of Pharmacy.*

to have lost 0·03 grams. The ethereal resin yielded similar results.

The resin is entirely soluble in amylic and methylic alcohol, acetone, and officinal solution of potassa, forming, when diluted, a bright yellow solution; it is also soluble in carbolic acid, with which it seems to combine, depositing upon evaporation reddish yellow crystals, but it is insoluble in turpentine.

Supported by a series of experiments made with the alcoholic and ethereal portion of this resin, I can confirm the statements that have been previously made, that while the portion of resin insoluble in ether is not without some activity, the ethereal resin is very much more active, and it is to be preferred for medicinal use.

By the following tabular statement the relative value of the officinal resin, as compared with some commercial varieties, will be seen based upon the relative activity of the ethereal and alcoholic resin; all were found to be free from admixture, and, with one exception, were found to be superior to many specimens of western manufacture; the difference in colour is probably due to various modifications in the process of preparation, by the application of heat in the separation of the resin, which no longer becomes necessary with the use of hydrochloric acid, or by the addition of a greater or less amount of muriate of berberina.

No. 1. U. S. Pharmacopœia, 1870: light yellowish brown. No. 2, bright yellow. No. 3, dark brown. No. 4, yellowish brown. No. 5, bright yellow. No. 6, bright yellow.

Action of Solvents upon five grams of Resin.

	1	2	3	4	5	6
Soluble in Turpentine	Insoluble.	Insoluble.	Insoluble.	Insoluble.	Insoluble.	Insoluble.
,, Ether	4·6	3·95	2·95	3·55	4·2	4·3
,, Chloroform	0·02	0·01	0·01	0·015	0·005	0·02
,, Carb. Bisulph.	—	—	—	—	—	—
,, Petrol. Benzin.	—	—	—	—	—	—
,, Officinal solution Potassa re-precipitated by HCl in excess	0·17	0·77	1·65	1·2	0·52	0·51
Loss	0·21	0·27	0·39	0·235	0·275	0·17
	5	5	5	5	5	5

Solubility of two grams of Ethereal Resina.

	1	2	3	4	5	6
Soluble in Chloroform	1·4	1·25	1·6	1·32	1·15	1·2
,, Carb. Bisulph.	—	—	—	—	—	—
,, Petro. Benzin.	—	—	—	—	—	—
,, Ether or alcohl.	0·45	0·55	0·3	0·45	0·70	0·6
Loss	0·15	0·20	0·1	0·23	0·15	0·2
	2	2	2	2	2	2

Some experiments were made with a view of isolating the white alkaloid, stated some time since by Professor Mayer to be contained in that portion of the former officinal resin which is insoluble in ether, but by the present process, should its hydrochlorate be soluble in water, it should have been present in the mother liquor, remaining after the precipitation of the resin, but was not there detected.

THE CARNIVOROUS HABITS OF SOME PLANTS.*

BY DR. HOOKER, C.B., D.C.L., PRES. R.S.

(*Continued from page 224.*)

To Mr. Darwin, who for some years past has had the subject under investigation, we are indebted, not merely for the complete confirmation of the facts attested by the earliest observers, but also for some additions to those facts, which are extremely important. The whole investigation still awaits publication at his hands, but some of the points which were established have been announced by Professor Asa Gray in America, to whom Mr. Darwin had communicated them.

Mr. Darwin found that the hairs of the leaf of *Drosera* responded to a piece of muscle or other animal substance, while to any particle of inorganic matter they were nearly indifferent. To minute fragments of carbonate of ammonia they were more responsive.

I will now give the results of Mrs. Treat's experiments, in her own words:—

"Fifteen minutes past ten I placed bits of raw beef on some of the most vigorous leaves of *Drosera longifolia.* Ten minutes past twelve two of the leaves had folded around the beef, hiding it from sight. Half-past eleven on the same day I placed living flies on the leaves of *D. longifolia.* At twelve o'clock and 48 minutes one of the leaves had folded entirely around its victim, and the other leaves had partially folded, and the flies had ceased to struggle. By half-past two four leaves had each folded around a fly. The leaf folds from the apex to the petiole, after the manner of its vernation. I tried mineral substance, bits of dry chalk, magnesia, and pebbles. In twenty-four hours neither the leaves nor the bristles had madeany move in clasping these articles. I wetted a piece of chalk in water, and in less than an hour the bristles were curving about it, but soon unfolded again, leaving the chalk free on the blade of the leaf."

Time will not allow me to enter into further details with respect to *Dionæa* and *Drosera.* The repeated testimony of various observers spreads over a century, and though at no time warmly received, must, I think, satisfy you that in this small family of the *Droseraceæ* we have plants which in the first place capture animals for purposes of food; and in the second digest and dissolve them by means of a fluid which is poured out for the purpose; and, thirdly, absorb the solution of animal matter which is so produced.

Before the investigations of Mr. Darwin had led other persons to work at the subject the meaning of these phenomena was very little appreciated. Only a few years ago, Duchartre, a French physiological botanist, after mentioning the views of Ellis and Curtis with respect to *Dionæa*, expressed his opinion that the idea that its leaves absorbed dissolved animal substances was too evidently in disagreement with our knowledge of the function of leaves, and the whole course of vegetable nutrition, to deserve being seriously discussed.

Perhaps if the *Droseraceæ* were an isolated case of a group of plants exhibiting propensities of this kind, there might be some reason for such a criticism. But I think I shall be able to show you that this is by no means the case. We have now reason to believe that there are many instances of these carnivorous habits in different parts of the vegetable kingdom, and among plants which have nothing else in common but this.

As another illustration I shall take the very curious group of Pitcher-plants, which is peculiar to the New World. And here also I think we shall find it most convenient to follow the historical order in the facts.

Sarracenia.—The genus *Sarracenia* consists of eight species, all similar in habit, and all natives of the eastern States of North America, where they are found more especially in bogs, and even in places covered with shallow water. Their leaves, which give them a character entirely their own, are pitcher-shaped or trumpet-like, and are collected in tufts springing immediately from the ground; and they send up at the flowering season one or more slender stems bearing each a solitary flower. This has a singular aspect, due to a great extent to the umbrella-like expansion in which the style terminates; the shape of this, or perhaps of the whole flower, caused the first English settlers to give to the plant the name of side-saddle flower.

Sarracenia purpurea is the best known species. About ten years ago it enjoyed an evanescent notoriety from the

* Address to the department of Zoology and Botany of the British Association.

fact that its rootstock was proposed as a remedy for small-pox. It is found from Newfoundland southward to Florida, and is fairly hardy under open-air cultivation in the British isles. At the commencement of the seventeenth century Clusius published a figure of it, from a sketch which found its way to Lisbon and thence to Paris. Thirty years later Johnson copied this in his edition of Gerard's Herbal, hoping "that some or other that travel into foreign parts may find this elegant plant, and know it by this small expression, and bring it home with them, so that we may come to a perfecter knowledge thereof." A few years afterwards this wish was gratified. John Tradescant, the younger. found the plant in Virginia, and succeeded in bringing it home alive to England. It was also sent to Paris from Quebec by Dr. Sarrazin, whose memory has been commemorated in the name of the genus by Tournefort.

The first fact which was observed about the pitchers was, that when they grew they contained water. But the next fact which was recorded about them was curiously mythical. Perhaps Morrison, who is responsible for it, had no favourable opportunities of studying them. for he declares them to be, what is by no means really the case, intolerant of cultivation ("respuere culturam videntur").

He speaks of the lid, which in all the species is tolerably rigidly fixed, as being furnished, by a special act of providence, with a hinge. This idea was adopted by Linnæus, and somewhat amplified by succeeding writers, who declared that in dry weather the lid closed over the mouth, and checked the loss of water by evaporation. Catesby, in his fine work on the 'Natural History of Carolina,' supposed that these water receptacles might "serve as an asylum or secure retreat for numerous insects, from frogs and other animals which feed on them;"—and others followed Linnæus in regarding the pitchers as reservoirs for birds and other animals, more especially in times of drought (præbet aquam sitientibus aviculis)."

The superficial teleology of the last century was easily satisfied, without looking far for explanations; but it is just worth while pausing for a moment to observe that, although Linnæus had no materials for making any real investigation as to the purpose of the pitchers of Sarracenias, he very sagaciously anticipated the modern views as to their affinities. They are now regarded as very near allies of water-lilies—precisely the position which Linnæus assigned to them in his fragmentary attempt at a true natural classification. And besides this he also suggested the analogy which, improbable as it may seem at first sight, has been worked out in detail by Baillon (in apparent ignorance of Linnæus' writings) between the leaves of *Sarracenia* and water-lilies.

Linnæus seems to have supposed that *Sarracenia* was originally aquatic in its habits, that it had Nymphæa-like leaves, and that when it took to a terrestrial life its leaves became hollowed out, to contain the water in which they could no longer float—in fact, he showed himself to be an evolutionist of the true Darwinian type.

Catesby's suggestion was a very infelicitous one. The insects which visit these plants may find in them a retreat, but it is one from which they never return. Linnæus' correspondent, Collinson, remarked in one of his letters, that "many poor insects lose their lives by being drowned in these cisterns of waters;" but Wiliam Bartram, the son of the botanist, seems to have been the first to have put on record, at the end of the last century, the fact that Sarracenias catch insects and put them to death, in the wholesale way that they do.

Before stopping to consider how this is actually achieved, I will carry the history a little further.

In the two species in which the mouth is unprotected by the lid it could not be doubted that a part, at any rate, of the contained fluid was supplied by rain. But in *Sarracenia variolaris*, in which the lid closes over the mouth, so that rain cannot readily enter it, there is no doubt that a fluid is secreted at the bottom of the pitchers, which probably has a digestive function. William Bartram, in the preface to his travels in 1791, described this fluid, but he was mistaken in supposing that it acted as a lure. There is a sugary secretion which attracts insects, but this is only found at the upper part of the tube. Bartram must be credited with the suggestion, which he, however, only put forward doubtfully, that the insects were dissolved in the fluid, and then became available for the alimentation of the plants.

Sir J. E. Smith, who published a figure and description of *Sarracenia variolaris*, noticed that it secreted fluid, but was content to suppose that it was merely the gaseous products of the decomposition of insects that subserved the processes of vegetation. In 1829, however, thirty years after Bartram's book, Burnett wrote a paper containing a good many original ideas, expressed in a somewhat quaint fashion, in which he very strongly insisted on the existence of a true digestive process in the case of *Sarracenia*, analogous to that which takes place in the stomach of an animal.

Our knowledge of the habits of *Sarracenia variolaris* is now pretty complete, owing to the observations of two South Carolina physicians. One, Dr. M'Bride, made his observations half a century ago, but they had, till quite recently, completely fallen into oblivion. He devoted himself to the task of ascertaining why it was that *Sarracenia variolaris* was visited by flies, and how it was that it captured them. This is what he ascertained:—

"The cause which attracts flies is evidently a viscid substance resembling honey, secreted by or exuding from the internal surface of the tube. From the margin, where it commences, it does not extend lower than one-fourth of an inch. The falling of the insect, as soon as it enters the tube, is wholly attributable to the downward or inverted position of the hairs of the internal surface of the leaf. At the bottom of a tube split open the hairs are plainly discernible. pointing downwards; as the eye ranges upward they gradually become shorter and attenuated, till at or just below the surface covered by the bait they are no longer perceptible to the naked eye, nor to the most delicate touch. It is here that the fly cannot take a hold sufficiently strong to support itself, but falls."

Dr. Mellichamp, who is now resident in the district in which Dr. M'Bride made his observations, has added a good many particulars to our knowledge. He first investigated the fluid which is secreted at the bottom of the tubes. He satisfied himself that it was really secreted, and describes it as mucilaginous, but leaving in the mouth a peculiar astringency. He compared the action of this fluid with that of distilled water on pieces of fresh venison, and found that after fifteen hours the fluid had produced most change, and also most smell; he therefore concluded that as the leaves, when stuffed with insects, become most disgusting in odour, we have to do, not with a true digestion but with an accelerated decomposition. Although he did not attribute any true digestive power to the fluid secreted by the pitchers, he found that it had a remarkable anæsthetic effect upon flies immersed in it. He remarked that "a fly when thrown into water is very apt to escape, as the fluid seems to *run* from its wings," but it never escaped from the *Sarracenia* secretion. About half a minute after being thrown in, the fly became to all appearance dead, though, if removed, it gradually recovered in from half an hour to an hour.

According to Dr. Mellichamp, the sugary lure discovered by Dr. M'Bride at the mouth of the pitchers is not found on either the young ones of one season nor the older ones of the previous year. He found, however, that about May it could be detected without difficulty, and, more wonderful still, that there is a honey-baited pathway leading directly from the ground to the mouth, along the broad wing of the pitcher, up which insects are led to their destruction.

From these narratives it is evident that there are two very different types of pitcher in *Sarracenia*, and an examination of the species shows that there must probably be three. These may be primarily classified into those with the mouth open and lid erect, and which consequently receive the rain water in more or less abundance, and those with the mouth closed by the lid, into which rain can hardly, if at all, find ingress.

To the first of these belongs the well-known *S. purpurea*, with inclined pitchers, and a lid so disposed as to direct all the rain that falls upon it also into the pitcher; also *S. flava*, *rubra*, and *Drummondii*, all with erect pitchers and vertical lids; of these three the lid in a young state arches over the mouth, and in an old state stands nearly erect, and has the sides so reflected that the rain which falls on its upper surface is guided down the outside of the back of the pitcher, as if to prevent the flooding of the latter.

To the second group belong *S. psittacina* and *S. variolaris*.

The tissues of the internal surfaces of the pitchers are singularly beautiful. They have been described in one species only, the *S. purpurea*, by August Vogt; but from this all the other species which I have examined differ materially. Beginning from the upper part of the pitcher, there are four surfaces, characterized by different tissues, which I shall name and define as follows:—

1. An *attractive* surface, occupying the inner surface of the lid, which is covered with an epidermis, stomata, and (in common with the mouth of the pitcher) with minute honey-secreting glands; it is further often more highly coloured than any other part of the pitcher, in order to attract insects to the honey.

2. A *conducting* surface, which is opaque, formed of glassy cells, which are produced into deflexed, short, conical, spinous processes. These processes, overlapping like the tiles of a house, form a surface down which an insect slips, and affords no foothold to an insect attempting to crawl up again.

3. A *glandular* surface (seen in *S. purpurea*), which occupies a considerable portion of the cavity of the pitcher below the conducting surface. It is formed of a layer of epidermis with sinuous cells, and is studded with glands; and being smooth and polished, this too affords no foothold for escaping insects.

4. A *detentive* surface, which occupies the lower part of the pitcher, in some cases for nearly its whole length. It possesses no cuticle, and is studded with deflexed, rigid, glass-like, needle-formed, striated hairs, which further conveys towards the axis of the diminishing cavity, so that an insect, if once amongst them, is effectually detained, and its struggles have no other result than to wedge it lower and more firmly in the pitcher.

Now, it is a very curious thing that in *S. purpurea*, which has an open pitcher, so formed as to receive and retain a maximum of rain, no honey secretion has hitherto been found, nor has any water been seen to be secreted in the pitcher; it is further the only species in which (as stated above) I have found a special glandular surface, and in which no glands occur on the detentive surface. This concurrence of circumstances suggests the possibility of this plant either having no proper secreting of its own, or only giving it off after the pitcher has been filled with rain water.

In *S. flava*, which has open-mouthed pitchers and no special glandular surface, I find glands in the upper portion of the detentive surface, amongst the hairs, but not in the middle or lower part of the same surface. It is proved that *S. flava* secretes fluid, but under what precise conditions I am not aware. I have found none but what may have been accidentally introduced in the few cultivated specimens which I have examined, either in the full-grown state or in the half-grown, when the lid arches over the pitcher. I find the honey in these as described by the American observers, and honey secreting glands on the edge of the wing of the pitcher, together with similar glands on the outer surface of the pitcher, as seen by Vogt in *S. purpurea*.

Of the pitchers with closed mouths, I have examined those of *S. variolaris* only, whose tissues closely resemble those of *S. flava*. That it secretes a fluid noxious to insects there is no doubt, though in the specimens I examined I found none.

There is obviously thus much still to be learned with regard to *Sarracenia*, and I hope that American botanists will apply themselves to this task. It is not probable that three pitchers so differently constructed as those of *S. flava*, *purpurea*, and *variolaris*, and presenting such differences in their tissues, should act similarly. The fact that insects normally decompose in the fluid of all, would suggest the probability that they all feed on the products of decomposition; but as yet we are absolutely ignorant whether the glands within the pitchers are secretive or absorptive, or both; if secretive, whether they secrete water or a solvent; and if absorptive, whether they absorb animal matter or the products of decomposition.

It is quite likely that, just as the saccharine exudation only makes its appearance during one particular period in the life of the pitcher, so the digestive functions may also be only of short duration. We should be prepared for this from the case of the *Dionæa*, the leaves of which cease after a time to be fit for absorption, and become less sensitive. It is quite certain that the insects which go on accumulating in the pitchers of *Sarracenias* must be far in excess of its needs for any legitimate process of digestion. They decompose; and various insects, too wary to be entrapped themselves, seem habitually to drop their eggs into the open mouth of the pitchers, to take advantage of the accumulation of food. The old pitchers are consequently found to contain living larvæ and maggots, a sufficient proof that the original properties of the fluid which they secreted must have become exhausted; and Barton tells us that various insectivorous birds slit open the pitchers with their beaks to get at the contents. This was probably the origin of Linnæus' statement that the pitchers supplied birds with water.

The pitchers finally decay, and part, at any rate, of their contents must supply some nutriment to the plant by fertilizing the ground in which it grows.

Darlingtonia.—I cannot take leave of *Sarracenia* without a short notice of its near ally, *Darlingtonia*, a still more wonderful plant, an outlier of *Sarracenia* in geographical distribution, being found at an elevation of 5,000 feet on the Sierra Nevada of California, far west of any locality inhabited by *Sarracenia*. It has pitchers of two forms; one, peculiar to the infant state of the plant, consists of narrow, somewhat twisted, trumpet-shaped tubes, with very oblique open mouths, the dorsal lip of which is drawn out into a long, slender, arching, scarlet hood, that hardly closes the mouth. The slight twist in the tube causes these mouths to point in various directions, and they entrap very small insects only. Before arriving at a state of maturity the plant bears much larger, suberect pitchers, also twisted, with the lip produced into a large inflated hood, that completely arches over a very small entrance to the cavity of the pitcher. A singular orange-red, flabby, two-lobed organ hangs from the end of the hood, right in front of the entrance, which, as I was informed last week by letter from Professor Asa Gray, is smeared with honey on its inner surface. These pitchers are crammed with large insects, especially moths, which decompose in them, and result in a putrid mass. I have no information of water being found in its pitchers in its native country, but have myself found a slight acid secretion in the young states of both forms of pitcher.

The tissues of the inner surfaces of the pitchers of both the young and old plant I find to be very similar to those of *Sarracenia variolaris* and *flava*.

Looking at a flowering specimen of *Darlingtonia*, I was struck with a remarkable analogy between the arrangement and colouring of the parts of the leaf and of the flower. The petals are of the same colour as the flap of the pitcher, and between each pair of petals is a hole (formed by a notch in the opposed margins of each) leading to the stamens and stigma. Turning to the pitcher, the relation of its flap to its entrance is somewhat similar. Now, we know that coloured petals are specially attractive organs, and that the object of their colour is to bring insects to feed on the pollen or nectar, and in this case, by means of the hole, to fertilize the flower; and that the object of the flap and its sugar is also to attract insects, but with a very different result, cannot be doubted. It is hence conceivable that this marvellous plant lures insects to its flowers for one object, and feeds them while it uses them to fertilize itself, and that, this accomplished, some of its benefactors are thereafter lured to its pitchers for the sake of feeding itself!

(*To be continued.*)

HERB-POISONING AT THE CAPE OF GOOD HOPE.*

BY GEORGE GREY, M.D., F.G.S. EDIN.,

District Surgeon to the Government for the Division of Cradock, Cape of Good Hope.

The Bushmen tribes (Bosjesmen) of Southern Africa are pretty generally known to be naturally cunning, treacherous, and vindictive. As regards *physique*, authorities in ethnological science have placed them in all but the lowest grade in the human scale, and their mental capacity is, no doubt, only on a par with their physical configuration. Nevertheless, these people manifest certain inherent powers of perception, and they may safely be credited with a tolerably accurate knowledge as to right and wrong. We must, therefore, not view them, as some have been disposed to do, in the light of beings wholly devoid of a moral sense—ill-regulated and distorted though it undoubtedly is.

Consequently the Bushman of Southern Africa must, like his superiors in the human family, be held responsible for his deeds, whether good or bad; though, after taking into consideration his very depraved habits and miserable mode of living, his criminal propensities, and his disregard of all means calculated to raise him from his degraded condition, we feel compelled to relegate him, in a social sense, to the class commonly denominated "evil-doers."

But in the Kaffir race, of which people we have a considerable number scattered throughout the district of Cradock, comprising principally individuals belonging to the Amaxosa, Tambookie, and Basuto tribes, we find no trace of resemblance to the genuine aborigines of Southern Africa. The Kaffir, whose original habitat is believed to be North-East Africa, is almost as distinct and different in his physical and mental development from the Bushman as he is from the European; and, if placed in comparison with the Koranna and Damara Hottentots, the Griquas, Bosjesmen, and other unpromising people peculiar to this region, we have to pronounce him in every respect a superior variety of the genus *Homo*.

But, notwithstanding, the Kaffir is an utter savage, and it is with much difficulty he can be brought to a proper appreciation of European laws and customs; a considerable time must elapse before the march of civilisation here, progressive as it is, can render him a trustworthy dependent to the colonists; and therefore we have good ground for assuming that, until such can take place, our barbarous coloured races are not likely to refrain from resorting, as occasion may suit them, to the crime of secret poisoning. We must not, however, forget that it is a stated axiom in the ethics and laws of savage races, that though criminal acts, or such as relate to death by poisoning, and, indeed, all serious offences, when perpetrated against any members of their own tribe or nation, are followed by condign punishment on the offenders, such crimes are really considered as meritorious deeds when members of foreign, and, therefore, to them ill-favoured, communities are the victims.

As bearing upon the foregoing remarks, I would now observe, that during the last eight years I have been required to investigate, in my official capacity as district surgeon of this division, eleven cases of reported poisoning in and around Cradock. In many of these whole families have been affected, and generally in each family one and sometimes more deaths have occurred. The above may be looked upon as a considerable number for a comparatively small and scattered population, which includes, in town and country, according to the last census, only 12,228 inhabitants, the whole district embracing an area of 1,806,692 acres (2,986 square miles). We must also take into account that, perhaps, not more than one-half of the above crimes (at least among the coloured people), when committed in isolated places, are ever brought to light.

It is not my intention to enter at present into any detailed statement on the cases above referred to, except on one which recently occurred at Middelburg, and which involved very serious and important issues. I would only remark, with respect to the others, that in many of them I found that strychnia, or else the seeds of *Strychnos Nux-vomica*, had been the drug resorted to; and in other cases the tuberous roots of certain iridaceous plants had, as far as could be ascertained, been used. At the scattered farm-houses hereabouts a small supply of strychnia is usually kept for the destruction of leopards, wolves, jackals, wild dogs, and other troublesome carnivora; this poison is, therefore, through carelessness, often of easy access to persons who may be criminally disposed.

In fatal cases of poisoning by strychnia, that alkaloid is not now considered a very difficult substance to detect; but, in this colony, which possesses a large and widely extended flora, an arrival at a correct determination by analysis as to the nature and properties of any indigenous plants used in attempts to poison cannot fail, in the absence of other good proof, to be a very complicated and troublesome procedure. Therefore, when a case of such a character rests otherwise upon very doubtful evidence, who can be surprised that a satisfactory conclusion is not frequently attained?

On March 25th, last year, an express reached Cradock from Mr. C. W. Andrews, resident magistrate of Middleburg—a town sixty miles north of this—with a request that I would attend there at once, for the purpose of rendering professional aid to the survivors in a case of poisoning which had just occurred. The whole household of Dr. Coward, district surgeon for Middelburg (except a Bushman maid-servant), had been seized on the previous day, after partaking of some soup, with alarming vomiting, followed by a painful feeling of constriction across the chest, and other abnormal symptoms. Mr. J. O. Reeve, a merchant of Graaff Reinet, at the time on a visit to Dr. Coward, had died within eighteen hours of receipt of the poison, and, on the same day (24th), little hope was entertained of the recovery of the others. On my arrival at Middelburg, I found the whole family overwhelmed with grief; for, on the morning of the 25th, a fine little boy of Dr. Coward's, eight years of age, had also succumbed to the effects of the poison. In all, eight persons had been affected by it. Fortunately, by that time serious symptoms in the survivors had considerably abated, and although all were suffering from severe shock and after-effects, restoration was being gradually established. I made a *post-mortem* examination on the body of Mr. Reeve, who had been a well-formed and muscular man of about 30 years. The body presented, externally, a natural appearance. There was no *rigor mortis*—a characteristic feature in cases of death from *Strychnos*, *Brehmia*, *Hyænanche*, *Melianthus* (the three last named are indigenous to the colony), and other substances belonging to the class "neurotic poisons." The lungs and heart were healthy, but the pulmonary arteries and their branches were engorged with a remarkably dark, venous blood. The right ventricle of the heart was filled with a similar very dark blood. The muscular structure of the heart was very flaccid. The stomach, where I had thought to have discovered indica-

* Reprinted from the *British Medical Journal*.

tions of inflammatory action, was quite empty, and exhibited no signs of inflammation. The continued vomiting, which had lasted for several hours after taking the soup, had evidently caused a rejection of the poison, and death had resulted from secondary causes. Other organs were natural in appearance, except that there was venous congestion throughout, and especially in the blood-vessels of the brain.

There can be no doubt that death resulted from effects produced by the soup taken on March 23rd, and, from the symptoms as observed till death in the two fatal cases, viz., intense vomiting, a constant feeling of oppression over the chest, a feeble and intermitting action of the heart, a tendency to coma for some hours before death, and from *post mortem* appearances I am of opinion that the poison used belonged to the class termed by Orfila "narcotico-irritant."

I think that the effects (secondary) of the poison were probably partial paralysis of the coats of blood-vessels, muscles, and nerves, belonging to the organs of respiration, involving considerably the cardiac and coronary plexuses. This would result in more or less loss of motor power, and may account (in part at least) for the flaccid condition of the walls of the heart, for the laboured respiration, and consequently imperfect oxidation of the blood.

The circumstances connected with the administration of the poison may be thus briefly recounted.

On March 20th, Dr. Coward returned to Middelburg after an absence of two or three weeks. He had been joined *en route* by Mr. Reeve, at Graaff Reinet. In the meantime, the Bushgirl had been employed as a servant at the house in Middelburg. Taking advantage of her master's absence, she had grossly misconducted herself, having, among other misdeeds, been in the habit of admitting a Kaffir admirer to the house, and, to disguise the fact, stated that the house was haunted. This being detected, she was very properly reprimanded. She then expressed to Miss Coward her intention of being revenged. On the evening of the 22nd, after eating some curry, some of the family party experienced a feeling of nausea, but this did not excite much notice. On the next day, soup was served up at dinner hour, and, before many spoonfuls had been taken, Mr. Reeve first, and afterwards every person in the house, except the suspected individual, was attacked with the alarming symptoms to which I have referred. Dr. Coward, though suffering severely himself, acted most promptly and energetically, and without doubt six out of the eight persons attacked owe their lives to his exertions. Dr. Coward suggested the possibility of the girl having got access to tartar emetic in his surgery. After charring with strong sulphuric acid to destroy all organic matter, I applied to scrapings from the stomach, and to part of the soup, the proper tests for detection of antimony, but with a negative result.

The belief at present is, that certain poisonous herbs (recent) had been resorted to, and that these had been furnished to the Bushgirl by her ally the Kaffir. An extractive of the material could readily be added to any article of diet, and this would appear to have been done, first in a small quantity to the curry on March 22nd, and again in much larger quantity on March 23rd.

I will now, if space permit, add a few words on some of the native plants, and their properties, which may have been used as agents in the case in question, concluding by a short statement of experiments on their action compared with some on that of the poisoned soup, as affecting animals.

By order of the resident magistrate, the tent of the Kaffir prisoner was searched, and a great number of dried roots and stems of native plants, besides seeds (some not indigenous), powdered wood, charcoal, wings and legs of the red locusts, hair of the Klipspringer (*Oreotragus saltatrix*), and other substances used by Kaffir impostors and witch doctors, were found in a large bag and removed. Owing to the dry and fragmentary state of these articles, it was almost impossible to identify many of them; but most proved, on testing, to be comparatively innocuous, and at present opinion is against the probability of any of them having been used prejudicially in the case in question. Among the seeds in the parcel, I found about half a dozen belonging to *Strychnos nuxvomica*—a quantity which would suffice to kill at least twenty persons; but the absence of symptoms characteristic of poisoning by nux vomica dismisses the admission of these seeds into the case. *Strychnos Nux-vomica* is an Indian plant, but we have one allied to it in *Hyænanche globosa* of the western districts, and also in *Brehmia spinosa* of Kaffirland and Natal. The latter plant is also a native of Madagascar. Among other recognizable plant-specimens were *Pilogyne Ecklonii*, termed in vernacular *Davidjes wortel*, a cucurbitaceous shrub, emetic, cathartic, and diuretic; *Garullum bipinnatum* (Compositæ) called "slangwortel," Anglicè, "snake-root," from its reputed efficacy in snake-bites; pieces of the stems of the *Gomphocarpus*, one of the varieties of the "Melk Bosjes," peculiar to the Cape, an Asclepiad (the white, milk-like juice of this plant is very acrid and corrosive); the *Cadaba juncea*, or "zwart-storm" of the colonists (*Capparidaceæ*), non-poisonous; the seeds of *Plantago major*, "plantain" (*H. Bolus*), comparatively harmless; and the resinous secretion from the urinary bladder of the *Hyrax capensis*, the "klipdas" or "rock-rabbit," used only as a stimulant and antispasmodic.

The following indigenous plants, mostly virulent poisons, have come under observation, in the course of the inquiry, as possible agents in the case, and are, I think, worthy of record.

Lessertia annularis, "T'Nenta" of the Karroo, produces cerebro-spinal paralysis and death in sheep and goats, like the *Gastrolobium*, the evil-renowned "poison-pea" of Australia.

Melianthus major (Melianthеæ), called locally *Truijtje roer mij niet*, Angl., "Gertrude, disturb me not," is a large, shrubby, disagreeably scented plant, occurring in patches in various parts of the Eastern Province. It has a widely creeping root. The leaves are alternate, smooth, pinnate, glauceous beneath; the flowers brown-red, an inch long, capsule four-celled, seeds two in each cell, black and shining. A decoction of the leaves is used as an antiseptic for sore-throat and various forms of ulcers. The bark of the root and stem are very poisonous. I will refer further on to some of its properties. There are four known species of this plant—*Melianthus major*; *M. comosus*; *M. minor*; *M. dregeana.*

Toxicophlœa (Apocyneæ), the "gift-boon," or "poison-tree" of the colonists, is a small tree or large shrub, with dark, dotted, and virulently poisonous bark. The flowers are sweetly scented, like jessamine, in dense, axillary, many-flowered fasicles. The only species at present known is, I believe, the *T. Thunbergii.* It produces the notorious arrow-poison of the Bosjesmen. Thunberg states "the aborigines use a decoction of the bark, reduced to the consistence of jelly, for poisoning their arrows." The symptoms in a case of accidental poisoning at Grahamstown by a decoction of the bark were rigors without convulsions, loss of muscular power, and death in a very few minutes. *Toxicophlœa* grows in the south-eastern parts of the colony and at Natal. Some knowledge of the nature and properties of this curious South African plant may be, to some extent, interesting in an ethnological point of view; for, now that the ever-advancing footsteps of the white man are exercising so dispersing an effect on the old strongholds, as well as on the old-established customs of the aborigines, the use of the deadly little missiles of the Bushman is gradually lessening, and before the lapse of many years may probably have to be numbered among the things of the past. Dr. Hooker will, I feel confident, be glad to give further information relating to this plant to any inquirers interested. I understand some specimens of it are thriving under his fostering care at the Royal Botanic Gardens, Kew.

Ornithogalum altissimum (Asphodeleæ), termed locally, "Magerman," is a large bulbous plant, bearing a tall solitary scape, which speedily withers. The flowers are white and whitish-yellow. The bulb is used occasionally as a diuretic and sedative. I introduce a note on this plant, because some experienced persons have stated that its active principle is in a great degree poisonous. But this is certainly not confirmed by my own experience. Professor Mac Owan, of Somerset, and Mr. H. Bolus, of Graaff Reinet, (two able observers) also believe it to be almost inert.

But, perhaps, the most important of the genera of our suspected herbs now deserves notice. I refer to *Moræa* (Thunberg) *Homeria* (sweet), called in Cape vernacular, "wilde tulp." It belongs to the family *Iridæa.* The root is a corm or tuberous bulb, covered with a fibrous, reticulated, hardened coat; shaft erect, smooth; branches 2-3-flowered (Pappe). The leaves are mostly few and narrow. The flowers yellow, white, orange, or parti-coloured pedicillate, rising from crowded or subsolitary terminal sheaths (Harvey, who states that the species are numerous). This plant is to be found in various parts of the colony, and the species vary apparently in different localities. They grow plentifully throughout the Karroo, and appear to thrive in arid plains and sterile, rocky spots. We may frequently notice their pretty vari-coloured flowers where little else of vegetative growth is to be seen—in dolorous-looking places, almost suggestive to the fancy of Ebenezer Elliott's

"Grim region in a world of woe,
Where toil-sown wheat and paupers will not grow."

The variety best known for its poisonous properties is the *M. collina*, native in the Western Province, and is the only species yet described growing there.* The late Dr. Pappe states that, "judging from the rapidity with which death ensued in recent cases when some of these bulbs had been eaten by mistake, they must be of a very poisonous kind." The only deaths resulting from these plants (except in a considerable number of cases in cattle) hitherto recorded have been caused by eating accidentally the bulbous parts of the *M. collina*; and a comparison of the symptoms in these cases with those in the fatal cases at Middleburg gives in some respects a slightly different result; for example, in the several persons in whom *M. collina* had been the fatal agent, acute gastritis and also enteritis occurred, notwithstanding that repeated vomiting had cleared the stomach, as in the persons affected at Middelburg. Consequently, in the former instances, the mucous membrane of the stomach and small intestines were found to be highly vascular and inflamed. Such was absent in the cases at Middelburg, though other *post mortem* appearances corresponded. To the present time, the only species of *Moræa* belonging to the Eastern Province which has been described is *M. polyanthus* (Thunberg) the "tulp blommetje." It is very probable that the effects of the "tulp" of the eastern districts differ from the western in degree only, and that the one is equally, or nearly equally, poisonous with the other. Portions of dry husks and stems of about a dozen specimens of *Moræa* were found in a room of Dr. Coward's house, previously occupied by the suspected Bushgirl, and these were forwarded to me for further report. The fleshy parts of the rootstocks being absent would appear in itself to afford extra presumptive proof against the girl; for, doubtless, the active part of the herbs had been disposed of for some nefarious purpose.

Soon after the occurrence, I prepared, as opportunity offered, concentrated decoctions and extracts from portions of all substances procurable to which I have referred, and applied to these various chemical tests and reagents, comparing the results of these with others applied to extractives prepared from the poisoned soup. These I have duly recorded, and may give a detailed statement upon them on a future occasion.

Mr. Gibb, Government Analyst at Cape Town, to whom I referred for a report on the nature of the poisoned soup, states that he finds it to contain "a peculiar vegetable principle similar to veratria, and highly poisonous;" and that "he believes it to be derived from a species of *Moræa*, or 'tulp.'" The latter is, I venture to think, the prevailing opinion, and the impression is, that one or more of the eastern district species formed the deadly element in the case at Middelburg.

It may be sufficient that I conclude this paper by giving a brief summary of the effects on animals after administration of (1) the soup, and (2) preparations made from some of the more important of the plant-substances to which I have adverted. On March 29th, I gave six ounces of the soup to a full-grown dog. It was taken voluntarily and with avidity. Rigors set in within three or four minutes, and soon afterwards intense vomiting, which continued at short intervals for about twenty minutes, and then ceased. There were no convulsions. The dog recovered, but refused to touch the soup again, although kept to a room without other food or water for six days. On April 3rd, a teaspoonful was administered to a kitten; rigors occurred, but no vomiting. It died within three hours. At the same time, a teaspoonful was given to a pup a month old. *Very slight* vomiting, with rigors, commenced in a few minutes, and continued for nearly two hours, the animal dying within six hours. No convulsions or rigor mortis either in this case or that of the kitten.

April 23rd. I concentrated a portion of the soup, so as to form an extract, and gave a few drops to a kitten. This animal was first of all convulsed, then partly paralysed, and died within eight minutes.

April 25th. A teaspoonful of decoctum melianthi ("Truijtje roer mij niet") was given to a kitten. Frothing at the mouth and shivering followed, but nothing more serious for twenty-four hours. About a dessert-spoonful was then administered. The animal was then attacked with convulsive movements, staggered gait, and general loss of muscular control. It died in less than two minutes. Considerable rigor mortis ensued. A *post-mortem* examination revealed considerable venous congestion throughout, and an inflamed condition of both pericardium and endocardium. The poison had evidently acted also through the brain and spinal cord, thus causing tetanic rigidity. The bark of *Melianthus* is, therefore, no doubt, a powerful neurotic poison, but it could not have been the material used in the poisonings at Middelburg.

A decoction of some rootstocks of one species of *Moræa* (boiled for four hours) was given to a dog twice within six hours, in doses of a teaspoonful. Nothing very serious supervened on the first dose, but the second proved fatal in a little more than two hours; symptoms being vomiting, rigors, heaving of chest and flanks, and speedy collapse. The mucous membrane of the stomach was slightly congested, and a general venous engorgement existed, affecting especially the right side of the heart and corresponding pulmonary blood-vessels. Otherwise nothing abnormal could be distinguished.

On July 3rd, Dr. Coward forwarded me a small parcel containing corms belonging to another Eastern Province variety of *Moræa.* Experiments with these specimens afforded results nearly identical with those above mentioned, the very poisonous properties of this order of plants being thereby confirmed.

Alas for the glorious uncertainty of the law! The Solicitor-General has decided that the evidence in the case is nearly wholly circumstantial, and that both prisoners must be discharged on their own recognizances. But murder by poison is nearly always a secret crime, and I should have thought that the evidence in this case was sufficiently strong to warrant the bringing in of a true bill. In this country, where colonists are so largely dependent upon the coloured population for servants' work, it is not too much to say that whole families of innocent persons run a risk at all times of being poisoned for no other reason than that the malice of certain ill-grained and very troublesome "coloured brethren" may be indulged.

* It may be seen at the Botanic Gardens, Kew.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 26, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE NEW EXAMINATIONS.

ONE of the wisest things, as certainly it is the kindest, that have been officially devised is the amended form for conducting our examinations. An examination in itself has definite limits: it can neither bestow nor create knowledge, but it can stimulate its acquirement and indicate its right direction. If not perfect in its results, it is yet the best and practically the only test we can employ in determining the standard of qualification.

Bearing this truth in mind, the Board of Examiners has deliberately set about the task, how to retain the official character of the ordeal, and, at the same time, to render it an efficient aid towards the well-being and advancement of the future pharmacist; in other words, to make it the interest of every candidate to submit to its requirements, were no honorary distinction granted as an additional motive. That in this they have succeeded little doubt can be entertained. Still, though the general bearing of the subject has been discussed already, a further debt of explanation is due to two classes, both of whose opinions are entitled to respect. On the one hand, masters see in these new provisions a chance of a material diminution in the ranks of their assistants, who may fear to enter on a course too well kept and guarded, or who may consider that the promised gain is by no means an equivalent for the struggle. On the other, assistants see nothng in perspective but an ever-increasing stringency, which they loudly deprecate, and the justice of which they are stoutly inclined to doubt.

We accept these questionings as a healthy sign that neither employers nor employed treat educational arrangements with indifference; we would talk the matter over, and shall fail ignominiously in our intention, could we not show that it is the misconception respecting the word *stringent* that has unhappily complicated the discussion. Carefully perusing the printed document relating to the regulations soon to come into force, we arrive at this conclusion, that the precise information is here made legally imperative, which the experience of every modern pharmacist would recognize as being the most direct and most effectual means for the attainment of that success with which he has himself been favoured. We speak now solely with regard to trade position and emolument, leaving intellectual considerations and social standing outside the present argument. Further, that the precise information here made legally imperative is that of which successful masters have felt themselves specially in want; which sometimes they have acquired with difficulty in after years; and, failing which, it has required their utmost skill and perseverance to prosper in their undertakings. A man is not stringent who requires his apprentice to know his business; he is not hard nor tyrannical in his dealings who insists that those entrusted to his care should be competent to discharge their duties. That is the official attitude assumed by the Pharmaceutical Society, and both master and student should rejoice that the reign of mere book literature should have ended, and that that of practical knowledge and common sense had been inaugurated.

Little need be said of the Preliminary Examination, which it is to be hoped will speedily be withdrawn from our supervision, and relegated to its appropriate sphere. It is not for pharmacists (actively engaged in peculiar occupations) to decide upon points of Latin grammar which probably they may have forgotten, or to sit in judgment on the rules of English composition, which are constantly subject to variation and to fresh theories of explanation. Nor should the candidate be expected to translate one line from the 'Selecta è Præscriptis,' for that is an evidence that he has stood behind a druggist's counter, not that his previous classical scholarship has fitted him for that occupation. Nevertheless, this very examination, as it now stands, displays the strong bias of the Examiners in the direction of common sense. Centres for conducting the Preliminary Examination have been established, and after December 31st next, medical Latin will be abandoned. That the elementary rules of arithmetic are essential, as well as a thorough knowledge of the British and metrical systems of weights and measures, is a sentiment that will pass unchallenged.

With fewer words the Major Examination may be despatched: it is not compulsory; it is an affair of honour; it confers a title, and exempts its fortunate possessor from serving with eleven other honest men upon a jury. As to what may be the exact nature of its requirements, pharmacists are disposed to raise few objections, and by consent they leave its stipulations to be carefully considered by the directing body. But this Minor Examination is the disturbance and the cause of war: the vexed question, and a fertile theme for grievance. The best mode (such is our sincere belief) of quieting preconceived anxieties is to read at leisure the text of its instructions.

Candidates are required to read prescriptions, detect unusual doses, and write accurate and appropriate directions. The Board is not to be harshly censured for the stringency of this enactment: it is a plagiarism from many a brass plate and circular, whereon we read in conspicuous letters, "Prescriptions accurately dispensed." That in an examination these should be required to be given without abbreviation, is simply a test of correct Latinity; and whereas some are wonderfully deficient in the power of deciphering an autograph, ordinary prescriptions written in the mother tongue are to be rendered in good Latin. We need not argue the point that a man engaged in Pharmacy, and unable to read a physician's recipe, is more qualified to pass the Insolvent Debtors' than any arrangement of a Minor Examination.

The subjects of Practical Dispensing, Pharmacy, and Materia Medica may be handed over to the meditation of the most apprehensive. Let him consider the case in his more quiet moments, carefully, slowly, and dispassionately, and let him answer to himself these questions: "Could an examining body have asked less? Are they asking for the wrong things? Are they seeking to catch me with their guile, or setting traps or placing stumbling blocks before the unwary?"

Surely the whole balance of evidence is a refutation of such suppositions. In dispensing, the candidate is to weigh, measure, and compound, direct and finish; in pharmacy, he is to show practical knowledge; and in materia medica, he is to do the same. In botany, the practical element is no less in the ascendant.

Every road, says the old proverb, *leads to Rome*, and likewise every pharmaceutical examination, however varied in its construction, must hinge on chemistry. No branch of inquiry so severely taxes the skill of the Examiner. It rests with him to ascertain how far the candidate is cleverly retailing information gleaned with a special object, or how far he is really conversant with a science on which his future must depend.

Herein consists the whole stringency to which allusion has been made so often. That a student should recognize the ordinary chemicals that are used in medicine requires no special application; but he must further know the processes by which they are produced, their composition, and the decompositions that are involved in chemical experiment. In addition, he must show the possession of an acquaintance with the laws of chemical philosophy, and be able to give practical demonstration of the means employed in reference to specific gravities, densities, and temperatures. No carefully stored recollections from printed manuals; no surreptitious notes, no ingeniously prepared answers to anticipated queries, will suffice, any more than they will enable him to determine practically by means of tests, the presence in solution of the chemicals in common use, or to explain the reactions which may possibly occur.

One thing will prove sufficient, which will inspire him with confidence in himself for ever, and lead him to meet his examination with a smile: that is, a course of honourable, sustained preparation. Books must by no means be neglected, for they save infinite and useless labour; they are the result, as well as the compendiums, of trained thought and painfully worked-out experiment. Teachers are to be held in honour, for they explain, instruct, and guide. But there is a point at which books and teachers must resign their office, and nothing will stand in the stead of personal practical work. Then seeming difficulties will disappear; and never let it be forgotten that a successful examination is just so far useful as it has prepared the competitor for those active duties on which he is about to enter.

How, then, shall a man study chemistry? Let him bend his own glass tubes, make his own thermometer, and fit up his own apparatus; let him prepare his own tests, trust to his own observations, work out his own equations, and write his own diagrams. Let him take authorized standard manuals, and himself determine their correctness, and in so doing understand the reason of their suggestions. In this manner every chemist known to fame has been created; and this is the manufacturing process adopted by every independent scholar. The Board of Examiners knew well that this frame of mind is not to be expected from the average race of students, though it is the direct tendency of their regulations to foster this excellent spirit. But they are justified in their action by the presence of many admirable schools. London and the country both can boast of institutions where the highest class of practical education is afforded. Standing as we are at the very threshold of a new session, we would urge our young pharmacists to avail themselves of these advantages; and should they do so conscientiously and courageously, they will be the first most heartily to endorse our opening statement: one of the wisest things, as certainly it is the kindest, that have been officially devised, is the amended form for conducting our examinations.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The American Pharmaceutical Association commenced its Twenty-second Annual Meeting in the Liederkranz Hall, Louisville, Kentucky, on Tuesday, the 8th inst. There was an attendance of about seventy members, including all the officers of the Society except one Vice-President. The greater part of the first day's proceedings consisted in reading the Report of the Secretary and Executive Committee, the nomination of various Committees, and the reception of Delegates. Twenty-two different Associations were represented, and other delegates were expected to arrive on the following day. At the close of the sitting, the President, Mr. John F. Hancock, of Baltimore, delivered an address in which he alluded to the practice of pharmacy, and gave advice concerning its practice to the members of the Association. The sitting was then adjourned until the next morning at nine o'clock. It is stated that the Association now numbers nearly eleven hundred members.

CAUTIONS.

A CORRESPONDENT, under the signature of "A VICTIM," sends an account of how he was persuaded by a woman to accept the sole district agency for a new night-light, and to invest some cash in laying in the necessary stock. After a time, however, he found that the lights went out, whilst two or three other "sole agents" became manifest in his immediate neighbourhood. The conclusion he has arrived at is obvious.

Mr. W. G. TAPLIN also writes to caution his brother chemists against purchasing a formula for pill coating, which has been offered by circular for 5*s*. He says that it is the same as was published in the PHARMACEUTICAL JOURNAL for May 30 last.

A PARIS pharmacien has been condemned to pay a penalty of five hundred francs for having sold some lozenges containing calomel, without an authority from a medical man. The Editor of the *Bulletin* of the Bordeaux Pharmaceutical Society pictures the surprise with which an anxious mother, seeking from a pharmacien some worm pastilles for the relief of a fractious child, would hear that she could no longer be supplied without first feeing a physician.

IT will be seen from our advertising columns that Sir PETER SPOKES, who acted for many years as the Local Secretary of the Pharmaceutical Society at Reading, is a candidate for the office of Director of the National Provident Institution, rendered vacant by the death of Mr. CHARLES GILPIN.

PROFESSOR GEORGE F. H. MARKOE, of the Massachusetts College of Pharmacy, who, it will be remembered, attended the Meeting of the British Pharmaceutical Conference at Brighton, in 1874, has been appointed Professor of Pharmacy and Materia Medica in the Medical Department of Harvard University. The appointment of a practical pharmacist to this post is considered by the *Tennessee Pharmacal Gazette* to be a step in the right direction.

MR. ARTHUR PEARSON LUFF, the Junior Bell Scholar during the last session in the School of Pharmacy, Bloomsbury Square, has been successful in obtaining one of the Science Scholarships at South Kensington which are offered as rewards to students who gain a high number of marks at the Science and Art examinations.

THE Court of Appeal, at Brussels, has recently confirmed a judgment which condemned Dr. CAMPENHOUT for having supplied his patients during three years with homœopathic medicines. The decision of the Court was based upon a law of 1818, by which a medical man is absolutely interdicted from practising pharmacy together with medicine, except in certain specified cases, even although he may hold the diploma of Doctor of Pharmacy. A medical man is not allowed to supply medicines to a patient even gratuitously.

Proceedings of Scientific Societies.

PARIS SOCIÉTÉ DE PHARMACIE.

At a meeting of the above Society on the 5th August, under the presidency of M. Boudet, a letter from Mr. Lescher was read, inviting such of the members of the Society as were able to attend the approaching meeting of the British Pharmaceutical Conference in London. M. Mayet stated that M. Adrian, who had been invited personally, would attend the meeting, and would willingly undertake to represent the Paris Society of Pharmacy. After a short discussion it was decided that there was no necessity for a special delegation.

M. P. Vigier furnished a note upon the "épithème argilleux" which has been proposed by him for the dressing of wounds. The substance which he employs, a specimen of which was exhibited, is a mixture of fine moist clay (100 grams) and glycerine (50 grams), and the advantages claimed for it are that it adheres to the skin, does not putrefy, and is easily removed by water.

THE PHARMACEUTICAL CONGRESS AT ST. PETERSBURG.

PROPOSED UNIVERSAL PHARMACOPŒIA.

The following is a translation of the report upon the subject of the proposed Universal Pharmacopœia, presented to the International Congress on behalf of the Paris Society of Pharmacy by M. Méhu:—

For a long time there have existed in the different countries of Europe national pharmacopœias, which have served as an authority to pharmacists in the selection and preparation of medicines that have become sanctioned by science and experience; as guides to physicians in making them acquainted with the nature and composition of such medicines; as guarantees to physicians and patients for the regular preparation and uniformity of their composition in all parts of the respective countries, and as means of surveillance by the administrative authorities acting as the protectors of the public health.

These pharmacopœias were at first collections of empirical formulæ, conceived according to an order of ideas and considerations foreign to the spirit of modern science, and often inspired by prejudices more or less whimsical rather than by scientific ideas. But from the commencement of the present century they have acquired a new character, in harmony with the progress of modern chemistry and the precision of its processes and products, and with the development of the natural sciences.

The French Pharmacopœia promulgated by the Paris Parliament in 1748, under the name of the 'Codex Medicamentarius,' constituted until 1818, or during a period of sixty years, the law imposed upon the practice of medicine and pharmacy in France.

A new edition of the 'Codex Medicamentarius' was published in 1818. In 1837, the progress of science having rendered a revision of the legal formulary necessary, the government ordered the construction of a new pharmacopœia, which should sanction the reforms demanded by the state of science, and the new medicines by which the domain of pharmacology and therapeutics had been enriched up to that time. This work having in its turn ceased to be in harmony with the new wants of medical practice and recent discoveries in chemistry and natural history, the French Government, in 1861, confided the editing of a new Codex Pharmaceutique to a special Commission. This Commission, composed of professors of schools of medicine and of pharmacy, and members of the Academy of Medicine and the Paris Society of Pharmacy, was presided over by M. Dumas. The new Codex was published in 1866. It presents to pharmacists under a succinct form, and in precise language, a complete *résumé* of the rules which regulate the practice of pharmacy in France, and the formulæ of medicines which have received the legal sanction.

The work is divided into three parts. The first is devoted to general and preliminary matters; the second, to the materia medica, properly so called; and the third, to the pharmacopœia. The alphabetic order has been adopted for the materia medica, and the methodical order for the pharmacopœia.

The Commission of the last Codex, considering the rapidity of the communications established between the different peoples of the civilized world, and the facilities of their intercourse, so multiplied in the present day, thought that the French Pharmacopœia should not be limited to presenting to practicians the medicines necessary to medical practice throughout the French territory, but that it ought to be enriched by all important matters that could be borrowed from analogous works published in other countries.

Impressed also by the manifest tendency of Europe and the New World to adopt the metric system of weights and measures, the Commission already comprehended the great advantages that would be presented by a fraternal agreement between the pharmacists of the various States for the construction of a universal or international Codex. It therefore did not hesitate to give to its work a character more general than that of the Codex of 1837, and to perfect it by introducing a large number of formulæ borrowed from other pharmacopœias, and thus seek to provoke, by its initiative and example, all pharmacists to join in their views of the future unity of pharmacy.

This appeal has been heard. Numerous testimonies of sympathy have been addressed to French pharmacy, and the remembrance of the cordial reception of which its representatives were the object at the Congress at Brunswick in 1865 has encouraged it in its hopes of the international confraternity of pharmacists. The Paris Society, anxious to justify the confidence of the international committee from which it had received the honourable mission to organize a second universal congress at Paris in 1867, was induced to bring forward three questions for submission to the deliberation of that assembly as to the best means of constructing a Universal Codex or Formulary. The excellent report of M. Mialhe upon the question will not have been forgotten, nor the discussions to which it gave rise, and the consequent votes.

The general question of the Universal Codex was divided in the following manner:—(1) Ought the proposition for a Universal Codex to be adopted? (2) Ought the text to be written in the Latin language? (3) Ought the metric system of weights and measures to be adopted in it? To the first question the Congress answered in the affirmative unanimously, with the exception of the United States; to the second in the affirmative unanimously; to the third in the affirmative unanimously. Thus the utility of a Universal Codex was recognized, and it was decided that it should be written in the Latin language, and in conformity with the metric system of weights and measures.

Afterwards, at the third international Congress held in Vienna in 1869, the decisions of the Paris Congress were confirmed by a vote, in virtue of which the Paris Society of Pharmacy was charged with the preparation of the various elements of the composition of a Universal Codex.

Though the misfortunes of France for a long time arrested the Society in the accomplishment of the duty entrusted to it, scarcely had the country issued from its sad trials when the Society delegated to a committee of thirteen of its members the drawing up the plan of a Universal Codex, and the preparation of a scheme for editing it, intended for submission to the approbation of the next international congress of pharmaceutists. The thirteen members of the committee were:—M. Bussy, Member of the Institute, Director of the Paris School of Pharmacy, Honorary President; M. Boudet, Member of the Academy of Medicine, President; M. Buignet, of the Academy of Medicine; M. Duquesnel, of the Society of Pharmacy; M. Guichard, of the Society of Pharmacy; M. Jungfleisch, Assistant Professor of the School of Pharmacy; M. J. Lefort, of the Academy of Medicine; M. Mayet, of the Society of Pharmacy; M. Méhu, of the Society of Pharmacy, Secretary; M. Mialhe, of the Academy of Medicine; M. Planchon, Professor of the School of Pharmacy; M. Roucher, Pharmacien Principal de l'Armée; M. Wurtz, of the Society of Pharmacy. The results of the labours and deliberations of the Committee constitute the scheme for a Universal Pharmacopœia which is now presented to the International Congress of 1874.

The nearly unanimous adhesion of the Congress of 1874 to the French proposition of a Universal Codex, and the choice of the Paris Society of Pharmacy to prepare and draw up a plan, was doubtless a high testimony of esteem for the French Pharmacopœia of 1866, which had just appeared, and in which the idea of a Universal Pharmacopœia had been indicated by the illustrious author of its preface. The Commission understood the signification, and considered that it was so authorized to infuse into the Universal Pharmacopœia the plan of the French Pharmacopœia, or 'Codex Medicamentarius' of 1866. This plan is, in fact, as simple as it is rational, and more or less conformed to that of most European pharmacopœias.

The 'Codex Medicamentarius' of 1866 is composed of three divisions:—(1) Preliminary matters; (2) Materia Medica; (3) the Pharmacopœia. In the first division, under the title of "Notions préliminaires," is combined the information indispensable for a knowledge and employment of the metric system of weights and measures, the relations of the metric weights to foreign medicinal weights, the value in weights of spoonfuls, drops, pinches, and handfuls of medicaments; the apparatus most employed to determine temperature, the centigrade and Fahrenheit thermometers and the equivalence of their indications, densimetres, melting points, boiling points, and the solubilities of frequently employed substances. There is also in the first division a table of equivalents of simple bodies employed in medicine, either in their natural state or as combinations. The second division contains all that concerns the materia medica. The third division, the largest and most important, constitutes the Pharmacopœia, properly so called.

The International Codex Commission has not hesitated to follow the plan of the French Pharmacopœia, and act principally in conformity with its prescriptions in the execution of the work. The preliminary matters of the 'Codex Medicamentarius' comprise only scientific facts established by experience and accepted by the scientific men of all countries. These cannot be the object of any dispute, and consequently will give rise to no dissension between pharmacists of different nationalities; the only doubt in respect to them, considered in their relation to an International Pharmacopœia, would be concerning their comparative utility, and the degree of development which should be given to them in such a work. The French Pharmacopœia has shown itself very reserved in the choice of these preliminary matters, and the limits within which their exposition is confined; in the work which the International Codex Commission has the honour to present to the International Congress it has been even more strict than the authors of the French Pharmacopœia. The "Materia Medica" presents, in the most abridged form, the most certain information upon the origin and specific characters of substances which pharmacy has taken from the organic kingdom, upon the properties and characteristics of medicinal substances of inorganic nature, and upon chemical products, which pharmacists prepare in their own establishments or procure in commerce, and which, therefore, should find a place in the "Materia Medica." The means of testing the purity of these products, and of preserving them, are indicated with particular care.

Under this title of "Materia Medica" the Commission has only included the substances and products of which the generally diffused usage in one or more European countries would render their adoption in an International Pharmacopœia justifiable.

The first two divisions of the work of the Commission, the "Preliminary Information," and "Materia Medica," belong to the domain of pure science, of that science which, like truth, is not the privilege of any people, but constitutes a domain common to all. Agreement, therefore, already exists between all the pharmacists of all countries upon the basis of this important portion of the Universal Codex, and if it could produce any disagreement this would have reference only to secondary matters that would be easy to decide.

The third portion of the Codex, the Pharmacopœia properly so called, as conceived by the Commission, raises problems much more numerous and delicate than the first two. Here the work is no longer to make a judicious choice from certain facts common to all nations, but to select from a great number of formulæ,—established more or less empirically and arbitrarily, and under the influence of most diverse considerations—which form the particular formularies or special pharmacopœias of the nations of Europe a collection of formulæ that will respond to the general wants of the art of healing, taking account of the special constitutions and usages of the different nations, and which, at the same time, shall be conformed to the precise rules that science has introduced into pharmacology. This programme is certainly difficult to fulfil thoroughly in such a manner as to avoid all the rocks that it presents, to give satisfaction to all interests and opinions, and to obtain the suffrages of the pharmaceutical body of the civilized world.

But the Society of Pharmacy, and the Commission which it appointed to prepare the accomplishment of this delicate work, have calculated upon the elevated and generous ideas of pharmacists, the methodical spirit and scientific sentiment by which they are guided in the exercise of their profession, and of which the pharmacopœias published in later years by the different nations of Europe bear incontestable and profound impress. They have also found encouragement in the wonderful accord which was manifested at the Congress in Paris in 1867 between all the pharmacists who took part in the unanimous vote which decided the compilation of a Universal Codex. Had not the vote, in fact, a great significance? Did it not show that the moment had come for pharmacists to establish, for medicines and their formulæ, the unity and universality which exist for other sciences, and to transform all the national pharmacopœias into a Universal Pharmacopœia, as they had already transformed all the collections of recipes or particular formulæ into national pharmacopœias?

Experience and time have led the teaching and practice of medicine to follow nearly everywhere the same road; their progress in all countries is simultaneous and conjoint with that of physical and chemical science. In the present day there is not a discovery, a fact, an observation in the field of medical science, that is not immediately known, submitted to the control of experiment, and discussed and applied more or less usefully in every civilized country, nearly as rapidly as in the provinces of a single empire.

In the midst of such evident manifestations of the simultaneity and unity of scientific movement in the civilized world, should not the numerous, yet often so baseless and insignificant, differences which exist between analogous medicines be made to disappear? The elements of which these medicines are formed, whether they belong to natural or chemical products, being determined according to the same scientific principles, why should they be submitted to different processes to be elaborated into medicines? If it be sought to extract the most active portions of certain vegetable substances by the aid of solvents, or to prepare solid or liquid extracts, tinctures, etc., ought not the best established scientific principles to be everywhere alike taken into consideration, to determine the processes to which these substances should be submitted, the nature and properties of the solvents to be employed, the temperature at which they should be used, and the proportion of product to be collected? If it be proposed to separate immediate principles—organic alkalis, for example, from plants that contain them—is it not according to the general and universal rules of chemistry that one should proceed to their preparation and to test the purity of the products obtained? Does not the same remark apply, with much stronger force, to the preparations which belong more especially to the department of industrial chemistry?

As to compound medicines which result from more or less complicated mixtures of simple or compound substances, such as syrups, electuaries, pills, draughts, mixtures, pomades, ointments, plasters, etc., it is evident that their numerous, complicated, arbitrary, and irrational formulæ of past times are already reduced in national pharmacopœias to simple, logical, and truly scientific terms, and that it is to the reduction to a single formula of the analogous formulæ still designated under different names, to the elimination from these formulæ of the ingredients recognized as useless, to the better definition of the choice and characters of those recognized as necessary, and to rendering more correct the manipulations which relate to them, that all the efforts of pharmacists should tend. If this be the case, and if in all European countries the principles of science and pharmacology are the same, if the tendency and direction of progress are the same, if, moreover, all national pharmacopœias bear already the deep impress of these principles and tendencies; why, resting upon these universally recognized truths, should it not be possible to gather together into our common work all the positive information, all the impartially proved progress of general pharmacology, and to prepare thus for all nations the common enjoyment of all the advantages that the particular pharmacopœias have been able to realize for each of them?

Certain medicaments, brought forth mysteriously in the spirit of speculation and luxury rather than by the love and genius of science and true progress, have acquired in the present day a universal notoriety and currency; the venal and conscienceless voice of the press has praised them and propagated their use throughout both continents, and they are there in request in spite of the local habits and special constitutions of the populations. Why should not the medical men and pharmacists of all countries seek in common accord, and by a vigorous and noble alliance, to oppose to these empirical medicaments, which tend to the revival of the panaceas and arcana of former centuries, those rational medicaments, known to all, in their elements and properties sanctioned by science and universal experience, which offer to the art of healing certain well-tempered weapons of constant uniform and measured energy, and which in their totality constitute the regular arsenal of true medicine? What means would be more powerful than the promulgation of an International Pharmacopœia to cause the disappearance of these mysterious and often injurious productions, before the legitimate, patent, and truly scientific conquests of which a Universal Pharmacopœia should be the most exact, clear, and complete representation?

Of what weight are these pretended discoveries of secret remedies if they be compared to the discoveries of pharmaceutical science,—if they be compared to those of morphine, codeine, quinine, digitalin, aconitine, iodine, bromine, chloroform, etc., the greater part of which have been given to humanity by pharmacists? Who will remember the former some years hence when they shall have been replaced by new conceptions of a similar value? Whilst the second, made fruitful by time, experience, and the researches of truly scientific men, will have acquired new titles to the gratitude of mankind.

Sustained and directed by the considerations and principles above set forth, the Society of Pharmacy and the Commission set to work with confidence in the success of their enterprise, and with the firm hope of obtaining the assent of the association and societies of pharmacists for which they were acting. The following was their mode of procedure:—The members of the Commission first studied and compared with great care the pharmacopœias of Europe and America, those, namely, of Germany, Great Britain, Austria, Belgium, Denmark, United States, France, Greece, Holland, Moldavia and Roumania, Sweden and Norway, and Switzerland. After this preliminary study, they have decided, after an exhaustive discussion, upon the general plan of a Universal Codex, to which each contributed his part. Finally, the individual work of each collaborateur was discussed by the entire Commission, and definitely adopted for submission, in the next place, as a whole to the Society of Pharmacy.

In the selection and editing of the formulæ, the Commission endeavoured to give the preference to the simplest, most rational, and most used, without distinction of origin. Profoundly imbued with the views that prevailed in drawing up the French Pharmacopœia of 1867, the Commission has naturally been led to propose a great number of matters and formulæ borrowed from the national pharmacopœia, but it has made it a duty, on all occasions when it has had to choose between a French and a foreign formula nearly equivalent, to give the preference to the latter.

The Commission considers its work to be essentially provisional; it is only a work offered for the appreciation of the Congress, and each member of every pharmaceutical nationality is entirely free to criticize the propositions, and to combat and seek to make prevail the particular ideas and prescriptions of his national pharmacopœia. The lists are open to all contradictions, and it is from the shock of diverse opinions and their independent discussion that should issue the common work of the pharmacists of all nations.

May you, gentlemen, and most honoured *confrères*, find, in the work which the Society of Pharmacy submits to your judgment, the proof of its energetic devotion to the consideration and honour of pharmacy! May you there recognize the plan and foundation of a general pharmacopœia which shall respond to your wishes, experience, and profound science, and confirm you in the conviction that it is possible to compose a Universal Pharmacopœia which shall be a pharmaceutical monument of high importance, which, whilst leaving to the pharmacists of all nations the free exercise of their national pharmacopœias, will permit them to execute faithfully, without uncertainty or hesitation, and with perfect security, the prescriptions of medical men of all countries, and which will constitute a true and valuable advance in the art of healing, in the relief of the suffering, and the facility of international relations.

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act.

The Colour of Preserved Peas.

At the Liverpool Police Court, on Wednesday, September 16th, before Mr. Raffles, stipendiary magistrate, Messrs. Beckett, Alty, and Co., grocers, etc., 8, James Street, were summoned for selling peas which were mixed with a material injurious to health. Mr. Atkinson, the deputy borough solicitor, supported the information, and Mr. Bremner defended. Mr. Atkinson stated that the case differed from any previous charge of adulteration that had been brought before the court. On selling the peas the servants of the defendants stated that they were coloured or adulterated. Had the colouring matter been of an innocuous character, the defendants, after this, could not have been summoned under the Adulteration Act; but the second section of that Act provided that, even if notice were given of the adulteration of any article, the person selling it was liable to a penalty if it were injurious to health. Certain French firms sent over to this country large quantities of preserved peas, of two kinds, coloured and uncoloured, and which were in great request. He believed the uncoloured ones were perfectly harmless; but some persons were not satisfied with them unless they were coloured green, and in order to meet this demand some of the peas were coloured green by means of copper. One of the inspectors had purchased a tin of these green peas at the defendants' shop, and on being opened it was found to contain a large amount of copper. He contended that if the defendants knew that the peas were coloured it was incumbent upon them to inquire by what means the colouring was effected, and it was therefore fair to assume that the presence of copper amongst the peas was known. He produced an ordinary steel needle thickly coated with copper, showing the result of its being allowed to remain amongst the peas for a short time. Mr. Raffles observed that it must be shown that when the defendants sold the article in question they knew that it was injurious to health. It might be that they thought the peas were coloured with a perfectly innocuous material. Mr. Atkinson thought it was the business of the seller to ascertain in what manner the peas he sold were coloured. Mr. Bremner said the defendants had had no knowledge of the injurious character of the peas; but, on becoming acquainted with the fact, the sale of the peas was immediately stopped. Mr. Raffles said he thought a person should certainly ascertain how peas were coloured; but it was not shown that the defendants knew it. He would, however, after the publicity which would be given to this case, be disposed to convict anyone else that should be brought before him similarly charged. The case was then dismissed.—*Grocer*

Adulteration of Brandy.

An innkeeper of Yeovil, by name David Smith, was lately summoned under the Adulteration Act for selling adulterated brandy. The public analyst for the district sent in his certificate of analysis of the brandy in question, stating that it had been adulterated with tannic acid, iron, sugar, and colouring, and further asserting that the consumption of such an article would be injurious to health. For the defence, Mr. Davies contended that brandy was an article not fit to be sold in its raw state, and that it was well known that manufacturers "used sundry devices for making it palatable." He further described the spirit as being "essentially a compound," and stated that even the famous French cognac, whose virtues are so generally lauded, was "a liquor obtained from beetroot, flavoured with cognac oil and sugar." After thus ingeniously attempting to show that his client had sold the usual article of commerce, the Yeovil advocate reverted more especially to the stern facts of the case, and mentioned that the defendant had paid 25*s.* a gallon for what he considered a pure article, and that the brandy was sold in the same condition as received by the retailer. Notwithstanding the vigorous defence of his legal representative, the Yeovil innkeeper was fined 2*l.* and costs.—*Grocer.*

Important to Soda Water Manufacturers.

On Wednesday, September 16, at the Longton police-court, before H. C. Greenwood, Esq., stipendiary, Mr. Samuel Taylor, soda water manufacturer, Longton, was charged with selling half a dozen bottles of adulterated soda water. The point raised was whether the soda water could be said to be adulterated by being devoid of bicarbonate of soda, and thus depriving the customer of the benefits to be derived from the active ingredient which it should have contained. The county analyst had certified that in this particular case the water analysed was devoid of the smallest particle of soda, and only contained water and carbonic acid gas. The wife of the maker swore that he being busy she herself superintended putting the soda into the bottles, and that each bottle contained the required quantity. The informations were dismissed, the stipendiary deciding that the act did not apply in this case, holding that to adulterate there must be an adding to, while in the case before him there was a taking from. A case was asked for by Mr. Tolford, counsel for the prosecution, and granted.—*Manchester Courier.*

Death from Hydrate of Chloral.

Dr. Hardwicke, the deputy coroner for Middlesex, held an inquest three days ago on the body of Mr. Charles Dawson, a law student, who died in consequence of taking an overdose of hydrate of chloral, which he had taken for the purpose of inducing sleep. Mr. Lucas, resident medical officer of Middlesex Hospital, stated that the deceased was admitted by Mr. Sydney Coupland, and expired six hours afterwards. Witness received from him a bottle containing "Improved Syrup of Chloral-Hydrate." The *post mortem* examination showed that the left ventricle of the heart was in a state of fibrous growth, which destroyed the muscular tissue, and there was also the remains of old peritonitis. The cause of death was the condition of the heart, accelerated by taking a dose of chloral. A rough analysis was made, which showed that the preparation was weaker than the usual strength sold by chemists and druggists. The jury returned a verdict of "Death from heart disease, accelerated by taking a dose of hydrate of chloral, which was uncertain in its action."—*British Medical Journal,* September 19.

Suicide of a Chemist and Druggist.

An inquest has been held in Manchester by the city coroner, upon the body of William George Searle, chemist and druggist, of 132, Upper Brook Street. From the evidence it appeared that the deceased had been unsettled in his mind for some time past, and after a slight quarrel had gone to his room, locked the door, and taken some prussic acid; the door was forced open, and deceased was found lying on the bed with the poison bottle in his hand. A verdict of suicide whilst in a state of insanity was returned.

The Prosecution for Embezzlement at Liverpool.

We have been requested to state that the Mr. J. Thompson referred to in the report, on p. 238 of last week's Journal, of the prosecution of two young men at Liverpool for embezzlement, is not in any way connected with Mr. J. Thompson, of 121, New North Road, London.

Review.

Nouveaux Éléments de Pharmacie, par A. Andouard, Pharmacien, Professeur de Chimie à l'École de Médecine et de Pharmacie de Nantes, membre du Conseil d'Hygiène et de Salubrité; avec 120 figures intercalées dans le Texte. Paris: J. B. Baillière et Fils. 1874.

"They manage these things better in France" is a saying as true in respect of pharmacy as it would be misapplied in speaking of government. If our mercurial neighbours cannot be said to march in the van, yet are they very far ahead in the general progress towards pharmacy as it should be, which we have in a manner just joined. Perhaps this is shown in no way more clearly than by a comparison of the literature of the two countries. Of English books on general pharmacy there are literally none, and in those works which do treat of it at all, as some of our text-books on materia medica, it holds a very unimportant position. This is not due to the want of men competent to deal with the subject, but to the want of a demand for information on a science respecting which we scarcely know as yet that we are ignorant. The need for this information is being now felt for the first time among British pharmacists, thanks to the leaven of the British Pharmaceutical Conference which is gradually spreading through the mass. That the need will be supplied in due time we cannot doubt. Meanwhile the immediate supply is furnished by France and Germany, but especially the former, chiefly because of more ready communication with this country, and because French as a language is more commonly studied among us than German is. French works on pharmacy are numerous, as our columns of reviews show. Most of them are good, many are excellent, and the one now before us is one of the best and most complete. M. Andouard is a pharmacien, and *au courant* with his subject, which he treats at the same time with a comprehensiveness and a minuteness leaving little to be desired.

In his preface the author expresses dissatisfaction with the dictionary definition of pharmacy,—*the art of preparing medicines*, and we agree with him that to define it as *the science of medicines and their preparations* would be more exact. For, says he, the pharmacist should know not only how to manipulate medicinal substances, but also he should know whatever refers to their physical and chemical properties, to the changes they undergo, and to the adulterations to which they are subject. It is evidently in sight of this view that the facts have been collected and the book written.

Now for a general view of the volume and its 884 pages. In treating of a science such as pharmacy, which has to do with so many substances of such diverse nature and composition, a good classification is all-important; if simple as well as sufficient, the science gains by it. The classification devised for the book before us certainly has the merit of simplicity—it may also be sufficient. Whether it is so or not will appear on use. It is possible that the fact of M. Andouard being professor of chemistry to the school of medicine and pharmacy at Nantes, may have something to do with the other fact that he regards chemistry as the soundest basis of pharmacal classification. Be that as it may, medicinal substances are first separated into those whose exact chemical composition is known, and those of which the composition is known only approximately. The first series comprises *simple bodies, mineral or inorganic compounds* and *organic compounds.* The second series is much more numerous, and includes *powders, pulps, juices* and *species*, the medicines obtained by means of *water, alcohol, glycerine, ether, fats, essences, wine, vinegar,* and *beer* respectively; and lastly, medicines which are formed by admixtures of any of the preceding, viz., *pills, capsules, liniments,* and *fumigations.* The first series is preceded by a lengthy chapter of a most exhaustive and minute nature, on pharmaceutical operations, the comprehension of the text being aided by an almost lavish use of very good woodcuts. Under the head of weighing and measuring is a table showing the relation of foreign weights used in medicine to the French gramme. Under this head also is an examination into the merits of *compte-gouttes*, followed by the common-sense conclusion that they are defective and untrustworthy.

The second series is introduced by directions for the choice and collection of animal and vegetable substances, their drying and preservation. This chapter, as indeed the whole book, is characterized by painstaking care. The subjects of extracts, tinctures, syrups, etc., are each introduced by a chapter discussing the general *modus operandi* of preparing before passing on to treat of the preparations in particular. In the classification of salts the acidulous radical is made to mark the genus, and the basylous the species. The effect of this is to distribute salts of the same base all over the book. Thus, sulphate of iron is found at p. 264, the carbonate at 213, sulphide at 182, and the chloride at 201. This is not so convenient, and does not seem to us so natural, as to employ the basylous radical for co-ordinator.

The mode of preparation of every definite chemical body is given, then come its purification and chemical and physical properties, followed by the mode of estimation and pharmacology. Under the latter heading appears every preparation of the body in the Codex, and other approved formulæ, with critical remarks wherever they seem to be called for. Twenty pages are given to the consideration of water in all its forms, soft, mineral, gaseous, aërated, etc. This is a fair proportion of the entire volume, yet not too much. The same sound judgment seems to have guided the author throughout his work; everything receives adequate mention, and we should not suppose that any part of the book is a favourite subject with the author. It is written as though from a student's standpoint, with a just appreciation of what he requires. There is nothing new to be found in it, at the same time we notice no important omissions.

It is to be deplored, however, that the work is not abreast of the times in the matter of nomenclature. The new atomic weights and molecular formulæ are so very generally recognized now that to disregard them in a handbook treating of chemistry must necessarily restrict both circulation and usefulness.

With this exception, the book before us is such as we would wish to see in the hands of every pharmaceutical student. Its equal is not to be found in English, and there is little question that an English edition would repay both translator and publisher.

BOOKS RECEIVED.

The Contrast between Crystallization and Life. By John Eliot Howard, F.R.S., etc. London: Hardwicke, 1874. From the Author.

How to Restore the Walking Powers and Muscular Movement Generally. By F. Graham Bennett, M.R.C.S., etc. Second Edition. London: Whittaker, 1874.

Notes and Queries.

[408.] OILED SILK. — Can any one inform me concerning the process for the manufacture of oiled silk? Also the difference in preparation between the English and the French make, the latter being so much softer than the former?—John Edkins.

[409.] DEPILATORY.—Wanted, a formula for a satisfactory depilatory without unpleasant smell.—W. W.

[410.] MARKING INK.—I shall feel obliged if any one will give a good recipe for marking ink—one which will turn black at once without heating.—M. F. Thompson

[411.] COMPOSITION ESSENCE.—Will any correspondent supply me with a formula for Composition Essence?—Querist.

TEST FOR ARSENIC.—MM. Mayençon and Bergeret describe (*Rép. Pharm.* ii., 497) a new method for the detection of arsenic in organic and inorganic substances, which they consider to be superior to Marsh's test. It is founded upon a reaction of arseniuretted hydrogen upon bichloride of mercury, which has been represented by H. Rose as—

$$6\,HgCl + AsH_3 = 3\,Hg_2Cl + As + 3\,HCl.$$

If a piece of paper moistened with a solution of bichloride of mercury be exposed while wet to the vapour of arseniuretted hydrogen a spot is produced, which is at first of a citron yellow colour, but afterwards darkens to a pale yellow brown. Antimony, on the other hand, gives rise to a grey brown spot, which is clearly distinguishable from the arsenical spot. The test is said to be extremely delicate.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The New Regulations.

Sir,—May I venture to ask your indulgence, and also to request that you will allow me a short space in the Journal to say a few words on the above subject. I believe the new bye-laws relative to the alterations and amendments of the examinations take effect at the October meeting of the Board, thereby rendering them, if possible, more practical than they have ever been, and it occurred to me the time might not be inopportune for reverting to the oft-repeated subject, the relative positions of a pharmaceutist and chemist and druggist, or, as some of our friends have it, chemist by examination.

The Major alone constitutes the right of all future pharmaceutists, and in order that they may hold a position known to the public—as higher than simply Member of the Pharmaceutical Society or Chemist and Druggist—some are advocating all sorts of additions and appendages, not only as an inducement to all Minors to become Major men, but also to secure to pharmaceutists the most elevated post in the eyes of the public as scientific men.

We all know that education elevates, refines, and raises all classes, be they men or women; and we have proof of the high estimation in which many pharmaceutists are held as chemists, by their being now constantly appointed public analysts in large provincial towns and districts, where hitherto such appointments were always carried off by members of the medical profession. This, therefore, we must all rejoice to see, as it is a step upward and onward.

It is not my province on this occasion to deal with pharmaceutists so much as non-pharmaceutists, having myself gone through the prescribed course. I may, perhaps, be excused for saying that the Major *vivâ voce* examination was one of the most pleasant and interesting meetings I ever attended, and conducted in the kindest and nicest manner possible. I say this to cheer some of our friends who may be candidates for the next meeting of the Board, and fearing that they might be, as Professor Bentley used to say, "a little nervous."

My object now is one of persuasion; to endeavour, if possible, rather to dissuade young men from accepting the Minor qualification as a fit and proper one for going into business. For my own part, I may say I feel with gratitude more and more every day the value of the information one gets in working up for these examinations, and I am glad to see that these are being elevated more and more. But it seems to me a very serious matter—as statistics prove—that so many pass the Minor and never go further; as they say, they rest and are thankful. But this resting on one's oars, or rather resting, as it were, in sight of the goal, is surely a bad thing, and I am very much disposed to advocate, not so much that there should be a very wide difference between the two examinations, as that the Minor should be considered essentially an Assistant's examination, and, as such, should not entitle its holder to enter business on his own account; then we should have no difficulty in getting all to go through the whole thing, and the question of grades in the future would be done with.

Time was when many firms would say—"Give me a man who knows his business; never mind about the Pharmaceutical Society." But times are now when educational requirements and demands have pushed the Pharmaceutical Society to the front, and the Society owes to itself jealousy for the proficiency of its members. If therefore it were possible to alter and amend the Pharmacy Act so that the Minor had to be passed by all assistants above the age of twenty-one years, and should be considered the first half, then it would, I think, be found that there was not the same difficulty or lack of members for the Major.

There is such a common feeling with us all to ask, Is this or that necessary? can we not do just as well by omitting this and only doing that? Once let us have the law that all men shall pass the Major examination before entering business, and we should then find the controversy relative to the two grades at an end. At the same time it would of course be necessary, as some of our friends in the sister isle would say, to preserve all existing rights to the present generation, and the future representatives of pharmacy would be all on one footing.

ARTHUR W. POSTANS.

35, *Baker Street, W., Sept. 22nd,* 1874.

THE JOURNAL OF THE CHEMICAL SOCIETY.

Sir,—Perhaps your columns offer as appropriate a place as any to remark on the—shall we say—platinum wire rather than red tape rigidity which binds down the able editor of the Journal of the Chemical Society, cramping him down in fact to the office of a mere corrector of the press. Surely the editor is worthy of having a more prominent place than simply to fill up one line of the cover of the Journal. Is it a minority of one only that considers some editorial reviews of progress, and at least a condensed digest of the discussions at the meetings of the Society, would be an interesting acquisition to the Journal? Every one familiar with the London learned societies must be aware that frequently discussions on papers read are far more interesting than the papers themselves, embodying as they often do the thoughts and criticisms of the foremost men of the day. Why should these thoughts be monopolized by the fortunate few who can attend these meetings? It may be inexpedient, perhaps, to follow the example of the Society of Arts and give a full report of these discussions, but what is pleaded for, is a little more elasticity, so as to admit of a little editorial work and responsibility. At one time, there were occasionally rather shy and modest glimpses of discussions, but even these appear to have vanished. Is there not also room for a limited portion of correspondence, so that involuntary absentees, and others, may give a few hints and remarks on subjects that have come before the society?

W. SYMONS, F.C.S.

Barnstaple.

KAURI GUM.

Sir,—I have long had such thoughts as those expressed in the preceding letter, but the topic which led me to put them on paper is Kauri Gum (*vide Journal of Chemical Society* for August). I have no claim whatever to assume to be an authority on the matter, but a visit to New Zealand a few years since naturally gave the opportunity for forming a slight acquaintance with the article. In Mr. Muir's paper he truly says, "It is largely imported into this country," and yet in his last paragraph he implies he has only been able to procure a small specimen. How is this? Is he speaking of two different articles? It may be so, but nothing in his paper implies this. His first remark is, "The gum or resin *exudes* from a tree." If the gum he has examined exuded from a tree this year or last, or within ten or fifty years, it is a different article to that which may be seen on the Auckland wharf frequently in scores, if not hundreds of chests. There appears little doubt that the Kauri Gum of commerce did exude rom the *Dammara Australis* or some similar pine, but surely before Captain Cooke was born; it may have been five thousand, or even five hundred thousand years since. Colonial dealers in the gum declare that the semi-fossilized article, which is the only one known in commerce, essentially differs from the gum which may be collected from the existing Kauri trees. This is certainly a point which may well engage Mr. Muir's attention, viz., in what way gum collected from growing trees differs from that dug up in the barren wastes, of which thousands of acres exist in New Zealand, and seem not to have any value whatever, except from the Kauri Gum which may be found under the surface.

It has been my lot to perambulate such a district at Mangawhai, which a grateful country gave to some military veterans, no doubt with the idea that (barring the Maories) they could now end their days, each man under his own vine and fig tree; but with almost the solitary exception of a Major, who keeps a wooden hotel, the ungrateful recipients have vanished, leaving little behind but what they found, a hungry desert of white clay, fifty acres of which would support neither a goat or a donkey. It is just in such districts the Kauri Gum is found. Nothing scarcely grows on it but the "ti" shrub, which is too bitter for any animal to touch. The only signs of life are a few grasshoppers and crickets, with now and then a solitary mute native lark. The presence of Kauri Gum in the soil seems to show that at some time, but distant enough to be a geological question, forests of the noble Kauri pine must have existed there, and have abstracted all the potash and other fertilizing elements which have since been washed away, leaving nothing behind but an expanse of hungry white clay, scattered over with the well-known shrub which proclaims the barrenness of the ground.

I would be far from implying that such scenes are general, even in this part of New Zealand; but what constitutes the difficulty of New Zealand settlers, at least in the north, is, that the good land is covered with forests still. There are thousands of acres such as I have described, the Kauri Gum being of little value to the nominal owners, as while it is hardly considered the right thing for white settlers to dig for gum on any native land, the Maories take it for granted that all unenclosed land is free for them to dig over. Gum-digging just suits Maori habits. They are averse to the necessary and continuous labour of cultivating the land. As an instance of this, a missionary, who had induced some of them to keep cows, told me that after a time one came to him and asked, "How long am I to be a slave to my cow?" But gum digging can be taken up at fits and starts, and the gum turned at once into money or bartered for provisions, etc. It is also the last resort of broken down colonists above the grade of labourers. They manage to buy the one tool necessary, and start gum digging.

In some outlying districts, money would be scarcely seen or circulated but for the little trade and commerce arising from supplying the gum diggers with provisions, etc. Large as is and has been the produce, it must in time cease, and then these tracts of country will indeed be worthless, unless lying fallow for a century or two will restore to them some little fertility. This seems to be the only hope, remote as it is, unless the "ti" shrub (pronounced *te*) may be utilized. The small hard leaves and twigs have an aromatic bitter taste, and I would suggest to Mr. Muir or some other investigator to examine the properties of this shrub. Should it be valuable as a medicine, New Zealand can supply the world.

Kauri is pronounced Kowri, as Maori is pronounced Mowri. The gum is sometimes found in large pieces. The colour varies from a soft cream white to amber, sometimes clear and occasionally prettily veined. It is frequently carved into ornaments of various kinds. As a memento of two or three pleasant days spent on the singular and many branched tidal estuary of the Kaipara, I had a heart; but I lost it somewhere crossing the Pacific or America, perhaps at Salt Lake City, where I staid a night. This heart, however, was a bought one, purchased from an almost hermit brother of a London R. A., who also had some artistic ability utilized in painting pictures, also doors and windows, for the *élite* among the settlers.

If cross-examined on oath, I should hesitate in saying so, but still my impression is that selected Kauri Gum sometimes passes for amber. It is a question for discussion whether this would be an adulteration to be brought under the cognizance of our official analysts of whom we hear so much. As amber mouth pieces are used in connection with tobacco, this may be a link for adding it to the list, and as many of the appointed analysts are among your readers, perhaps they will make a note of it for discussion at their next meeting. A preliminary, but difficult question, however, will require to be settled first, viz., is tobacco meat, drink, or medicine?

W. SYMONS.

Barnstaple, 25th August, 1874.

AMMONIACAL FISH.

Sir,—The remarkable property of the skate or ray in developing ammoniacal gas during the process of drying is shared by other cartilaginous fishes, particularly by the genus *Squalus* (sharks), as any person familiar with fishing towns and villages on the Kentish coast must have noticed when passing a fish-curing establishment, where may be seen and smelt rays, riggs, and sweet williams.

The former are not unlike the white shark in habits and appearance; have the largely developed dorsal fin, harsh skin, and ferocious aspect. I have frequently seen, at Jersey, a cartload of them pitched down in the market, writhing in horrible contortions, opening and shutting their villainous-looking eyes with malignant expression. Terrible stories are related by fishermen about these monsters of the deep, but the *ichthyophagi* like them none the worse for having fed upon human flesh.

The sweet william, so named on account of its more delicate flavour, like the basking shark (*Squalus maximus*), has nothing of the ferocity of its congeners, a fact that may be taken as corroborative of its complimentary title.

The dog-fish is another and smaller species of shark, regarded with unmitigated hatred by fishermen, who bring them ashore merely for the sake of destroying them. These fish swarm round the shoals of herrings, sprats, etc., and getting entangled in the net, "shake and tear it like a dog," thus not only effecting their own escape but endangering loss of the haul.

A peculiarity is noticed by Cuvier in reference to the cranium of the sharks; the sac which constitutes part of it "contains mere amylaceous masses, and not stones."

As dog-fish may be had for nothing, and would perhaps yield as much trimethylamine as good wholesome skate, it might be worth while for manufacturers to secure a cargo, hitherto of no value except for manure.

Neither the sharks nor the rays possess scales, the skin of the former being covered with spiculæ, while the ray is slimy.

The idea that any *gourmets*, however deficient in good taste, could eat "hartshorny" skate, is past belief. I remember, when a boy, that some skate was brought to table, and was sent away on account of its pungency. The fish acquires this odour after having been kept a short time, when it again becomes sweet, and cooks say it is all the better for keeping.

If any one desires to preserve skate after the style of Finnan haddock, he would succeed better than did Mr. Groves in his experiment by adopting the plan of smoking. The acetic acid evolved during the combustion of the wood, combining with the ammoniacal gas, would prevent decomposition.

Whether trimethylamine will ever be recognized as more than a passing experiment in therapeutics, or whether, like "our little systems have its day, and cease to be," consigned to the Tophet of volatile alkali distilled from human bones, with which the doctors dosed poor Charles I., the moss from a dead man's skull, the Græcum album, and more lately the excretæ of serpents, remains to be proved. I have not yet met with a practitioner who knew anything respecting the efficacy of the new remedy, or who even recognized its name.

R. GOODWIN MUMBRAY.

Richmond, Surrey.

"*Associate.*"—It is necessary, in order that green extracts may be elegant, efficacious, and at the same time possessed of good keeping qualities, that the chlorophyll and extractive be combined in certain proportions. If the leaves only be used the chlorophyll will be in excess, while if the stalks and upper stems be selected, the extractive will preponderate, and the completed product will be deficient in colouring matter. The use of leaves, branches, and upper stems produces an expressed juice, which when treated by the officinal process gives an elegant extract.

A. J. Knight.—"Salaratus," we imagine, is intended for sal aëratus. Both bicarbonate of sodium and carbonate of ammonia are used for the purpose indicated.

W. A. Maggs.—Iridin is an oleo-resinous substance obtained from the rhizome of *Iris versicolor* (Blue Flag). It is one of the eclectic remedies, and you will find accounts of it in American works on materia medica.

G. W.—You are right in supposing that the plant is a white variety of *Calamintha clinopodium.*

G. Broom.—We have already expressed our determination not to insert any more correspondence on the subject.

S. C.—Since the issue of the British Pharmacopœia, sumbul has been determined to be the product of a species of a new genus of Umbellifereæ, which has been described by Kaufmann, under the name of *Euryangium Sumbul.* Galbanum also is now known to be derived from *Ferula galbaniflua,* Buhse.

A. E. Tribe.—Probably the substance inquired for is dynamite.

Messrs. Young and Postans.—See an article on Goa Powder in the second series of the *Pharmaceutical Journal,* vol. v., p. 345.

K. K. K.—*Essence of Musk.*—The following formula is given in Cooley's Cyclopædia as yielding essence of musk of the very finest quality:—

Musk (from the bladder, rubbed very small), 5 oz., civet 1 oz., essence of ambergris 1 pint; 1 gallon. Digest with frequent agitation for two months, in the sunshine in summer, or in a warm place in winter; decant and filter. The addition of 1 fl. dr. of liq. ammoniæ to each pint of essence increases its fragrance. The same authority states that the essence of musk of the London wholesale druggists is generally made by merely digesting the freshly emptied musk pods in rectified spirit.

"*A Father.*"—We do not feel at liberty to insert your letter, notwithstanding your offer to take the responsibility. The practice may be as you say, and, if so, it would be blameable, but it would be difficult to prove in the face of a denial.

Nemo.—It is undoubtedly intended to be an eight-ounce mixture. Literally it might perhaps be construed into twelve, but such was never in the mind of the prescriber. Had there only been an ounce of infusion in place of four, there would not have been the shadow of a doubt; but as we have often seen a prescription commenced with ℞ Inf. gentianæ co. ad ℥viij, we give our verdict in favour of an eight.

"*Nemo.*"—(1) The cheapest, especially if the ink is to be sold for 6*d.* But whether the cheapest or the dearest be employed, it will be found that purple solutions are not necessarily purple pigments. (2) Many experiments have been made with aniline blue dyes in the manufacture of marking ink, but always with one result; the blue colour lasts for twenty-four hours, when it gradually changes into what Lady Morgan called "a dun ducketty mud colour." (3) If our correspondent desires to colour his marking ink blue, he would confer a great benefit on himself and on many others who desire the same thing by consulting through some simple medium the acute spirit of the late Mr. John Bond.

J. J. Harvey.—We have received your communication, too late for insertion in this number of the Journal. We are glad to learn that you have submitted the question to the authorities at Somerset House, and until a reply has been returned we do not think it would be desirable to publish your letter to us.

"*A Correspondent.*"—The '*Veterinarian,*' published by Longman and Co., is the only existing English veterinary journal. It appears monthly, and the price is 1*s.* 6*d.* a number.

Mr. W. Wilkinson is thanked for his communications.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ.* A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. L. E. Bore, Mr. B. Proctor, Mr. Thompson, Mr. J. W. Yates, Mr. Tichborne, Mr. Shaw, Mr. Bennett, Mr. Davies, W. H. F., W. H. L., W. W., R. G. B., "Nil Desperandum."

The following journals have been received:—The 'British Medical Journal,' Sept. 19; the 'Medical Times and Gazette,' Sept. 19; the 'Lancet,' Sept. 19; the 'London Medical Record,' Sept. 19; 'Medical Press and Circular,' Sept. 19; 'Nature,' Sept. 19; 'Chemical News,' Sept. 19; 'Gardeners' Chronicle,' Sept. 19; the 'Grocer,' Sept. 19; 'Journal of the Society of Arts,' Sept. 19; 'Grocery News,' Sept. 19; 'Produce Markets Review,' Sept. 19; 'Practical Magazine,' for September; 'Educational Times,' for September; 'British Journal of Dental Science,' for September; 'Journal of Applied Science,' for September; 'American Journal of Pharmacy,' for September; 'Pharmacist,' for September; 'Canadian Pharmaceutical Journal,' for September; 'Tennessee Pharmacal Journal,' for September; 'Moniteur Scientifique,' for September; 'Pharmaceutische Zeitung,' for Sept. 16 and 19; 'Sanitary Record,' Sept. 19.

LEAD IN AERATED WATERS.

BY J. C. HUNTER, A.P.S.

Poisoning accidentally by means of water impregnated with lead has occurred in the past, and it also occurs in the present time, from the same cause. An instance of this kind happened near Glasgow a short time ago.

An old lady died near Glasgow, and her medical attendant, Dr. Wilson, was rather perplexed to account for some of the symptoms that affected her; he was sure that they indicated lead poisoning, there being no source from whence the lead could be obtained and introduced into her system unless by means of soda-water, which she was in the habit of taking largely, sometimes as many as six bottles daily. Consequently he got Dr. Wallace, of Glasgow, to analyse a sample, and, as he suspected, lead was found to be present, which at once cleared up the mystery as to the symptoms that affected her.

After this case I was determined to see if this contamination was general, and from my own results and those of Dr. Milne, of Glasgow, it has been proved to be more general, at least in Glasgow, than one would suppose.

Having selected at random from our stock two bottles of soda-water and one bottle of lemonade, and having subjected them respectively to analysis, I found lead present in them all.

Its presence being proved, I now wished to know in what quantity it was present, and on quantitative analysis, it was proved to be present in the proportion of in—

Sample No. 1, Soda-water, 2-10ths grain per gallon.
„ „ 2, „ „ „

and in the sample of lemonade in the proportion of a quarter grain per gallon. These three samples were made by a well-known and long-established house in Glasgow.

Dr. Milne, of Glasgow, has confirmed the above results by independently analysing several samples bought around Glasgow.

He has found in soda-water the following amounts of lead:—

Sample 1. 2-10ths grain lead per gallon.
„ 2. 6-10 „ „ „
„ 3. 1-10 „ „ „

In lemonade he found it present as follows:—

Sample 1. 2-10ths grain per gallon
„ 2. 4-10 „ „

In gingerade nearly 1-20th grain per gallon.

Now, from the above results it is evident that aerated waters are sometimes contaminated more or less with lead, which lead is obtained from leaden cisterns, or pipes used in their manufacture; for on testing the Loch Katrine water, and also water from the other source which supplies the greater part of the south side of Glasgow, there was not the slightest indication of lead.

Water, aerated or otherwise, impregnated with lead, when taken into the system in small doses, which accumulate, is well known to be hurtful to health. Dr. Muspratt, in his 'Chemistry,' mentions a case that came under his notice where several families were affected with lead-poisoning, which was traced to the water; and, on the cistern being coated with slate slabs, and glazed iron pipes used to supply the water, the health of the families affected was completely restored.

From the foregoing results I would suggest that our public analysts throughout England and Scotland should investigate as to the presence or absence of lead in our aerated waters as supplied to the trade.

I think the proof of the presence of lead in those beverages, now so largely consumed in this country, would add more to the reputation of some of our analysts than the paltry catch analyses which some of them favour us with now and again, much to the detriment of trade. For I maintain that if we can get proof that lead exists in any proportion in our aerated waters, the makers of them are quite liable to be prosecuted under the Adulteration Act.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 222.)

Leaves.—The microscopical structure of leaves is often of great interest to the microscopist, and to the analyst, and will afford the means of accurate diagnosis when only fragments are present, as in the adulteration of tobacco; or when the leaves have been subjected to certain processes, as in the adulteration of tea. They require somewhat considerable manipulative skill for their complete examination, but a very little practice will enable the student to make sufficiently good preparations for analytical purposes. Frequently, indeed, little or no preparation at all is necessary.

The various tissues of leaves may be grouped as follows:—Vascular, cellular, epidermal.

The *Vascular* tissues form what are popularly known as the veins and ribs of the leaves. They differ in their arrangement much, and in their component parts somewhat, in different plants. Speaking generally, these tissues may be said to consist of spiral vessels composed of one, two, or more fibres, annular, netted or pitted vessels, associated in different proportions—sometimes all are present—and woody fibres. With the vascular tissues we must include the laticiferous systems, and perhaps the accompanying liber may best here find a place. These last differ greatly in different plants, especially as regards the numbers present. There may be either one or two sets of vascular tissues in the same leaf, an upper and a lower, when two are present.

The course of the vascular system within the leaves may be traced by the naked eye in most other than very fleshy leaves, and easily enough in skeletonized leaves, and often affords a ready means for determining between two leaves. The remarkable looped veins of tea-leaves, for instance, are quite unlike those of other leaves at all resembling them, or likely to be used as an adulterant. The vascular system may be studied microscopically in transverse sections of leaves, which show the cross sections of the vessels, their arrangement with regard to each other, and the amount of thickening the wood and other cells have received. The character of the vessels, whether spiral or otherwise, may be best made out when leaves, boiled either in water, alkali, or dilute acids, are teased out under a single microscope, the vessels removed and examined in glycerine, under a half-inch or a quarter-inch objective. They may be permanently mounted either in glycerine, glycerine jelly, or Canada balsam, the two former being preferable. They may be examined *in situ* in succulent leaves, if the cuticle be removed and a thin horizontal section be made of the cellular tissues.

The cellular tissues are not often of so much importance to the analyst as those of the cuticle, but they are often of considerable interest to the microscopist.

They differ much in different plants, but may be grouped into two, or perhaps three, classes of cells. We have first blunt-ended sub-cylindrical cells placed endwise, that is, vertical to the upper surface, beneath which they are, containing chlorophyll and other colouring matters and sometimes crystals; and secondly a loose parenchymatous tissue, very varied in character, often of erratic shape, and containing, with chlorophyll, starch. Frequently this inner layer is loosely adherent, sometimes large spaces occur, and, speaking generally, the whole tissue is characterized by want of firmness and strength. The special spiral or reticulated cells of some orchids, *Sanseviera*, and according to Schleiden, *Gesnera latifolia*, and the cells approaching the cubical underlying the vertical cells of the upper surface; and sometimes, also, the spongiform parenchyma, in certain plants, as species of *Ficus*, and also perhaps the cells forming the internal glands of Myrtaceæ and Rutaceæ, might all be classed into a third group of modified parenchyma cells, did not difficulties arise as to where the line should be drawn between the ordinary cellular, or the vascular, and these specialized tissues. The collenchymatous tissues of *Barosma* lately described by Professor Flückiger, must probably, as we shall see presently, be classed as a distinct class of cell from the two classes I have been speaking of, and will most likely be made into a third class by future writers.

The several details of structure, just referred to, may be studied in vertical sections immersed in water or glycerine. Such sections may easily be made by means of a razor, either with or without the section-cutting instrument. Much better sections, however, may be made by the aid of this instrument, and its use is almost essential when many successive sections are wanted with a view to tracing some particular tissue for a considerable distance. A fine soft cork should be chosen, of such size as will fit the tube of the section instrument. The cork should be slit, a slice the thickness of the leaf removed, and the leaf placed between its halves, and the whole placed in the instrument. When this plan is followed, the leaf is not injured by pressure, which in the case of succulent leaves seriously interferes with obtaining good sections. Cork and leaf are cut together by means of a sharp razor, and separated in water by means of a camel hair brush or needles. Horizontal sections of course cannot be cut in this way. A leaf may, however, be gummed on the level surface of a cork placed in the cutter, and several successive sections cut. Care must be taken that the upper and lower ends of the cork are exactly parallel, or the sections will not be perfectly horizontal, and wrong conclusions will be arrived at. The epidermis and cuticle must be removed from the subjacent tissues before they can be properly investigated. The lower cuticle may in most leaves be torn off by means of a pair of fine forceps, but more or less prolonged maceration is usually required before the upper can be removed in a sufficiently clean state. I have found the following plan answer well with nearly all leaves, more especially the tough leathery leaves that are so troublesome when dealt with in the ordinary way. I cut off the base of the leaf and one margin with a pair of scissors, boil the leaf for a minute or so in water, and then in liq. potassæ (B.P.) for several minutes (10 to 30). I pour off the alkali and fill the test tube with warm water, in which I agitate the leaves somewhat violently. Usually the cuticles separate from the parenchymatous tissues at once, and these latter are more or less completely dissolved in the warm water. The cuticles and vascular systems are removed and mounted in glycerine jelly for examination. This plan answers well for skeletonizing leaves, but the "skeletons" require to be bleached by chlorine or sulphurous acid gas to make them presentable.

The several points to be attended to, from a technical point of view, in the examination of cuticles are, the comparative size and shape of the cells of the upper and lower surface; the occurrence of stomates on one or both, their number per inch, shape, and composition, *i.e.*, of two or more cells. The amount of thickening of the upper surface (*i.e.*, the epidermis) is of importance, but only secondarily. The nature of the surface appendages, whether hairs, if so, simple or compound, unicellular or multicellular, scales or glands, is of considerable importance, and can be ascertained by simply viewing unprepared leaves by reflected light, and by removing the hairs, etc., when present, by scraping the surface of the leaf with a sharp scalpel. Sections and other preparations of leaves should always be mounted in glycerine, or other fluid, or in glycerine jelly. Cuticles *in situ*, intended for examination by reflected light, must of course be mounted dry.

Buchu Folia.* —In some respects these leaves possess the common features of the natural order to which they belong, but in some other respects they are nearly unique. They require careful study, and many points in their structure require much working at with the aid of careful micro-chemical and ordinary chemical (ultimate) analysis. Prof. Flückiger† divides the tissues of these leaves into three layers, neglecting the cells of the epidermis. So far the leaves of the three kinds of Buchu, *Barosma betulina*, *B. crenulata*, and *B. serratifolia* are agreed; they have minor differences, which I will presently indicate. The epidermis of the upper surface of the leaves is quite devoid of stomata, and is composed of five and six-sided irregularly-shaped cells, not sinuous, and covered externally with a thick layer of the ordinary cuticular substance, which here as elsewhere stains deeply with magenta. Near the margin of the leaves these cells are much elongated, and are also rather modified over the midrib, but to a much smaller extent than is usual. The vertical section of these cells is oblong, and they are frequently much compressed towards the margin of the leaf. Within these cells is the remarkable layer of cells described by Professor Flückiger. These are, when in their natural conditions, oval cells with their long axis perpendicular, and have very thin walls. They contain but little chlorophyll, in the form of minute granules, and charged with amorphous nearly soluble starch, but much mucilage, which appears to be identical with the mucilage of linseed and quince. If a section of the leaf be placed in an aqueous solution of chromic acid, this layer of cells is seen to swell up gradually with a distinct striation parallel to the surface of the

* See also Prof. Flückiger's paper in Sch. Wochensch. für Pharm. reprinted (without plates,) in Pharmaceutical Journal (3), vol. iv., p. 689. I am indebted to Professor Flückiger for a reprint of the original memoir.

† Op. cit.

leaf, and a less distinct striation vertical thereto, and determined by the walls of the containing cells. In water the swelling is more rapid, but the striation is not so evident. The swelling continues until the epidermis is forced off, often the inner membrane of the epidermal cell is much torn, and the whole of the mucilage-bearing layer is broken up, and the mucilage dissolved in the water. The cell-walls themselves do not, I think, dissolve; they simply become broken up and invisible on account of the close identity of their refractive index with that of the mucilaginous solution. They may be seen floating in small pieces, if the section be previously carefully stained with tincture of iodine, and their reaction throughout is that of pure cellulose. The mucilage itself does not stain with iodine, nor does it give any cellulose reaction. Its reactions, so far as I have been able to study them, are those of a mucilage contaminated with chlorophylloids, and with other protein matters.

The same swelling occurs in a smaller degree and less rapidly when glycerine is used; essential oils and alcohol have no effect. This layer exists in the three species of *Barosma*, but is perhaps most highly developed, in proportion to the thinness of the leaf, in the thinner leaved species, as the size of the collenchyma cells remains pretty constant through the genus, but varies slightly with the age of the leaf; or perhaps it will be more accurate to say that the mucilaginous contents are more highly developed in the mature than in the young or very old leaves.

Beneath these cells are layers of very small irregularly shaped chlorophyll-bearing cells in which the small veins of the leaf terminate in a remarkable club-shaped expansion. The cells themselves are not remarkable, except on account of their numerous sphæraphides of oxalate of lime, but the nerve-vein terminals are worth much more attention than any one appears yet to have given them,* and there is little doubt in my mind that they will prove to be absorbent organs of some kind. They are in many respects similar to the "organs" figured some years since by Mr. Herbert Spencer, and found in the roots of certain plants. Beneath this layer we have the loose spongy or stellate parenchyma of the interior of the leaf and the overlying vascular system. There is nothing at all remarkable in the loose parenchyma. The vascular system is very largely developed, and, as I have just said, is remarkable for the full development of its terminals in the chlorophyll-bearing tissues. The wood-fibres accompanying it are very long, tough, and cord-like. In this tissue are also the remarkably large oil reservoirs so commonly found in the plants of this and a few other natural orders. They are well formed, with several layers of specialized cells, and contain, no doubt, with other matters, the aromatic oil examined by Professor Flückiger. The lower epidermis lies beneath these, and is remarkable for the great number of two-celled stomata, which are evenly disposed over its surface, except where the oil-glands determine a locally modified arrangement. The cells of this epidermis resemble those of the upper except in size, but are subject to more frequent modifications (*a*) by the stomates, (*b*) by the midrib, and (*c*) most characteristically by the subjacent oil-glands. Above these the cuticle cells are much changed as regards shape, and group themselves in irregular circles, with the gland-cell over it as a focus.

Sections of these leaves, immersed in an alcohol solution of magenta, much diluted with water, form very interesting objects, and much facilitate the working out of many of these details.

(*To be continued.*)

* This is by no means the only leaf in which they occur, they are, however, more highly developed here than elsewhere.

NOTE ON SCAMMONY.*

BY THOMAS GREENISH, F.C.S.

The result of a microscopic examination of different samples of virgin scammony may at the present time possess some interest, and if it gives rise to a discussion, some remarks may be elicited possessing more intrinsic value than the paper itself.

I was induced to undertake this subject from having observed that the presence of starch was usually detected by iodine, and that little attention had been given to determine the particular kind of starch granules, whether of wheat, or those peculiar to the scammony root itself.

The scammony which appears in English commerce is principally of four kinds—virgin scammony, Angora scammony, Syrian scammony, and Skeleep scammony.

Of the virgin scammony not more than 800 lbs. arrives in this country yearly, none of which is again exported. Of the Angora and Syrian scammonies about half a ton each are annually imported. Of this quantity half remains in this country. Of the Skeleep scammony about one ton annually arrives in London, only half of which is again exported.

The Angora and Syrian scammonies vary in amount of resin from 46 to 76 per cent., while the Skeleep contains about 36 per cent. only, the remainder being impurity.

We have thus one ton of adulterated scammony remaining in this country every year. According to Mr. Maltass, the peasants adulterate scammony before bringing it into the market, the adulterations being wheat, starch, wood, ashes, earth, gum arabic or tragacanth, pounded scammony roots, etc.

The starch granules peculiar to the scammony root are shown in this diagram; they are, for the most part,

compound, composed of two, three, and sometimes more granules. In shape the single granules resemble those of Tacca, muller-shaped, with dihedral base, and the hilum approximates to that seen in the starch of orris-root. With polarized light the arms of the black cross run down in the direction of those lines marked on the grains. Occa-

* Read before the British Pharmaceutical Conference, August 7, 1874. The discussion to which the reading of the paper gave rise has been reported, *ante*, p. 191.

sionally a lenticular grain is met with, but the hilum or markings about the hilum serve to distinguish it from that of wheat starch, to which it otherwise bears a close resemblance.

The starch grains from the scammony root vary very much in size about the centre of the root, where the texture is loose; some granules will be found very large, at the same time in company with these will be found a good many of very variable size.

From an examination of a variety of samples of virgin scammony from different sources, I may state as a result, that the *lump* was in every instance free from the starch of scammony root or any other starch, and that every sample of *powdered* virgin scammony contained more or less of the scammony starch, and some of them a little wheat starch in addition. A few also contained particles of the tissue peculiar to the root with the starch grains still in it, and I would observe that the examinations here referred to were made on the finest samples of virgin scammony.

In these investigations I think it very desirable, having determined the presence of starch, to distinguish the granules of the scammony starch from those of wheat. I consider that the presence of the scammony starch indicates an admixture of inferior scammony, and more especially when it is accompanied by some of the tissue of the root. There exists a theory to account for the wheat starch, that it is used to prevent the semi-solid gum resin from sticking to the hands. If this were correct, I should expect to find it *especially* in that powder which adheres to the outside of the lumps of scammony, constituting what may be termed the bloom upon it; but I do not find this to be the case in the samples which I have examined, neither does the greyish white powder which covers the lump consist, so far as I have observed, of chalk. It seems to me to be merely the particles of scammony reduced to a powder by the friction of the lumps against each other, and it is of the same quality in every respect as the lump from which it has been detached.

I can only account for the presence of starch in powdered virgin scammony, by reference to the practice of picking the virgin scammony in lump from the chest, and suggesting that after a good deal of picking there must remain a quantity of fragments, too small for further picking, but not for grinding. To this must be added the fact, that sometimes in a chest a good piece of virgin scammony may have a very inferior one stuck to it, so as to escape observation. It is much to be desired that flour and starch, when spoken of in connection with scammony, should not be considered synonymous. I have never met with cellular tissue, such as I should expect to find if flour had been present.

It is an interesting question, whether the gum resin possesses any value over the more uniform and less costly resin obtained from the dry root. If it should prove that the resin is equally active and more reliable than the exuded gum resin, then the pharmacist would be independent of the Greek of the Levant, or the Turk nearer home.

I have examined the mineral matter scraped from the outside of a fine specimen of the root, and find it to be, as already shown by Professor Attfield, a calcareous earth, which effervesces with hydrochloric acid, indicating that it was grown on a chalky soil.

THE CARNIVOROUS HABITS OF SOME PLANTS.*

BY DR. HOOKER, C.B., D.C.L., PRES. R.S.

(*Concluded from p.* 248.)

But to return from mere conjecture to scientific earnest, I cannot dismiss *Darlingtonia* without pointing out to you what appears to me a most curious point in its history; which is, that the change from the slender, tubular, open-mouthed, to the inflated, closed-mouthed pitchers, is, in all the specimens which I have examined, absolutely sudden in the individual plant. I find no pitchers in an intermediate stage of development. This, a matter of no little significance in itself, derives additional interest from the fact that the young pitchers to a certain degree represent those of the *Sarracenias* with open mouths and erect lids; and the old pitchers those of the *Sarracenias* with closed mouths and globose lids. The combination of representative characters in an outlying species of a small order cannot but be regarded as a marvellously significant fact in the view of those morphologists who hold the doctrine of evolution.

Nepenthes.—The genus *Nepenthes* consists of upwards of 30 species of climbing, half-shrubby plants, natives of the hotter parts of the Asiatic Archipelago from Borneo to Ceylon, with a few outlying species in New Caledonia, in Tropical Australia, and in the Seychelle Islands on the African Coast. Its pitchers are abundantly produced, especially during the younger state of the plants. They present very considerable modifications of form and external structure, and vary greatly in size, from little more than an inch to almost a foot in length; one species, indeed, which I have here from the mountains of Borneo, has pitchers which, including the lid, measure a foot and a half, and its capacious bowl is large enough to drown a small animal or bird.

The structure of the pitcher of *Nepenthes* is less complicated on the whole than that of *Sarracenia*, though some of its tissues are much more highly specialized. The pitcher itself is here not a transformed leaf, as in *Sarracenia*, nor is it a transformed leaf-blade, like that of *Dionœa*, but an appendage of the leaf developed at its tip, and answers to a water-secreting gland that may be seen terminating the mid-rib of the leaf of certain plants. It is furnished with a stalk, often a very long one, which, in the case of pitchers formed on leaves high up the stem, has (before the full development of the pitcher) the power of twisting like a tendril round neighbouring objects, and thus aiding the plant in climbing, often to a great height, in the forest.

In most species the pitchers are of two forms, one appertaining to the young, the other to the old state of the plant, the transition from one form to the other being gradual. Those of the young state are shorter and more inflated; they have broad fringed longitudinal wings on the outside, which are probably guides to lead insects to the mouth; the lid is smaller and more open, and the whole interior surface is covered with secreting glands. Being formed near the root of the plant, these pitchers often rest on the ground, and in species which do not form leaves near the root they are sometimes suspended from stalks which may be fully a yard long, and which bring them to the ground. In the older state of the plant the pitchers are usually much longer, narrower, and less inflated, trumpet-shaped, or even, and are conical; the wings also are narrower, less fringed, or almost absent. The lid is larger and slants over the mouth, and only the lower part of the pitcher is covered with secreting glands, the upper part presenting a tissue analogous to the conducting tissue of *Sarracenia*, but very different anatomically. The difference in structure of these two forms of pitcher, if considered in reference to their different positions on the plant, forces the conclusion on the mind, that the one form is intended for ground game, the other for winged game. In all cases the mouth of the pitcher is furnished with a thickened corrugated rim, which serves three purposes: it strengthens the mouth and keeps it distended; it secretes honey (at least in all the species I have examined under cultivation, for I do not find that any other observer has noticed the secretion of honey by *Nepenthes*), and it is in various species developed into a funnel-shaped tube, that descends into the pitcher, and prevents the escape of insects, or into a row of incurved hooks, that are in some cases strong enough to retain a small bird, should it, when in search of water or insects, thrust its body beyond a certain length into the pitcher.

* Address to the department of Zoology and Botany of the British Association.

In the interior of the pitcher of *Nepenthes* there are three principal surfaces; an *attractive*, *conductive*, and a *secretive* surface; the *detentive* surface of *Sarracenia* being represented by the fluid secretion, which is here invariably present at all stages of growth of the pitcher.

The attractive surfaces of *Nepenthes* are two: those, namely, of the rim of the pitcher, and of the under surface of the lid, which is provided in almost every species with honey-secreting glands, often in great abundance. These glands consist of spherical masses of cells, each embedded in a cavity of the tissue of the lid, and encircled by a guard-ring of glass-like cellular tissue. As in *Sarracenia* the lid and mouth of the pitcher are more highly coloured than any other part, with the view of attracting insects to their honey. It is a singular fact that the only species known to me that wants these honey glands on the lid is the *N. ampullaria*, whose lid, unlike that of the other species, is thrown back horizontally. The secretion of honey on a lid so placed would tend to lure insects away from the pitcher instead of into it.

From the mouth to a variable distance down the pitcher is an opaque glaucous surface, precisely resembling in colour and appearance the conductive surface of the *Sarracenia*, and, like it, affording no foothold to insects, but otherwise wholly different; it is formed of a fine network of cells, covered with a glass-like cuticle, and studded with minute reniform transverse excrescences.

The rest of the pitcher is entirely occupied with the secretive surface, which consist of a cellular floor crowded with spherical glands in inconceivable numbers. Each gland precisely resembles a honey-gland of the lid, and is contained in a pocket of the same nature, but semicircular, with the mouth downwards, so that the secretive fluid all falls to the bottom of the pitcher. In the *Nepenthes Rafflesiana* three thousand of the glands occur on a square inch of the inner surface of the pitcher, and upwards of a million in an ordinary sized pitcher. I have ascertained that, as was indeed to be expected, they secrete the fluid which is contained in the bottom of the pitcher before this opens, and that the fluid is always acid.

The fluid, though invariably present, occupies a comparatively small portion of the glandular surface of the pitcher, and is collected before the lid opens. When the fluid is emptied out of a fully formed pitcher that has not received animal matter, it forms again, but in comparatively very small quantities; and the formation goes on for many days, and to some extent even after the pitcher has been removed from the plant. I do not find that placing inorganic substances in the fluid causes an increased secretion, but I have twice observed a considerable increase of fluid in pitchers after putting animal matter in the fluid.

To test the digestive powers of *Nepenthes* I have closely followed Mr. Darwin's treatment of *Dionæa* and *Drosera*, employing white of egg, raw meat, fibrine, and cartilage. In all cases the action is most evident, in some surprising. After twenty-four hours' immersion the edges of the cubes of white of egg are eaten away and the surfaces gelatinized. Fragments of meat are rapidly reduced; and pieces of fibrine weighing several grains dissolve and totally disappear in two or three days. With cartilage the action is most remarkable of all; lumps of this weighing eight and ten grains are half gelatinized in twenty-four hours, and in three days the whole mass is greatly diminished, and reduced to a clear transparent jelly. After drying some cartilage in the open air for a week, and placing it in an unopened but fully formed pitcher of *N. Rafflesiana*, it was acted upon similarly, and very little slower.

That this process, which is comparable to digestion, is not wholly due to the fluid first secreted by the glands, appears to me most probable; for I find that very little action takes place in any of the substances placed in the fluid drawn from pitchers, and put into glass tubes; nor has any followed after six days' immersion of cartilage or fibrine in pitchers of *N. ampullaria* placed in a cold room, whilst on transferring the cartilage from the pitcher of *N. ampullaria* in the cold room to one of *Rafflesiana* in the stove, it was immediately acted upon. Comparing the action of fibrine, meat, and cartilage placed in tubes of *Nepenthes* fluid, with others in tubes of distilled water, I observed that their disintegration is three times more rapid in the fluid; but this disintegration is wholly different from that effected by immersion in the fluid of the pitcher of a living plant.

In the case of small portions of meat, ½ to 2 grains, all seem to be absorbed; but with 8 to 10 grains of cartilage it is not so; a certain portion disappears, the rest remains as a transparent jelly, and finally becomes putrid, but not till after many days. Insects appear to be acted upon somewhat differently, for after several days' immersion of a large piece of cartilage, I found that a good-sized cockroach, which had followed the cartilage and was drowned for its temerity, in two days became putrid. In removing the cockroach the cartilage remained inodorous for many days. In this case, no doubt, the antiseptic fluid had permeated the tissue of the cartilage, whilst enough did not remain to penetrate the chitinous hard covering of the insect, which consequently decomposed.

In the case of cartilage placed in fluid taken from the pitcher, it becomes putrid, but not so soon as if placed in distilled water.

From the above observations it would appear probable that a substance acting as pepsine is given off from the inner wall of the pitcher, but chiefly after placing animal matter in the acid fluid; but whether this active agent flows from the glands or from the cellular tissue in which they are imbedded, I have no evidence to show.

I have here not alluded to the action of these animal matters in the cells of the glands, which is, as has been observed by Mr. Darwin in *Drosera*, to bring about remarkable changes in their protoplasm, ending in their discoloration. Not only is there aggregation of the protoplasm in the gland-cells, but the walls of the cells themselves become discoloured, and the glandular surface of the pitcher, that at first was of a uniform green, becomes covered with innumerable brown specks (which are the discoloured glands). After the function of the glands is exhausted, the fluid evaporates, and the pitcher slowly withers.

At this stage I am obliged to leave this interesting investigation. That *Nepenthes* possesses a true digestive process such as has been proved in the case of *Drosera*, *Dionæa*, and *Pinguicula* cannot be doubted. This process, however, takes place in a fluid which deprives us of the power of following it further by direct observation. We cannot here witness the pouring out of the digestive fluid; we must assume its presence and nature from the behaviour of the animal matter placed in the fluid in the pitcher. From certain characters of the cellular tissues of the interior walls of the pitcher, I am disposed to think that it takes little part in the processes of either digestion or assimilation, and that these, as well as the pouring out of the acid fluid, are all functions of the glands.

In what I have said I have described the most striking instances of plants which seem to invert the order of nature, and to draw their nutriment—in part at least—from the animal kingdom, which is often held to be the function of the vegetable kingdom to sustain.

I might have added some additional cases to those I have already dwelt upon. Probably, too, there are others still unknown to science, or whose habits have not yet been detected. Delpino, for example, has suggested that a plant, first described by myself in the 'Botany of the Antarctic Voyage,' *Caltha dionææfolia*, is so analogous in the structure of its leaves to *Dionæa*, that it is difficult to resist the conviction that its structure also is adapted for the capture of small insects.

But the problem that forces itself upon our attention is, how does it come to pass that these singular aberrations from the otherwise uniform order of vegetable nutrition make their appearance in remote parts of the vegetable kingdom? why are they not more frequent, and how were such extraordinary habits brought about or contracted? At first sight the perplexity is not diminished by considering—as we may do for a moment—the nature of ordinary vegetable nutrition. Vegetation, as we see it everywhere, is distinguished by its green colour, which we know depends on a peculiar substance called chlorophyll; a substance which has the singular property of attracting to itself the carbonic acid gas which is present in minute quantities in the atmosphere, of partly decomposing it, so far as to set free a portion of its oxygen, and of recombining it with the elements of water, to form those substances, such as starch, cellulose, and sugar, out of which the framework of the plant is constructed.

But, besides these processes, the roots take up certain matters from the soil. Nitrogen forms nearly four-fifths of the air we breathe, yet plants can possess themselves of none of it in the free uncombined state. They withdraw nitrates and salts of ammonia in minute quantities from the ground, and from these they build up with starch, or some analogous material, albuminoids or protein compounds, necessary for the sustentation and growth of protoplasm.

At first sight nothing can be more unlike this than a *Dionœa* or a *Nepenthes* capturing insects, pouring out a digestive fluid upon them, and absorbing the albuminoids of the animal, in a form probably directly capable of appropriation for their own nutrition. Yet there is something not altogether wanting in analogy in the case of the most regularly constituted plants. The seed of the castor-oil plant contains, besides the embryo seedling, a mass of cellular tissue or endosperm filled with highly nutritive substances. The seedling lies between masses of this, and is in contact with it—and has the warmth and moisture of germination set up, changes which bring about the liquefaction of the contents of the endosperm and the embryo absorbs them; it grows in so doing, and at last having taken up all it can from the exhausted endosperm, develops chlorophyll in its cotyledons under the influence of light, and relies on its own resources.

A large number of plants, then, in their young condition borrow their nutritive compounds ready prepared, and this is in effect what carnivorous plants do later in life.

That this is not merely a fanciful way of regarding the relation of the embryo to the endosperm, is proved by the ingenious experiments of Van Jieghem, who has succeeded in substituting for the real, an artificial endosperm, consisting of appropriate nutritive matters. Except that the embryo has its food given to it in a manner which needs no digestion—a proper concession to its infantine state—the analogy here with the mature plants which feed on organic food seems to be complete.

But we are beginning also to recognize the fact that there are a large number of flowering-plants that pass through their lives without ever doing a stroke of the work that green plants do. These have been called *Saprophytes*. *Monotropa*, the curious bird's nest orchid (*Neottia Nidus-avis*), *Epipogium*, and *Corallorhiza* are instances of British plants which nourish themselves by absorbing the partially decomposed materials of other plants, in the shady or marshy places which they inhabit. They reconstitute these products of organic decomposition, and build them up once more into an organism. It is curious to notice, however, that the tissues of *Neottia* still contain chlorophyll in a nascent though useless state, and that if a plant of it be immersed in boiling water, the characterestic green colour reveals itself.

Epipogium and *Corallorhiza* have lost their proper absorbent organs; they are destitute of roots, and take in their food by the surfaces of their underground stem structures.

The absolute difference between plants which absorb and nourish themselves by the products of the decomposition of plant-structures, and those which make a similar use of animal structures, is not very great. We may imagine that plants accidentally permitted the accumulation of insects in some parts of their structure, and the practice became developed because it was found to be useful. It was long ago suggested that the receptacle formed by the connate leaves of *Dipsacus* might be an incipient organ of this kind; and though no insectivorous habit has ever been brought home to that plant, the theory is not improbable.

Linnæus, and more lately Baillon, have shown how a pitcher of *Sarracenia* may be regarded as a modification of a leaf of the *Nymphæa* type. We may imagine such a leaf first becoming hollow, and allowing *débris* of different kinds to accumulate; these would decompose, and a solution would be produced, some of the constituents of which would diffuse themselves into the subjacent plant tissues. This is in point of fact absorption, and we may suppose that in the first instance—as, perhaps, still in *Sarracenia purpurea*—the matter absorbed was merely the saline nutritive products of decomposition, such as ammoniacal salts. The act of digestion—that process by which soluble food is reduced without decomposition to a soluble form fitted for absorption—was doubtless subsequently required.

The secretion, however, of fluids by plants, is not an unusual phenomenon. In many aroids a small gland at the apex of the leaves secretes fluid, often in considerable quantities, and the pitcher of *Nepenthes* is, as I have shown elsewhere, only a gland of this kind, enormously developed. May not, therefore, the wonderful pitchers and carnivorous habit of *Nepenthes* have both originated by natural selection out of one such honey-secreting gland as we still find developed near that part of the pitcher which represents the tip of the leaf? We may suppose insects to have been entangled in the viscid secretion of such a gland, and to have perished there, being acted upon by those acid secretions that abound in these and most other plants. The subsequent differentiation of the secreting organs of the pitcher into aqueous, saccharine, and acid, would follow *pari passu* with the evolution of the pitcher itself, according to those mysterious laws which result in the correlation of organs and functions throughout the kingdom of Nature; and which, in my apprehension, transcend in wonder and interest those of evolution and the origin of species.

Delpino has recorded the fact that the spathe of *Alocasia* secretes an acid fluid which destroys the slugs that visit it, and which he believes subserves its fertilization. Here any process of nutrition can only be purely secondary. But the fluids of plants are in the great majority of cases acid, and, when exuded, would be almost certain to bring about some solution in substances with which they came in contact. Thus, the acid secretions of roots were found by Sachs to corrode polished marble surfaces with which they came in contact, and thus to favour the absorption of mineral matter.

The solution of albuminoid substances requires, however, besides a suitable acid, the presence of some other albuminoid substance analogous to pepsine. Such substances, however, are frequent in plants. Besides the well-known diastase, which converts the starch of malt into sugar, there are other instances in the synaptase which determines the formation of hydrocyanic acid from emulsions, and the myrosin which similarly induces the formation of oil of mustard. We need not wonder, then, if the fluid secreted by a plant should prove to possess the ingredients necessary for the digestion of insoluble animal matters.

These remarks will, I hope, lead you to see that though the processes of plant nutrition are in general extremely different from those of animal nutrition, and involve very simple compounds, yet that the protoplasm of plants is not absolutely prohibited from availing itself of food, such as that by which the protoplasm of animals is nourished; under which point of view these phenomena of carnivorous plants will find their place, as one more link in the continuity of nature.

EVAPORATION AND DIFFUSION.*

BY PROFESSOR ODLING, M.A., F.R.S.

Of the circumstances on which the rate of evaporation of the same volatile substance chiefly depends, one very influential circumstance, namely, the nature of the atmosphere into which the vapour proceeds and distributes itself, does not appear to have been made the subject of careful examination. There is, however, one familiar experiment on the subject; and it consists in passing up a little ether into two equal volumes, one of hydrogen and the other of air, contained in similar cylinders standing over water. Evaporation of the ether takes place in both cases; though far more rapidly into the hydrogen than into the air, as shown by the far more rapid expansion of the hydrogenous than of the aerial space, from the addition to it of the ether-vapour. This experiment is usually cited in illustration of the greater rapidity at which ether-vapour diffuses itself into an atmosphere of light hydrogen than into an atmosphere of comparatively heavy air. It is doubtful, however, whether the explanation in this precise form is strictly correct, the diffusive mobility of any gas or vapour being a property altogether special to itself, irrespective of extraneous conditions. Thus, in a particular experiment, Mr. Graham found that while the quantity of hydrogen which in one minute of time passed through a graphite plate into a vacuum was 1·289 c. c., the quantity of hydrogen which in the same time passed through the same graphite plate into the surrounding air was 1·243 c. c., or almost exactly the same.

A novel experiment on the influence due to the nature of the contiguous atmosphere upon the rapidity of the process of evaporation consists in introducing into each of two similar tall cylinder bottles a sealed glass bulb containing a little iodine. The one cylinder being filled with hydrogen, and the other with air, and each having suspended from its mouth a piece of starched paper or cloth, the bulbs are then broken by concussion of the containing cylinders. But, in this case, the test paper or cloth suspended in the cylinder of air becomes affected by the iodine considerably before that suspended in the cylinder of hydrogen; or, contrary to what happens with ether, the iodine *appears* to volatilize more quickly in the comparatively heavy air than in the much lighter hydrogen. Similarly, if some weak aqueous ammonia contained in a sealed glass bulb be set free in a tall bottle of hydrogen, and also in a tall bottle of air, a piece of turmeric paper suspended from the stopper of each bottle becomes affected by the ammonia vapour more quickly in the bottle of air than in the bottle of hydrogen.

Water may be taken as the type of a volatile substance, and the nature of the process of evaporation be conveniently studied in relation thereto. Now, in a hermetically-closed vessel exhausted of air, but partly filled with water, the matter of the water exists in two states—a portion of it in the liquid state, and another portion in the aerial, or vaporous, or evaporated state; and, with excess of liquid water present, the quantity of vaporous water that can exist in an otherwise vacuous space, or the density of the vapour filling the space, is found to vary solely with the temperature. Thus 100 cubic inches of space will contain, at 58° C., 3 grains of vaporous water; at 100° C., 15 grains; at 144° C., 58 grains, and so on; or the densities of the vapour of water at these different temperatures are as the numbers 3, 15, and 58 respectively. Now, the quantity of water-vapour that can exist at any particular temperature in a volume of otherwise vacuous space is almost identical—it used to be considered absolutely identical,—with the quantity of vapour that can exist in the same volume of space already occupied by air. In other words, a cubic inch of water-vapour, and a cubic inch of air saturated with water-vapour, contain the same weight of the matter of water. Hence it is found that with continuous increase of temperature, a greater and greater quantity of liquid water ceases to be liquid and becomes vaporous, or is, in other words, evaporated into the adjoining space, whether vacuous or aerial; and conversely with decrease of temperature, a greater and greater quantity of vaporous water ceases to be vaporous, and is deposited in the liquid state. Thus, upon cooling a globe of transparent warm moist air, it is at once filled with an opaque mist, which, left to itself, soon becomes deposited in the form of drops; but which may be readily made to disappear or re-vaporize by gently heating the globe. The deposition of dew on cold surfaces brought into a warm moist room is familiar to all.

The tension or spring of water-vapour varies with the quantity of vapour filling the space—that is, with the density of the vapour, and consequently with its temperature. Thus the tension is equal, at 15° C., to a pressure of 13 millimetres of mercury; at 60° C., to a pressure of 149 millimetres; at 100° C., to a pressure of 760 millimetres; at 144° C., to a pressure of 3,040 millimetres. At the temperature of 100° C., the tension of the vapour of water being equal to a pressure of 760 millimetres of mercury, balances the tension or pressure of the atmosphere, as measured by the height of the barometric column. Hence, on continuing to heat water already at the temperature of 100°, it boils, or is converted into vapour, having a tension equal to that of the atmosphere. And so with a less or greater external pressure, water boils at a lower or higher temperature—in each case at the particular temperature whereat the elastic force of the water-vapour balances the particular external pressure. Under a pressure of 149 millimetres, for instance, water boils at 60° C.; under a pressure of 3040 millimetres, it boils at 144° C. The occurrence, then, of ebullition at some particular point of temperature may be viewed as a mere accident of the process of evaporation—a more and more rapid evaporation, with production of vapour of higher and higher density and elasticity, proceeding continuously with the continuous increase of temperature, although, indeed, at a far more rapid rate than the rate of increase of temperature.

In the conversion of liquid water into water-vapour heat is absorbed. It was at one time considered that the quantity of heat absorbed was independent of the temperature and correlative tension of the vapour yielded, and that it varied only with the quantity yielded. It was held, for example, that in the conversion, say, of a gramme of liquid water into a gramme of water-vapour—whether of tenuous vapour at a low temperature, or of dense vapour at a high temperature—the same quantity of heat was absorbed. This rule, though now known to be only approximately true, is nevertheless sufficiently true to allow of the amount of cold or absorption of heat resulting from any evaporation being taken as an indication or measure of the amount of that evaporation. The depression of temperature caused by the evaporation of water is familiarly shown in the use of the wet-bulb hygrometer. This instrument, consisting simply of a couple of thermometers, one of which has its bulb kept continuously moist, the difference in way of deficit between the temperature manifested by this wet-bulb thermometer and the temperature manifested by the other thermometer, is a measure of the amount of water evaporating from the surface of the moistened bulb.

What is true of liquid water and of water-vapour is true, in principle, of other volatile liquids and of their several vapours. At any given temperature some of these bodies volatilize much more rapidly, others of them much less rapidly, than one another, and than water; and in the process of their evaporation some of them absorb a much greater amount of heat than others, though for the same weight of vapour formed no one of them is known to absorb so large an amount of heat as water. Disulphide of carbon, ether, and alcohol are familiar examples of bodies more volatile than water; aniline, mercury, and molten silver, of bodies less volatile. It is well known

* Lecture delivered at the Royal Institution of Great Britain.—Reprinted from the proceedings.

that water when required pure is distilled—that is to say, it is first vaporized by heat and then re-liquefied by cold; and silver when required absolutely pure is sometimes submitted to the same process of distillation. Evaporation is, moreover, a property not only of liquid, but also of solid bodies, as of sal-ammoniac, iodine, camphor, ice and snow, solid carbonic acid, etc. Many of the phenomena of evaporation can be illustrated more conveniently with other volatile substances than with water. Thus the cooling produced by evaporation may be strikingly illustrated by means of ether, and still more strikingly by means of some liquefied gas, as liquefied sulphurous or nitrous oxide.

The necessary influence of some conditions on the rate of evaporation is obvious. Evaporation being a direct result of the absorption of heat, and the higher the temperature the greater the quantity of vapour capable of existing in a given space, it is found that at higher and higher temperatures water evaporates or dries up more and more rapidly, in proportion approximately to the increasing density of the vapour at higher and higher temperatures. Wet linen, for example, is habitually dried by being hung before the fire or placed in heated chambers or ovens.

Similarly, with regard to the influence of the extent of liquid surface on the rate of evaporation, it is found that the evaporation of a given weight of liquid water takes place more rapidly when the water is spread out in a wide dish than when it is contained in a narrow tube, in proportion to the greater extent of surface from which the evaporation can take place in the one case than in the other. Thus, while half a pint of water in a tumbler will remain for an almost indefinite time without becoming dried up, half a pint of water absorbed in a thick towel, exposing on its two sides more than a dozen square feet of surface, will become dried up in the course of twenty-four hours.

Again, the influence exerted by the greater or lesser dryness of the adjacent space, whether or not aerial, upon the evaporation of water is obvious. Into a space already saturated with vapour no further evaporation whatever can take place; and other conditions being alike, the drier the space the greater the amount of evaporation that can take place with it, and the more rapid the process of evaporation. In the laboratory moist substances are made dry by allowing the water from them to evaporate into spaces kept artificially dry by means of desiccating agents, such as oil of vitriol, quicklime, chloride of calcium, etc., which absorb the water-vapour from the space as fast as it is produced therein. Moreover, evaporation proceeding into any space, vacuous or aerial, until the space is saturated with water-vapour, and more rapidly in proportion to the removal from saturation of the space, it is obvious that, other conditions being equal, evaporation proceeds more rapidly into a large space requiring for its saturation a considerable weight of water-vapour than into a small space capable of being saturated by a minute quantity of the vapour.

The influence of the extent of aerial space into which a vapour can distribute itself upon the rate of formation of the vapour leads to a consideration of the effect of the movement of the contiguous air upon the rate of evaporation from a given surface. With an absolutely quiescent atmosphere, the layer of atmosphere in immediate contact with the surface of evaporating liquid must become quickly saturated with vapour; and but for some spontaneous means of removal of the vapour itself, or the air saturated with it, from the surface of the liquid, all further evaporation would be arrested. The nature of these spontaneous means of removal will be considered presently; but the influence of the artificial removal of the more or less saturated air from the surface of the evaporating liquid can be easily manifested. Thus, on allowing a strong current of air to play upon a surface of ether contained in a thin glass vessel standing on a stratum of water, the stratum of water becomes quickly frozen by reason of the heat abstracted from it, in the rapid production of ether-vapour which takes place in the current of air. For whereas with the ether in the vessel left to itself, the interior of the vessel soon becomes saturated with ether-vapour, and further evaporation with correlative cooling effect is almost arrested, with a current of air blown on to the surface of the ether, the liquid ether is in continuous contact with a fresh unsaturated atmosphere, into which it continues to evaporate with rapidity.

In connection with the above influences, it is observable that the evaporation of water from growing plants is favoured by the three conditions of extent of leaf surface, movement of the more or less dry atmosphere, and heat of the summer sun. An early and very striking experiment on the extent of this evaporation was made by Dr. Stephen Hales in 1724, and is recorded in his 'Vegetable Statics.' He found that with a healthy, full-grown sunflower more than a yard high, planted when young in a suitable pot, the evaporation from the plant itself amounted on the average to 20 ounces in a twelve hours' day, the maximum quantity being 30 ounces. Some very interesting and exact modern experiments on this subject were conducted in 1850 by Mr. Lawes, at Rothamstead. As an example of the results obtained, he found that a plant of barley, during a period of 172 days' growth, in which it acquired 419 grains of dry organic, and 46 grains of dry mineral matter, evaporated not less than 120,000 grains, or upwards of 17lbs. of water; so that for every grain of dry matter, organic and mineral, fixed by the plant during its period of growth, 257 grains of water were absorbed and evaporated.

A most important condition affecting the rate of evaporation is the pressure on the surface of the volatile substance. Into a vacuum indeed, where there is no pressure, evaporation is practically instantaneous. Thus, on letting up a little water, alcohol, or ether into the vacuum of a barometer, the mercury is at once depressed to the maximum extent producible by the tension of the particular vapour at the particular temperature. Again, on breaking a sealed bulb of iodine, within and at the lower end of a long sealed vacuous tube, a piece of starch-paper at the upper end of the tube is almost immediately affected by the iodine vapour. Further, the cooling consequent on the rapid evaporation of ether, ammonia, etc., into a vacuum, is taken advantage of in the construction of several well-known freezing machines. Again, in Leslie's celebrated experiment, the evaporation even of water into a vacuous space, from which the water-vapour is removed by some desiccant as fast as produced, takes place with such rapidity and correlative absorption of heat as to effect the freezing of the residual water from which the evaporation is proceeding. The same result is effected in Wollaston's cryophorus, the water-vapour in this case not being absorbed by oil of vitriol or other desiccant, but being simply condensed by cold applied to the other and distant bulb of the twice bent vacuous tube. Moreover, it was long ago shown by Daniel that evaporation of water into the same dry atmosphere takes place at a rate inversely proportioned to the pressure of the atmosphere. Thus in a particular set of experiments, the pressures of the air being 30·4, 15·2, and 7·6 inches of mercury, the quantities of water evaporated in half an hour were found to be 1·24, 2·97, and 5·68 grains respectively.

That the nature of the atmosphere into which a vapour can distribute itself has an important influence on the rate of formation of the vapour may be manifested by several experiments, in addition to those shown at the beginning of the lecture. Thus, with a couple of thin glasses standing on a stratum of water, and containing each some rectified wood-spirit, if the one portion of spirit be blown upon by a strong current of hydrogen, and the other portion by a strong current of air, the stratum of water underlying the glass of spirit blown upon by the hydrogen will alone become frozen, by reason of the excessive vaporization of, and heat-absorption by, the spirit in contact with the atmosphere of hydrogen. Again, a series of experiments has recently been made by the speaker on the relative rates of evaporation of water into limited atmospheres of hydrogen, air, and carbonic acid respectively, alike kept dry by contact with a large surface of oil of vitriol. In these experiments the evaporation was found to take place most rapidly in hydrogen, and least rapidly in carbonic acid; and as a mean of seven tolerably concordant results, the ratio of the rate of evaporation in hydrogen to the rate of evaporation in air, under the particular conditions of the experiment, was found to be as 2·68 : 1.

The influence of the particular contiguous atmosphere on the rate of evaporation of any particular liquid may be, and probably is, of a very complex nature. There are, however, two easily intelligible ways in which the particular atmosphere may act by virtue of its specific gravity. Thus a lighter or heavier gas or vapour ascends or descends bodily through another at a rate proportionate to the difference in their specific gravities, a very slight difference sufficing to bring about an upward or downward current of considerable activity. This upward or downward movement is well shown by introducing first heavy ether-vapour, and then light coal-gas, through a lateral opening made at about the middle of the length of a tall, somewhat wide, perpendicular glass tube, open at both ends; when it will be found that the ether-vapour, descending by reason of its heaviness, can only be inflamed at the bottom of the tube, while the coal-gas, ascending by reason of its lightness, can only be inflamed at the top. Now, the specific gravities of hydrogen, aqueous vapour, and air at the same temperature, being to one another as the numbers 1, 9, and 14·5 respectively, it is obvious that, whereas hydrogen saturated with water-vapour is heavier than dry hydrogen, air saturated with water-vapour is lighter than dry air. Accordingly, with a surface of water exposed to an atmosphere of originally dry hydrogen, the hydrogen in actual contact with the water will not, by becoming moist, acquire a tendency to rise up through the dry hydrogen, and so be removed from the surface of the liquid; whereas, with a surface of water exposed to an atmosphere of originally dry air, the air in actual contact with the water will, by becoming moist, acquire a tendency to rise up through the dry air, and so become removed from the surface of the liquid. And, having regard to this influence alone, water when occupying an inferior position should evaporate more rapidly into air than into hydrogen. It must be borne in mind that any given volume of moist air or gas is the sum of the volume of its constituent water-vapour, and of the volume of its constituent dry air or gas; and that the tension of the moist air or gas is the sum of the tension of its constituent water-vapour, and of the tension of its constituent dry air or gas, actually or virtually expanded by the addition to it of a certain volume of water-vapour. So that, with water boiling in a deep open vessel there may exist in close proximity to each other, almost pure water-vapour, different mixtures of water-vapour and air, and comparatively dry air, all having alike a tension of 760 millimetres of mercury.

But independently of their bodily movements in the form of currents, gases and vapours distribute themselves among one another by a proper molecular movement of diffusion—the relative diffusive mobilities of different gases or vapours being inversely as the square roots of their several specific gravities. Accordingly, with equal surfaces of water, exposed respectively to an atmosphere of hydrogen and to an atmosphere of air, the vapour produced from the surface of the water is interpenetrated and distributed through the contiguous space with greater rapidity by the highly-diffusive hydrogen than by the feebly-diffusive air, in proportion to their relative diffusion-velocities 3·8 and 1·0 respectively. And it is, doubtless, to the more rapid diffusion of hydrogen than of air into the vapour as formed, and the consequent more rapid supply to the liquid of an unsaturated atmosphere into which it can evaporate, that the more rapid evaporation of water, ether, and wood-spirit into an atmosphere of hydrogen than into an atmosphere of air, as in the experiments, for instance, already shown and described, is substantially due.

METHOD OF DETECTING THE MINERAL ACIDS IN VINEGAR.*

BY M. STROHL.

The author's method is founded upon the insolubility of oxalate of lime in dilute acetic acid and vinegar, and the solubility of the same salt in dilute mineral acids. The reagent, therefore, which he proposes for the detection of mineral acids in vinegar is oxalate of lime. But as reagents are generally more sensitive in proportion as they are freshly prepared, and approach nearer to the nascent state, the author prefers to produce oxalate of lime at the moment of the reaction by pouring into the liquid to be tested determined quantities of oxalate of ammonia and chloride of calcium in solution. As, moreover, so much more acid is required as there is oxalate of lime to dissolve, and consequently the degree of delicacy of the test diminishes with the quantity of the reagent added, in order to avoid excess of one or other of the two salts, the two solutions should be prepared to fulfil the following conditions: (1) To neutralize exactly in equal volumes; (2) to be sufficiently dilute to produce a turbidity—but a very perceptible turbidity—in vinegar free from mineral acids.

Preparation of the Reagent.—By a series of experiments it has been ascertained that one-fifth of an equivalent of each lime salt dissolved in a sufficient quantity of water to produce a litre, yields solutions fulfilling the required conditions; that is to say, if half a cubic centimetre of such solution of oxalate of ammonia and half a cubic centimetre of such solution of chloride of calcium be added to 50 cubic centimetres of vinegar, free from mineral acids, after agitation, a very apparent turbidity is produced.

Preparation of the Titrated Solutions.—The reagent once prepared under the best conditions for delicacy and clearness, it was then necessary to prepare acid liquors of known strength, from the mineral acids ordinarily employed in the sophistication of vinegar. The author used solutions containing two centigrams of anhydrous acid in each cubic centimetre. These he prepared as follows. He first determined the density of the different acids which he intended to use in his experiments, and then ascertained, from the tables drawn up by Bineau, Otto, and Ure, the percentage of anhydrous acid with which this corresponded. Supposing that the sulphuric acid had a density equal to 1·841: the tables showed that 100 grams would contain 80 grams of anhydrous acid (SO_3). As it was desired to obtain a solution one cubic centimetre of which should contain two centigrams of anhydrous acid, or what came to the same thing, of which 100 cubic centimetres should contain two grams of SO_3, by a simple calculation it was ascertained that that proportion of anhydrous acid would be contained in 2·5 grains of the acid in which the density had been taken. That quantity of acid of 1 841 density was therefore mixed with sufficient distilled water to make 100 cubic centimetres. The other acid mixtures were prepared in an exactly similar way.

Determination of the Limit of Sensibility of the different Acids.—50 cubic centimetres of vinegar were introduced into a test tube, then half a cubic centimetre of each of the solutions added, forming by their combination oxalate of lime; a very apparent turbidity was thus produced after agitation. Afterwards the titrated acid liquor was added by means of a burette, divided into tenths of a cubic centimetre, until the complete disappearance of the turbidity, *i.e.*, until the vinegar resumed the limpidity

* *Journal de Pharmacie et de Chimie*, vol. xx., p. 172.

which it had before the addition of the reagent. A certain volume of the acid liquor was thus employed. Suppose that six cubic centimetres had been required. The experiment was then repeated, only, instead of adding the acid after the oxalate of lime, it was added before and in smaller quantity. Thus, in this case, four cubic centimetres would be added to 46 cubic centimetres of vinegar, well mixed, the reagent added, and again shaken. If the turbidity disappeared immediately, four cubic centimetres was too much, and the experiment was repeated with a smaller quantity. If, on the contrary, the turbidity did not disappear by the addition of four cubic centimetres, a larger quantity was used in a fresh experiment.

Thus operating, the author ascertained the last limit of sensibility for each of the acids. Thus, for nitric acid he at first used 6·5 c.c., but operating as above the limit was lowered to 5·0 c.c. In this manner the limits for other acids were found to be:—

Hydrochloric Acid	2·5 c.c.
Nitric Acid	5·0 c.c.
Sulphuric Acid	3·5 c.c.

In each of these acid mixtures one cubic centimetre corresponded to two centigrams of anhydrous acid. Therefore, five centigrams of anhydrous hydrochloric acid, ten centigrams of anhydrous nitric acid, or seven centigrams of anhydrous sulphuric acid, present in fifty cubic centimetres of vinegar, is sufficient to prevent its being rendered turbid on the addition of the oxalate of lime. In other words, five centigrams of hydrochloric acid, ten centigrams of nitric acid, or seven centigrams of sulphuric acid (anhydrous) may be recognized in fifty cubic centimetres of vinegar; or, multiplying these terms by twenty, that is to say, taking a litre of vinegar, the presence of one gram of hydrochloric acid, two grams of nitric acid, or 1·4 grams of sulphuric in the litre can be detected.

Finally, as it may be interesting to know the limit of sensibility of the acids of commerce, the following calculations have been made according to the tables before referred to:—

			Grams.
Commercial Hydrochloric Acid	(sp. gr. 1·174)	.	2·85.
„ Nitric „	(sp. gr. 1·330)	.	4·40.
„ Sulphuric „	(sp. gr. 1·843)	.	1·71.

Résumé.—From the foregoing it may, therefore, be said that, in order to detect a mineral acid in a vinegar, it is sufficient to take fifty cubic centimetres of the vinegar, and add with a pipette half a cubic centimetre of each of the solutions of oxalate of ammonia and chloride of calcium, containing one-fifth of an equivalent of the salt per litre. If, after agitation, the turbidity does not completely disappear, the vinegar contains per litre less than 2·85 grams of hydrochloric acid, 4·40 grams of nitric acid, or 1·70 grams of sulphuric acid. If the turbidity disappears completely, the vinegar contains at least a quantity of acid represented by these figures.

IS THE EUCALYPTUS A FEVER-DESTROYING TREE?

BY MR. BOSISTO.

At a recent meeting of the Royal Society of Melbourne, a paper was read by Mr. Bosisto, in which he discussed the question whether the Eucalyptus is really a fever-destroying tree. As it is not long since that a Secretary of State, in reply to a question, expressed an opinion that the anti-malarial reputation of the Eucalyptus is founded on exaggerated statements, the evidence given in its favour by one so well acquainted with the trees of this genus as Mr. Bosisto will be read with interest. We therefore reproduce the following abstract of the paper from the *Melbourne Argus*:—

Mr. Bosisto said that in many places on the European continent, and elsewhere where experiments had been made to acclimatize the eucalypti, more especially the blue-gum species, the rapidity of its growth, its early maturity to a forest tree, together with the power to absorb considerable moisture, and to permeate the air with its peculiar odour, led to the belief that the tree, attractive in itself, exerted a beneficial influence upon malarious districts. In the consideration of the question whether the eucalypti tended to destroy miasmatic poison or to lessen malaria, it was necessary to take into account the whole of the eucalypti vegetation. Four-fifths of Australian vegetation consisted of the eucalyptus. Australia on the whole might be said to be pretty free from violent endemic or miasmatic poisons, and concerning the latter they might be said to exist only as the eucalyptus receded. The physical geography of Australia did not differ in general outline from that of other countries, but the vegetation of the eucalypti was absolutely indigenous to Australia and Tasmania. Baron Von Mueller described 130 species of this genus as existing in Australia. The physical properties of all eucalypts were that they cast their bark and that their leaves were evergreen, with, in some species, translucent cells. The chemical contents of a eucalyptus tree were neither poisonous nor virulent, and from the tree might be obtained a tannate gum resin, a volatile acid, and a volatile oil, peculiarly of eucalyptic origin. The two first were found in most parts of the tree, but the latter only in the leaves. In those three constituents the key to the question was to be found. The first matter to consider was whether there was any proof that these volatile bodies were set free in the air by the forces of the plant in unison with atmospheric agencies, and if so, when did the process take place, what was the quantity, and what was the probable sanitary effect. He then proceeded to give a detailed account of his experiments in the extraction of eucalyptus oil. The representative species were the manna gum, the odorata, the red gum, stringy bark, iron bark, blue gum, mallee, and peppermint. The mallee supplied an abundance of oil during the moist season, and the coast species during the summer months. In fact, as mid-winter approached, the coast species were ebbing in volatile products, and the others were flowing. The evidence of oil evaporation might thus be stated—that the desert scrub gums, after a winter of average rainfall, supplied the air with a continuous and even quantity of aromatic vapour, and kept up a vigorous vitality throughout the summer, and that a short season of rain, and a long dry summer, diminished the formation of oil and so lessened the exhalation; but, on the other hand, the species tending seaward increased their quantity after a short winter. The aroma of the volatile acid present in the eucalyptus might be detected in the air, along with that of the oil, when travelling in the bush. The extent of the eucalyptus vegetation in Victoria was given by Mr. Skene in his report to the Commissioners of the Exhibition as follows:—"The area of the whole colony was 55,644,000 acres, of which 5,560,000 acres was of dense mallee scrub; 6,225,000 acres of mountainous ranges, densely wooded with gums; and 38,922,000 acres of open timbered country." He calculated that mallee scrub would retain in the leaves, at one time, 4,843,872,000 gallons of oil, and the seaward species 280,891,000 gallons. The extent of mallee country in New South Wales and South Australia was estimated at 20 times the area in Victoria, and that would, calculated on the same basis, return 96,877,440,000 gallons of oil, held at one and the same time in a belt of country massed together over which the hot winds traversed. Considering, also, that the same condition existed throughout the greater part of Australia with the other eucalypts, he could not arrive at any other conclusion than that the whole atmosphere of Australia was more or less affected by the perpetual exhalation of these volatile bodies. From all that he could gather on the subject, he arrived at the conclusion that there was an active agency existing in Australian vegetation over that of other countries, and the exhalation from which gave to the atmosphere an invigorating and healthy tone. After examining all the evidence, Mr. Bosisto came to the conclusion that the eucalyptus is a fever-destroying tree.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 3, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CLAIMS OF THE MAJOR EXAMINATION.

An invincible argument for the adoption of a high standard of education might well be founded on the recollection of the past history of the Pharmaceutical Society, and the memory of those who once laboured in our ranks. Of the men who by indomitable perseverance have risen to eminence outside the pale of pharmacy, there must just now be no mention here. Rather we speak, as occasionally it is our bounden duty, of those who have never failed to be industrious workers in our own trade; and who, notwithstanding a marked scientific bent, have never cast aside the character of a simple chemist and druggist. From this race sprang the Pharmaceutical Society, and neither its origin nor its continuance can receive other explanation than that some years back a body of trading pharmacists were not content with the position of their craft in England. They compared it with that of other countries, specially with France; they measured themselves with those who were engaged in industrial pursuits of a more liberal nature, and the comparison was to their disadvantage. Lastly, there rose in their breasts a feeling of profound dissatisfaction that, linked so closely as their calling was with the beneficent art of the physician, they were but poorly qualified to share his professional instincts or to become his intelligent adviser. A new train of thought led to energetic action, the consequences of which remain until this day; but in whatever light we view either the action or the thought, we can assign to it no other motive than that inspired by honour, or the craving for improvement. Proudly we refer to the last proceedings of the Linnean Society, where we find enrolled the memorials of Henry Deane and Thomas Morson. We appeal to the career of men like these, and ask if we of a later generation should not strive to acquire something better than a legal qualification for the exercise of our trade?

It is not well to linger too long over the cypress, or to dwell too exclusively in the memories of the past: let us turn from the dead to the living—rather from the dead who are yet speaking, to the living whose works are an epistle known and read of all men.

One fact admits of no denial; pharmacy in England can boast of a very respectable series of Fellows of various learned bodies, who have gone far beyond the immediate requirements necessary for *keeping open shop*, or compounding physic. Some few of these, by an accident of date, were exempt from even the form of an examination; the rest have shown a rare willingness of disposition to develop the spirit of the Association to which they belong. Law has made compulsory a certain portion of these generous impulses, and has rendered them matters of obligation.

Seeing, then, how much was accomplished by spontaneous effort, and the importance of the results obtained, the Government was not slow to perpetuate and ratify the new conditions under which pharmacy was placed; and when it passed an imperative enactment compelling a standard of qualification, it found, ready to hand, an existing body prepared—nay, entitled—to carry out its intentions.

But the events of the past thirty years made such a provision of itself inadequate. The Minor Examination is a safeguard standing midway between the public and the pharmacist, and on both sides is a righteous measure of precaution. In its creation a paternal Government has released itself from responsibility, but it would have feebly interpreted the spirit of the age had it not provided that to pharmacy also, as a branch of learning, a road to honourable distinction should be accessible. Once more, then, we make a direct appeal in favour of the Major Examination. We are convinced that a mass of our younger readers know little the reason of its institution. That so few venture to claim its privilege cannot be due to a sudden degeneracy of feeling, but to a misconception of its design, and an ignorance of the traditions by which it is surrounded. The theory seems to be, What is the lowest modicum of knowledge with which I can slip through life? What is the minimum of intellectual strain with which I can exercise an intellectual calling? So the pharmacist, whom no one forced to enter upon a trade-science, stands aloof from those whose thirst for mental culture is directed mainly by inclination. The artisan goes home, and in his after-hours repairs to South Kensington, where he learns to draw or model; the London workmen crowd to hear art-lectures; and the Strand shopmen frequent the admirable evening classes at King's College. But he, compelled by stress of circumstances to have a streak of science in his composition, thinks *that* an evil sufficient for its day. Another examination, and not compulsory! *Miserere!* Alps on Alps! And the half-open gates of knowledge creak back upon their hinges.

The subject has always appeared to us in as practical a manner as the Board of Examiners could desire. Hard it is to grapple with the minutiæ of botanical research; to learn about roots and stems, about cells and tissues, and Professor Bentley best knows what. Then succeeds the keen delight which Nature never yet refused to the diligent student of her mysteries. Hard it is to stumble over the rough stones of materia medica; but there are men amongst us who find their chief happiness in its pursuit. Hard it is, and difficult beyond measure, to master the preliminary details on which chemistry is built; but, patience! there will come a time when the sense of power will alone be a sufficient compensation. And though it may be very nice to see that the acquirement of this higher standard is only an equation on the right side of which is money—that from our ranks the public analyst will be selected—that to us chemists and druggists the farmer will intrust his phosphates, the dyer submit his chlorides, and the manufacturer the salts which concern his industry—we back our appeal in favour of the Major Examination on the personal satisfaction which passing it will bestow. We cannot bear to think that those who must earn a livelihood behind a druggist's counter should go through so large an amount of preparation, and not let their studies issue in their full legitimate results. We want our members to take up their right position—to become the friend of the physician, his aid and fit companion—to be abreast of the intellectual culture of the world—to be accepted in the social circle on equal and honourable terms, and to let their sons feel some ambition to follow in their steps. Quite as much we wish them to be prosperous in their affairs—to have a bright pharmacy, a good family connexion, and customers without stint. The New Regulations will not be found futile if accepted in their entirety; for there is no surer guarantee for ultimate success than that our pharmacists should be thoroughly well-grounded and practical business men.

THE COMMENCEMENT OF A NEW SESSION IN BLOOMSBURY SQUARE.

It will be seen from the official notices that the sessional work of the Pharmaceutical Society commences on Wednesday next, the 7th of October, when the first of the evening meetings will be held, at which, after the distribution of the sessional prizes and certificates to the students who successfully competed for them in the last session of the Society's school, Mr. R. W. Giles, of Clifton, will deliver an address to the students, and especially to those who are now entering the school. The Lectures and Laboratory instruction will, in fact, have commenced before the evening meeting takes place. The practical class under Professor Attfield will have met on Thursday, the 1st of October; Professor Bentley's class on Friday, the 2nd, and Professor Redwood's will meet on Monday, the 5th of October. The examinations, of which official notice is elsewhere given, will soon follow, and the Society's House in Bloomsbury Square, after the thorough cleaning and decoration it has received during the recess, will in a few days resume its accustomed activity.

OPIUM IN AMERICAN PROPRIETARY PREPARATIONS.

In a recent number of the *American Chemist*, Mr. S. Dana Hayes, State Assayer for Massachusetts, refers to the increasing use in the United States of opium and morphia in cough mixtures, tooth-washes, lotions, liniments, and other proprietary medicines. He states that some analyses made recently showed that the quantity of morphia present in several medicines intended for internal use varied from $\frac{1}{4}$ of a grain to $1\frac{1}{2}$ grains in the doses ordered in the printed directions accompanying them. One nostrum, a "sure cure for the opium habit," was found to be a clear solution of sulphate of morphia coloured pink by aniline red and sweetened with sugar. Of this a dose containing nearly two grains of sulphate of morphia was directed to be taken three times a day, by a patient suffering severely from depression. A "brandy," sold by a dealer in "medicines" in the country, contained morphia equal to $2\frac{1}{2}$ grains of opium in four fluid ounces; a tooth-wash contained nearly $\frac{4}{10}$ of a grain of morphia in each fluid ounce; and a cough mixture contained more than $\frac{3}{10}$ of a grain in the dose ordered for a child.

IMITATION OF TRADE-MARKS.

That "all is fair in love and war" is a saying that has long had considerable currency. But this "easy virtue" has not yet been extended to competition in trade, unless, indeed, such competition be only a form of war. In fact, it has been thought necessary in many countries that a law should be enacted, having for its special object the prevention of one form of unfair competition,—the imitation of trade-marks. Two complaints of breach of such a law, by the imitation of labels, etc., used for popular proprietary medicines, have recently been heard in France, and in another part of this Journal will be found the report of a prosecution in this country for an alleged similar offence.

In Paris, the success with which M. Lebeault, a pharmacien, has for some years carried on the manufacture and sale of an article under the name of "Vin de Bugeaud," appears to have roused the cupidity of two other persons named Caut and Subert, who associated themselves with a pharmacien named Bourgeaud to bring out a similar article under the name of "Vin de Bourgeaud." More than this, they appear to have sought to add to the confusion caused by the similarity of names by the adoption of similar bottles, labels, and wrappers. M. Lebeault appealed to the tribunals, and, as the result of the trial and two appeals, obtained a decision that his opponents should always insert Bourgeaud's Christian name before the surname, wherever it occurred, on bottle, label, or handbill; also, that they should pay him 3000 francs as damages.

The second French case was very similar. The complainant was a Dr. Felix Dehaut, who has introduced an article under the name of "Pilules purgatives Dehaut." A M. Denaut, in conjunction with a M. Hugo, pharmacien, brought out "Pilules purgatives Denaut," imitating the labels, etc., of M. Dehaut very closely. This the Court decided to be a fraudulent imitation of the trade-mark which would be likely to deceive the public, and it ordered the confiscation of the stock seized and the payment of 2000 francs as damages.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

September 22nd, 23rd, 24th, 25th, and 28th, 1874.

Present—Messrs. Ainslie, Buchanan, Gilmour, Kinninmont, Noble, Tait, and Young.

MINOR EXAMINATION.

Seventy-five candidates presented themselves for this examination. *Forty-seven* failed. The following *twenty-eight* passed, and were declared qualified to be registered as Chemists and Druggists :—

	Name	Town
	*Couper, Charles James	Edinburgh.
	*Webb, Frederick Brooks	Birmingham.
	Wylie, David Neil	Edinburgh.
	Hindes, James	Edinburgh.
	Presslie, Robert Dowell	Aberdeen.
Equal.	Dawson, George Alan	Hanley.
Equal.	Roebuck, Alfred	Manchester.
	Gardner, Robert	Kelso.
	Forgie, William	Falkirk.
Equal.	Gilbert, William	London.
Equal.	Nottingham, Thomas	Streatham.
	Plant, Frank George Lawrence	Ashton-under-Lyne.
	Hamilton, Robert	York Town.
	Forrest, John Kerr	Edinburgh.
	Moore, Joshua	Preston.
Equal.	Challinor, Samuel McMillan	Bolton.
Equal.	Horton, James Alfred	Aberdeen.
Equal.	Alldridge, William Edward	Birmingham.
Equal.	Fenton, Thomas	Edinburgh.
Equal.	Louden, William T.	Dumfermline.
Equal.	Robinson, Edward	Birmingham.
	Storie, Robert	Edinburgh.
Equal.	Haworth, Hezekiah	Blackburn.
Equal.	Watt, George Adam	Hartlepool.
	Heynes, William Henry	Woodstock.
	Broomhead, George Emmet	Aberdeen.
	Heald, Samuel Haldine	Wakefield.
	Fingland, James	Thornhill.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Four candidates presented themselves for this examination. *All* passed, and were declared qualified to be registered as Chemists and Druggists :—

Lateward, John Richard	Rugeley.
Macfarlane, James	Glasgow.
Roberts, Owen	Liverpool.
Sutherland, Daniel	Upper Clapton.

* Passed with Honours.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING JUNE, JULY, AUGUST, AND SEPTEMBER, 1874.

LONDON.

	£	*s.*	*d.*
A Friend, Pimlico, S.W.	1	1	0
Bell, William H., 96, Albany Street, N.W.	0	10	6
Bigg, Thomas, Great Dover Street, S.E.	1	1	0
Brookes, Samuel, 62, Lisson Grove, N.W.	1	1	0
Brown, A. J., 55, Trafalgar Road, Greenwich, S.E.	0	10	6
Burgoyne, Burbidges, and Co., 16, Coleman Street, E.C.	2	2	0
Chapman, S. S., South Hackney, E.	0	5	0
Chard, F. J., 39, Warwick Street, Pimlico, S.W.	0	10	6
Churchill, J. and A., 11, New Burlington Street, W.	1	1	0
Coles, John William, 197, Camberwell New Road, S.E.	0	10	6
Cornelius, James, 73, Camden Road, N.W.	0	10	6
Darby and Gosden, 149, Leadenhall Street, E.C.	2	2	0
Davenport, Horace, 33, Great Russell Street, W.C.	1	1	0
Davy, Yates, and Routledge, 64, Park Street, S.E.	2	2	0
Epps, James, 48, Threadneedle Street, E.C.	1	1	0
Fallowfield, J., 36, Lower Marsh, Lambeth, S.E.	1	1	0
Field, James J., 22, Upper Gifford Street, N.	1	1	0
Fox, William, 109, Bethnal Green Road, E.	1	1	0
Gething, W. B., 75, Fleet Street, E.C.	1	1	0
Herriags and Co., 40, Aldersgate Street, E.C.	2	2	0
Hickman, William, Archer Street, Kensington Park, W.	0	10	6
Hodgkinson, Stead, and Treacher, 127, Aldersgate Street, E.C.	2	2	0
Marshall, C. E., 67, Bedford Street, Mile End, E.	£0	5	0
Maw, Charles, 11, Aldersgate Street, E.C.	1	1	0
Maw, Son, and Thompson, 11, Aldersgate Street, E.C.	2	2	0
Newzam, H. S., 40, Theberton Street, N.	0	10	6
Parkinson and Son, Southampton Row, W.C.	1	1	0
Piddock, John W., 11, Bridge Terrace, Harrow Road, W.	0	10	6
Powell, Thomas H., 7, Poultry, E.C.	0	10	0
Prichard, Edward, 10, Vigo Street, W.	1	1	0
Thompson, John, 11, Aldersgate Street, E.C.	1	1	0
Warner, Charles H., 55, Fore Street, E.C.	1	1	0
Warner, Richard, 20, Charterhouse Square, E.C.	1	1	0
Whitburn, A. R., 174, Regent Street, W.	0	10	6
Wilkinson, B. J., 1, Middleton Road, Kingsland, E.	0	12	6
Williams, Richard, 2, Gresham Place, Cold Harbour Lane, Brixton, S.W.	1	1	0
Wilkon, A., West London Hospital, Hammersmith, W.	0	5	0

COUNTRY.

	£	*s.*	*d.*
Addingham, Spencer, Thomas	0	5	0
Alford, Shaw, Charles J.	0	10	6
Arbroath, Burn, David H.	0	5	0
Balham, Smith, P. J.	0	10	6
Banbury, Falkner, Richard	0	10	6
Barton-on-Humber, Ingoldby, William	0	2	6
Bedwyn, Great, Gerard, G. R.	0	10	6
Bingley, Skirrow, W. E.	0	5	0
Birmingham, Mantell, Charles	0	10	6
,, Palmer, C. F.	0	10	6
,, Robinson, Eardley	0	10	6
,, Snape, Edward	0	10	6
Blackheath, Miller, C. B.	0	10	6
Bourne, Maude, Major	1	1	0
Bradford, Richardson, Edward	0	10	6
,, Watts, John	0	10	0
Brampton, Younger, Jane	0	5	0
Brill, Tottenham, Mary A.	0	5	0
Bristol, Kear, H. F.	0	10	6
,, Trooke, R. J. (Clifton)	0	10	6
Brompton (New), King, T. S.	0	10	6
,, King, W. S.	0	10	6
Cambridge, Pearse, John	0	5	0
Cheltenham, Butcher, Thomas	2	2	0
,, Walters, J. R.	0	10	6
Chester, Grindley, William	0	10	0
Chester-le-Street, Longbotham, Joseph	0	2	6
Congleton, Baxendale, P. O.	1	1	0
Crewe, Bayley, W.	0	10	6
Cromarty, Johnstone, Walter	0	3	0
Croston, Hackforth, Matthew	0	5	0
Dewsbury, Fox, George	0	10	6
Dorchester, How, W.	0	10	6
Dorking, Clark, W. W.	0	10	6
Edinburgh, Tait, William	1	1	0
Exeter, Delves, George	0	10	6
Frodsham, Harvey, S.	0	5	0
Gamrie, Stephen, James	0	2	6
Halesowen, Harrop, W. H.	0	5	0
Halifax, Blade, Edward	0	5	0
,, Farr, James	1	0	0
,, Hebden, W. C.	0	10	6
,, Kershaw, J. H.	0	5	0
,, Shaw, Benjamin	0	5	0
Harpenden, Busby, James	0	10	0
Heage, Bates, George	0	10	6
Hunstanton, Twiss, W.	0	10	6
Irvine, Gillespie, James	0	5	0
Keighley, Sheldrake, G.	0	5	0
Kelsey (North), Dixon, James	0	3	0
Kingston-on-Thames, Whaley, Edward	0	10	6
Lewisham, Groves, Henry Francis	2	2	0
Leyland, Hackforth, Frederick	0	10	6
Liverpool, Parry, William	0	5	0
,, Raimes and Co.	1	1	0
,, Taylor, Charles	0	10	6
,, Thompson and Capper	1	1	0
Long Bennington, Bemrose, J.	0	10	6
Louth, Simpson, H. D.	0	10	6
Lowestoft, Hall, Thomas	0	10	6
Manchester, Beard, James	1	1	0
,, Casey, E.	0	2	6
,, West, Thomas	0	5	0
Mansfield, Oldham, John	0	10	2
,, Patterson, Douglas J.	0	5	0
Minchinhampton, Simpkins, John	0	10	6
Mirfield, Crook, Charles	0	5	0
Norwood (Upper), Birch, H. C.	1	1	0
Nottingham, Truman, Henry V.	1	1	0
Oldbury, Briggs, George	0	10	6
Oldham, Bates, Henry	0	10	6
,, Braddock, George	1	1	0
,, Braddock, James	0	5	0
,, Brelsford, James	0	10	6
,, Eckersley, James	0	5	0
,, Geddes, William	0	5	0
,, Goodall, F.	0	10	6
,, Haslop, William	0	5	0
,, Hulme, John	0	10	6
,, Lord, Robert B.	0	5	0

Oldham, Myott, William	£0	5	0
,, Parkinson, William	0	10	6
,, Rigley, William	0	10	6
,, Shepherd, James	0	10	6
,, Wharton, Frederic	0	10	6
,, Wild, William	0	5	0
Pontardulais, Hinds, Howell D.	0	5	0
Portsea, Spear, George	0	5	0
Rochdale, Bamford, J. W.	0	5	0
St. Clear's, Williams, Evan	0	10	6
St. Leonard's-on-Sea, Maggs, S. B.	0	10	6
Saffron Walden, Machon, Henry	0	10	6
Sedgley, Thompson, John W.	0	10	6
Shaw, Platt, J. W.	0	5	0
,, Wall, H.	0	5	0
,, Whitaker, E. H.	0	5	0
Sheffield, Learoyd, E. R.	0	5	0
Sunbury, Leare, James	0	5	0
Staines, Executors of the late E. G. Jones	0	5	0
Stockport, Royse, Robert	0	10	6
Stowmarket, Simpson and Son	0	5	0
Swaffham, Gardner, John	1	1	0
Sydney, N. S. W., Hughes, James	2	2	0
Tweedmouth, McIntyre, P. S.	0	5	0
Uppingham, Hope, William	0	10	6
Wandsworth (New), Crosby, James	0	10	6
Wellingboro', Thorne, John	0	10	6
Welwyn, Lawrance, Edmund	0	11	0
West Bromwich, Burch, William	0	10	6
Whitehaven, Wilson and Kitchin	1	1	0
Wisbeach, Bradley, William	1	1	0
Wolverhampton, "S. T."	0	5	0
Yarmouth, Great, Walpole, W.	0	10	6
Yaxley, Thomas, S. C.	1	1	0

Donations.

LONDON.

Kingsford, Frederick, 54, Piccadilly	2	10	0

COUNTRY.

Edinburgh, Tait, William	2	2	0
Ipswich, Sharp, Benjamin	5	5	0
Liverpool, Edisbury, John	1	1	0
Northampton, Superintendent's fee—Preliminary Examination	1	1	0
Reading, Bailey, J. B.	5	5	0
Settle, Procter, William	0	10	6

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The opening meeting of the session was held on September 25th, 1874, the chair being taken by the President, Mr. C. Hester, who expressed his great pleasure at presiding over such a largely attended meeting.

Mr. G. C. Druce, Secretary, read the following report of the Council for the past session:—

Report.

"The Council, in presenting the fourth report of the Northampton Pharmaceutical Association, has great pleasure in still being able to draw attention to its flourishing condition. Classes in Botany, Materia Medica, Practical and Theoretical Chemistry, and Pharmacy have been conducted during the winter session, but the attendance in the early part of the year, owing to the numerous removals, did not reach the high average of former years.

"Since last session, four members have passed the Preliminary, three the Minor, and one the Major examination, the latter being first in honours.

"During the year several special meetings have been held, at which the following papers were read:—On 'Iron,' by Mr. H. J. Masters; 'The Chemistry of Sugar and Starch,' Mr. O. Wallis; 'Indigenous Botany,' Mr. G. C. Druce; 'Source of Vegetable Matter,' Mr. H. Kemp; 'Pyroxylin,' Mr. W. J. Campling; 'Yeast, Caoutchouc, and Specific Gravity,' Mr. W. Stott.

"The botanical ramble through Brickhill Woods to Woburn Abbey was an extremely pleasant break in the routine of class work; the number of specimens obtained, the picturesque character of the scenery, and the collection of works of art in the Abbey combined to render the excursion in every way successful.

"The Council thanks Mr. Jeyes for the use of the room, the Pharmaceutical Society for the Journal and Calendar, the class conductors for their services, and other friends who have so frequently rendered aid.

"The balance-sheet will show a good sum in hand, and that the expenses of the Association have been again defrayed by the members' subscriptions.

"At the commencement of the Association a loan of £10 was granted by the parent society for the purchase of books and apparatus; that loan this year has to be returned if the condition of the Association is not satisfactory. Hence a further incentive, if any were needed, for strong individual exertion to be made in order to increase and extend its scope of usefulness.

"The new regulations for the Minor examination throw greater responsibility upon the class conductors, which, however, may be much lightened by punctual attendance and strict attention during class time.

"The Council wishes to purchase apparatus for volumetric testing, so as to be able to furnish instruction in volumetric analysis in a class which might also include elementary physics. The library also requires considerably enlarging.

"It is no little satisfaction to the Council to be able to say that ALL the assistants and apprentices in Northampton have joined the Association."

The report was adopted with much applause.

Mr. C. Hester then read the following—

Presidential Address.

Gentlemen,—Called by your suffrages to occupy the presidential chair for the ensuing session, I thank you for the compliment, and for the confidence thus placed in me. I undertake the office more from a sense of duty, and a desire to further the interests of our Association, rather than from any fitness or capability I feel in myself for the position you have assigned me. It will be my desire to render you my best services at all times; and with your co-operation endeavour to promote our mutual advance in pharmaceutical knowledge. You must bear in mind, it is not so much from the chair as from your own individual laborious application to study, at all fitting times and opportunities, coupled with the matured information obtained at no small amount of toil and assiduity, which I am sure our class preceptors will bring to bear upon the subjects in their several departments before they come before you, that we must look and expect to see the fruits of the session in a goodly array of members being duly qualified to pass, with credit to themselves and our Association, the pharmaceutical examinations. As in former years, the Society may be congratulated that we have upon the Council, and as class preceptors, the names of gentlemen who by former services which they have rendered to the Association have proved that they have both the power and the ability to make the Association a great success. I find since the foundation of the Society 67 members have been enrolled amongst us, 1 (with honours) has passed the Major, 10 (2 in honours) have passed the Minor, and 10 the Preliminary. I am very pleased to see present in our midst this evening our late and esteemed President, Mr. Masters, who, if he were still residing in our town, I should prefer to see occupying the position I do just now. I take it that his presence here to-night augurs that he still feels a lively interest in the welfare of our Association, although removed to a distance from us. It would be very unbecoming of me in his presence, as well as distasteful to him, were I to pass an eulogium upon him for his past services, and the ability with which he conducted the business connected with the Society; suffice it to say, that he was one of the first founders of the Society, and for two-thirds of its existence has occupied the position of President, with business tact, courtesy, and magnanimity to all. No word of comment is required from me respecting our indefatigable Secretary, Mr. Druce; his arduous and unremitting exertions for the benefit of the Association are equally known to all of us. I am glad, however, that we have secured his valuable services for another year. My business engagements, I fear, will preclude me from being with you as frequent as I should wish to be; then the duties will devolve upon the Vice-President, Mr. Osborne, who will discharge the duty equally as well, if not much better than myself. For the gentlemen who have so kindly undertaken to prepare subjects for the classes, at such pains and sacrifices of time and pleasure, which their paucity of leisure must of necessity put upon them—I refer to Messrs. Wallis, Druce, Osborne, and Princeps—I ask that you will show your appreciation of their services by being punctual in your attendance at their respective classes, and not letting any small matter prevent your being here as often as possible. If anybody wishes to distinguish himself in any walk of life he must be prepared to make many sacrifices, but don't let the thought of it deter you from aspiring to something great, good, and noble.

> "In the bivouac of life
> Be not like dumb, driven cattle;
> Be a hero in the strife."

Mr. Hester then asked the Secretary to read the financial statement.

Before doing so, Mr. Druce thanked the members for again so unanimously electing him Secretary, and said they would perhaps excuse him for a moment dwelling upon the course of the Association. Begun as it was, with much fear as to its success, the number of possible members being so small and that number disunited, it was felt to be a very risky venture. Many prophecies were made as to the fate of such an attempt, mostly of a gloomy character; some predicted it would end in smoke or smoking, others that its time would be occupied in gossip or in politico-religious controversy. Fortunately, those predictions had been completely falsified, and at the end of three years they could look with complaisant satisfaction at its course. Taken up as it was eagerly by the assistants and apprentices, with aid given as soon as asked from the principals, with a grant from the Pharmaceutical Society, rendered doubly welcome by the kind remarks accompanying it, and with words of advice, warning, and encouragement made personally by Dr. Attfield, an impetus was given to the Association the motive force of which had not yet been expended. The classes had been well attended, the special meetings had been frequent, and the general knowledge of the members would not discredit any association. As the President had noticed, they could show results from their study in a large proportion of qualified members. The continual migration of members of course sapped their strength, but though no longer with them, they did not pass into complete oblivion here, nor was the Association unremembered by them, for some frequently, by correspondence, by sending a prescription of undecipherable caligraphy, by forwarding some strange plant, or compiling a paper, evinced a remembrance as kindly as welcome. With regard to the coming session, Mr. Druce continued, there was little doubt that that could also be made successful. They started with an unprecedented number of members, with energetic class takers, with a good President, with, as they had seen, an ex-President taking great interest in their proceedings, and always ready to come over and help them, and with a strong desire on the part of the members—rendered stronger by the new regulations—to pass not only the Minor examination, but also to obtain a practical knowledge of all the branches of their curriculum. Might the Council ask the members for their assistance during the session in making good classes, and to render all the help they could to their Association? If they did they would make still greater progress, and earn deservedly still kinder praise.

Financial Statement.

Receipts.

	£	s.	d.
Balance	4	18	0
Eighteen Subscriptions	4	10	0
Chemistry Fees	0	8	0
Corresponding Member	0	2	6
Waste Paper	0	0	4
Interest	0	2	0
	£10	0	10

Expenditure.

	£	s.	d.
Books	2	3	9
Stationery, etc.	1	16	0
Gas and Chemicals, etc.	1	1	4
Balance	4	19	9
	£10	0	10

Audited and found correct,

Owen Wallis, J. D. Willis, } Auditors.

Mr. H. J. Masters said it was a pleasure to him to be present that evening, and he much regretted the circumstance of not being still able to be a real member of their Association. He noticed with pleasure the new regulations for conducting the Minor Examination, as he was quite sure they were needed, and would prove conducive to the professional interest of their trade. They made it absolutely a necessity for the members to study their work and perform it practically, and for that practical knowledge the Association's classes would prove of the greatest assistance. Of course it would entail some expense to purchase the apparatus, but he believed the principals in the town would be very willing to become honorary members, and, if so, the money obtained would be of very great service. He was pleased with the financial state of the Association, and considered the fact of their being for two years self-supporting very creditable indeed. Having alluded to the pleasures of the ramble, and expressed a hope that the next might be near Bedford, Mr. Masters concluded a capital address by wishing them every success.

Mr. Shepherd trusted that the members would not overlook the advantages of the Latin tongue.

The vote of thanks to the President was then passed.

Mr. Hester, in responding, thanked the members for their attention, and for appearing in such numbers despite political excitement, this being the largest meeting he ever had noticed in their room. He also was much obliged to Mr. Wallis for taking the Prescription Class, and trusted that and all the other classes would be numerously attended.

Parliamentary and Law Proceedings.

Supposed Improper Use of a Medicine.

An adjourned inquest was held at Dundonald, on Thursday, September 17, to inquire into the circumstances attending the death of Mr. William M'Kee (of the firm of Bryce & M'Kee, seedsmen, Belfast), at his residence, Ballymiscaw, on the 9th September.

The Coroner briefly recapitulated the evidence that had been given on the 11th ult., from which he said it appeared from the testimony of the widow of the deceased that on Sunday, the 6th of last month, he complained of being unwell. He shivered and vomited. On Monday he did not go into Belfast at his usual hour, but dined at one, and went to town at two o'clock. He returned about five, and informed her (witness) that he had been to Dr. O'Hare's medical establishment in Belfast, where he had got a dose of medicine that did him good. He brought a bottle home with him, which he stated he had got at the same place, and which he was to take at three doses—one as soon as he came home, another at bedtime, and a third at six on the following morning. He took the two first doses at the time specified, but felt so well the next morning that he did not take the third, but proceeded to Belfast at eight o'clock in the morning. He returned at two, and said that he had been at the same medical establishment, and got another dose that did him good. He was then sickly-looking, and complained of being ill. He brought a second bottle with him on that day, which he stated he had got at the same place, and was also to take three doses. He got his dinner, and ate heartily. He afterwards took a dose of the medicine, and went out to look after the cattle. In about five minutes he returned and went to bed, and did not complain of being unwell. At five o'clock he asked for tea, but was unable to take it when ready, and again vomited. He afterwards asked for some stirabout, and when given to him he only took a little. At nine o'clock he took another dose out of the bottle, and said it soothed him, and that he felt sleepy. She (witness) then went to bed, and both of them fell asleep. About ten o'clock she was awoke by the deceased coughing, when he said that he had a tickling sensation in his throat, and that his throat was sore. She put some flannel on it, and then returned to bed, when they both fell asleep again. Shortly after eleven o'clock she was awoke by deceased breathing heavily, and then sent for Dr. M'Meekin, of Mountpottinger, the family physician. Dr. M'Meekin was next examined, and deposed that he arrived at deceased's residence about twelve o'clock, and found him breathing slowly and heavily. His face was livid, his pupils enlarged, and he was altogether in a comatose state. He at once suspected poison, and sent to Belfast for Dr. Smyth, of Clarence Place, with instructions to come at once and bring the stomach-pump with him. In the meantime he used every remedy he could possibly think of, but without avail. Dr. Smyth arrived at three o'clock, and they pumped the contents of the stomach, and preserved the same. They remained with him for five hours, but could not succeed in awakening him. He died at five o'clock the same evening. There was no label on either of the bottles, nor any direction as to how the contents were to be taken. Dr. Murney was the next witness. He said he made a *post-mortem* examination. The body was that of a healthy person in the prime of life. There were no marks of violence on it. On examining the brain he found it perfectly healthy, and discovered nothing to account for death. He also examined the chest and abdomen, and found all the organs healthy, and no cause for death. He removed the stomach, and sealed it up in a jar, and handed it to Dr. M'Meekin. A narcotic poison would not leave any trace of irritation behind. Under these circumstances, he (the Coroner) had adjourned the inquiry till that day, in order that Dr. Hodges might submit the result of his analysis of the stomach and the contents of the bottle to the jury; also, that Dr. O'Hare might be present, and that other evidence might be taken.

Sub-Inspector Robertson said Dr. Hodges had not arrived, and no communication had been received from him.

Constable Alexander Fisher was examined by the Coroner, and deposed that he was stationed at Sydenham. On Saturday, the 12th ult., he received from Dr. M'Meekin two sealed bottles and a sealed jar. These bottles and the jar he delivered to Dr. Hodges, in Belfast, on Saturday, the 19th ult.

Dr. O'Hare said he would be much obliged to the Coroner if he would take his evidence now before he called another witness. There was a member of his family lying ill, and he wished to get home as soon as possible.

The Coroner did not think there could be any objection to taking Dr. O'Hare's evidence now.

Dr. O'Hare was then sworn, and examined: My name is Owen Patrick O'Hare.

The Coroner: It is right for me, Dr. O'Hare, before you give your evidence, to tell you that it has been stated that the last medicine the deceased received was prescribed by you.

Dr. O'Hare: I am aware of that.

The Coroner: My duty is to tell you that you are not bound to say anything that may criminate yourself, and anything you may say will be taken down in evidence, and may be used against you hereafter.

Dr. O'Hare: I am aware of my position, and have come here to tell the truth.

Dr. O'Hare (to the Coroner): I am a duly qualified medical practitioner, and a Bachelor of Arts in Trinity College, Dublin. I am a licentiate apothecary, and a licentiate of midwifery. My establishment is at No. 86, Castle Street, Belfast.

Did you know the deceased William M'Kee?—I did, for the last fifteen years. I have been his medical adviser for that length of time.

Have you attended him lately?—My last attendance dates from the 5th June last. I attended him from that time until his death, with the exception of an interval of some weeks. The witness here wished to give in evidence his attendance on the deceased in years prior to the present, but

The Coroner said all they had to do with was the deceased's last illness, and Dr. O'Hare might confine himself to that.

Dr. O'Hare said that in order to explain matters to the jury he would have to go back some years.

The Coroner said that if such an explanation became necessary it could be given at the end of the evidence as to the last illness.

Dr. O'Hare (to the Coroner): The last complaint I attended him for was inflammation of the urinary organs, and acute inflammation of the kidneys, consequent thereon.

You prescribed medicine for him?—I did. The last medicine I gave him was on Friday, the 4th September, about nine o'clock in the morning. On that occasion I gave him two bottles, one to be externally used, and the other internally. They were marked "double strength," in my own handwriting.

Was there anything else on the label?—Yes, "To be taken as before."

Was your name and address on the label?—No. Being the graduate of a certain university that is not necessary on my part. The labels on the bottles were the same as I put on those for other members of his own family.

Did you give him any directions when you gave him the bottles?—Yes.

What directions?—I must give a word of explanation. On that Friday morning before giving the medicine I had an interview with Mr. M'Kee. I explained to him how the bottles were to be taken, and I remarked at the same time that he would require no more. I told him how the one was to be taken and the other used, and that the dose that I prescribed was to be taken three times a day—the dose consisting of a teaspoonful mixed with water. I remarked at the same time that it was double strength, and taken as I directed would prevent a recurrence of the symptoms. On Monday, the 7th Sept., the deceased called on me again. I may add that he called upon me a second time on the 4th ult., about five o'clock in the evening, but that was in reference to the payment of my account. On the 7th, when he came into my establishment, I explained to him the necessity of keeping in his own house. He said he was well, and that he required no more medicine. The dose I last gave him would have sufficed for at least eight days, and I told him he must remain in his house for at least a week.

What was in the two last bottles you supplied to the deceased?—In the first, for external use—Goulard's solution, 4 drachms; water, 7 ozs.; and they were to be mixed and used as directed. In the second, for internal use—infusion of quassia, 2 drachms; infusion of gentian, 1 drachm; liquor potassæ, 3 drachms; solution of morphia, ½ drachm; water, 6½ ozs. After giving him these bottles, I also told him to take a dose of purgative medicine when going to bed that night.

Did you not think it necessary, when giving these medicines containing poisons, to label them according to the Act of Parliament?—That is only required in the case of a druggist.

The Coroner read the sections of the Act of Parliament as to the retail of poisons, and said the law applied to medical men as well as to other vendors, and the penalty for not marking "poison" on a vessel containing poison was £5 for the first offence, and £10 for any subsequent offence.

Dr. O'Hare explained that these bottles did not contain sufficient to cause a person's death.

The Coroner: Morphia is a poison.

Dr. O'Hare: But the half drachm in the bottle would not cause death. I don't retail poisons out of my establishment. Any I use is in my own prescriptions.

The Coroner: In sending out poison in any quantity the Act of Parliament requires that it shall be labelled.

Dr. O'Hare: I put my usual label upon the bottles, and gave my directions as to their use.

The Coroner: Supposing he had taken one of these bottles that you gave him on Friday at three doses, would that have been according to your directions?—No; but if he had taken the bottle for internal use at one dose, it would not have done him a bit of harm.

If he had taken the bottle for external use at one dose, what would be the result?—If he drank it, the result would be serious.

If he took it at three doses, would it be serious?—I don't believe it would. If taken at once it might produce paralysis or lead poisoning.

On Monday, the 7th, did you see the deceased?—Yes. At a few minutes before nine o'clock he came into my place with a leather bag, with a large bottle in it, which he said a member of his family wanted renewed. When he came in I remonstrated with him for being out of his house. He told me he was so ill on Saturday and Sunday that his wife was going to send for a doctor. He did not give that as a reason why he called on me that morning, but that he had to come to town on business. He came back about half-past twelve o'clock the same day, and agreed to pay his account on a certain day.

What was the sum he was to pay?—£10.

Was that for attendance from June?—No, for a later period. On the 8th he called for the bottle which he had left on the previous day. He told me then that he was quite well, and never felt better. He alleged that I was keeping him from his business by being over-careful of him. He took away the bottle of medicine which I had prepared, according to his instructions, for a member of his family. It was a quart bottle he took away. The two bottles he got from me on the 4th ult. contained eight ounces each.

To the Jury—The two bottles contained simple medicine. There was nothing accompanying them.

A Juror: Are the bottles here?

The Coroner: They are with Dr. Hodges.

Juror: There is a possibility that something may have been put into the bottles since they left Dr. O'Hare's place; and I think he should have an opportunity of seeing them.

Dr. O'Hare: I think that is a very just remark, and I am thankful for the juror making it. It would be only justice to me to see the bottles, and ascertain if the contents are as I made them up. I will stand by my own bottles.

The Coroner said that the bottles had been given over to Dr. Hodges, and unfortunately he was not present. (To Dr. O'Hare)—On Monday and Tuesday what appearance did the deceased present?—He was morally downcast. He said his wife should know the nature of the malady he was suffering under. He showed signs of shivering. Goulard's solution is a preparation of diacetate of lead. Dr. Goulard himself was the originator of it. It is poisonous, as all preparations of lead are. There was not sufficient poison in the preparation to cause death. It might cause paralysis. Liquor potassæ is caustic potash.

To Sub-Inspector Robertson—The reason I recommended him to keep his house was in consequence of the inflammation of the kidneys, but not on account of the medicine I had given him.

When the examination had concluded,

Dr. O'Hare asked was he to get a fee.

The Coroner said he had not examined Dr. O'Hare to give medical evidence as to the cause of death, but as the witness who had prescribed the medicine which the deceased had taken.

Dr. O'Hare said he might have used his prerogative, and not attended; but when he received the invitation to attend, and had done so, he thought he was entitled to his fee. He considered he had given medical evidence, and that he was entitled to his fee.

The Coroner believed he could not allow the fee under such circumstances.

Dr. O'Hare hoped the Coroner would not take it ill if he looked for the recovery of his fee in another place.

The Coroner said he would not.

Dr. O'Hare was about to leave, when one of the jurors said he thought the doctor, for his own sake, ought to remain and hear the remainder of the evidence.

Dr. O'Hare: Let me look after my own interest.

Juror: Suppose the two bottles are brought up?

Dr. O'Hare: Then you know where to get me.

Dr. O'Hare then left the room.

Mrs. Margaret M'Kee, widow of the deceased, who was examined on the day the inquiry was opened, was recalled, and deposed, in answer to the Coroner, that on the 11th ult. her husband brought home two bottles, which he said he got from Dr. O'Hare. She gave him the doses out of the bottles according to his instructions.

How did these bottles, with the remainder of their contents, leave your house?—Dr. M'Meekin took charge of them.

Was there any label or writing on either of these bottles?—I did not observe any.

Did your husband say anything to you as to how the bottles were to be used—that one was for internal use and one for external use?—He did not. Both bottles appeared to contain the same kind of liquid. I gave him about a third of each bottle at a dose.

Were your husband and you always on the best of terms?—Yes, always. I never had any dispute with him or any members of his family. I did not know he was being attended by Dr. O'Hare. I never was in Dr. O'Hare's place along with him, but I have been twice there alone.

Did your husband ever threaten to commit suicide?—Never. I never suspected it at all. I was not aware he was taking medicine previous to Sunday, the 6th Sept.

To Sub-Inspector Robertson: One of the bottles was a bluish colour, and the other white. I gave him the medicine out of a wine-glass. I asked him whether I should put water in it, and he said no.

The Coroner: During the days he was taking the medicine did you observe any change in him?—Yes, he was sickly-looking and excited like. There was a strange expression in his eyes, and towards the evening he was drowsy.

To Sub-Inspector Robertson: I am certain that on Monday, the 7th, he did not leave home until two o'clock in the daytime.

A Juror: Did you see any account from Dr. O'Hare?—Yes; after his decease. I found a letter from Dr. O'Hare in his pocket, in which he said his account was £10.

To Sub-Inspector Robertson: I gave him medicine out of both the bottles. The blue bottle was larger than the other one. That was the one he brought on the Monday.

A Juror: Were there any other bottles except these two found?—Yes; there were two bottles found in his coat pockets after his death. There appeared to be about one dose taken out of each. They were about three-quarters full. I have these bottles now in my own house. I did not tell the police I had found these bottles.

The Coroner: It is unfortunate you did not tell the police when you found these bottles. Give them to Constable Fisher when he calls for them.

To a Juror: There was a label on each of the bottles. I could not read the writing distinctly, but I could read the words "double strength" upon them.

A Juror : These must be the bottles Dr. O'Hare described.

To the Coroner : My husband did not tell me of these two bottles during his lifetime. I am certain he told me the bottles I gave him the medicine out of were received from Dr. O'Hare. I am certain he took no medicine out of the two bottles I found in his pocket on the Tuesday evening before his death, as I was in his bedroom during the entire time. He would not let me leave him. It was on Saturday, the 12th, the day he was interred, I found the two bottles in his pocket. I told Dr. M'Meekin on a day last week that I had found the two bottles.

The Coroner said it was unfortunate this circumstance had not been made known sooner, as these two bottles might turn out to be of very great importance in this inquiry. (To the witness) : Have you any further information to give the jury touching your husband's death, or any other matter to explain ?

Mrs. M'Kee : There was another bottle found to-day by my servant man. Wm. Kane is the man's name. He found the bottle in one of the out-offices. It was similar to the bottles I found in my husband's pocket, and had a similar label. It was about three-quarters full. Beside it was found a delf jug containing a white lotion and a glass syringe. I was not aware my husband was suffering from any illness. He was depressed and in low spirits for some time, and I did not understand him.

Dr. M'Meekin, who had been previously examined, was recalled, and said that on the 9th Sept. Mrs. M'Kee pointed out to him two bottles on the dressing table. He sealed them up, and gave them in charge to Constable Fisher. He numbered the bottles 1 and 2. No. 2 he put on the bottle deceased got last. He also gave the constable the jar that had been sealed by Dr. Murney.

Did the deceased present the appearance of suffering from disease such as described by Dr. O'Hare ?—No. I saw traces of a lotion having been applied externally. On Wednesday week I visited Mrs. M'Kee at her residence. She showed me two bottles and a glass syringe which had been found in the deceased's pockets. On these bottles there was a label on which he could read the words "double strength—to be taken as before," or words to that effect. I did not have anything to do with the bottles. Perhaps I was wrong in not doing so, but I did not. The bottles were both eight-ounce bottles. The two bottles which I sealed and gave to Constable Fisher to be taken to Dr. Hodges were both four-ounce bottles. The prescriptions described by Dr. O'Hare would require eight-ounce bottles to contain them.

The Coroner said that there was other evidence to be received, and Dr. Hodges had to be examined. He would, therefore, adjourn the inquiry.—*Northern Whig.*

On Monday last the inquest was resumed and some additional evidence was taken ; but the Coroner stated that as he had received a letter from Dr. Hodges saying that the analysis being of so tedious a character it would take several days more to complete it, it would be necessary again to adjourn the inquiry.

Mrs. M'Kee, widow of deceased, again gave evidence, in the course of which she said that since the inquest was adjourned on Friday last her father had found another bottle in the stable. It was only about a quarter full of the same kind of liquid as the bottles contained which were found in her husband's pockets after his death. Since her husband's death she had received a letter from Dr. O'Hare. In it he said something to the effect that it would be useless for him to sympathize with her for the loss of her truly beloved husband. He then requested payment of his account, which he said was £23 odd. This included an old balance of £6. On the Tuesday evening before his death her husband said it must be some very strange medicine he was getting, it was so soothing. He made that remark after he got the last dose. He said he felt a strange feeling which he never felt before. She asked him if he felt any pain, and he said no. When he was in bed for some time he said he felt his skin in its natural state, and that he was not sweating as he usually did.

The inquiry was further adjourned until Monday next.

Poisoning by Oxalic Acid.

Mr. W. Emsley, Leeds Deputy Coroner, has held an inquest on the body of Louisa Esberger, 27, a housemaid in the employment of Mr. Bruce, Leeds stipendiary magistrate, who died very suddenly. As the girl's death could not be accounted for at the first sitting except by the presence of a quantity of black fluid in the stomach which was supposed to contain poison, Dr. Scattergood and Mr. Horsfall, surgeon, were appointed to make an analysis of it, and the inquiry was adjourned. At the adjourned inquest, it appeared from the evidence that, in June last, deceased took into the house one pennyworth of salts of lemon to take stains out of an apron. A sister of the deceased said that when her sister told her that she was unwell, she asked her if she had taken breakfast, to which she replied that she had had nothing to eat that morning. Witness did not think that her sister and the cook agreed very well, as deceased had told her that they often quarrelled. She did not for a moment believe that deceased had wilfully made away with herself, and there was nothing known to her which would lead her to think so. She was a very quiet girl. Another of deceased's sisters gave similar evidence. Dr. Scattergood said that he had made an analysis of the contents of the girl's stomach, and found that the stomach was of a brownish black colour, and partly corroded, as through the action of some corrosive irritant. The stomach contained a quantity of blood, which had been altered by the action of some acid. He found it to contain 11½ grains of oxalic acid. Some of the acid had also been imbibed by the stomach. He had received a pot of jam from the Coroner's officer, which he found to be wholesome raspberry jam. A bottle also given him by the officer, and labelled "Leeds Penny Relish," contained turpentine, ammonia, etc. The acid found in the stomach was capable of producing all the symptoms he had mentioned, and there was nothing else which could have caused death. Oxalic acid is a poison which acts very quickly—sometimes immediately. The longest time he had known it required to take effect (and this was the only instance he knew) was six hours. It was in the highest degree unlikely deceased could have taken the poison on the previous night. The smallest quantity of this poison he had known to act was sixty grains, and of course the quantity found in the stomach of the girl was no measure of what might have been taken, as the vomiting produced by it is so great that there is but a small quantity found afterwards. At the request of the jury the inquiry was further adjourned. At the further adjourned inquest it was shown that the deceased had previously exhibited suicidal tendencies, having twice secreted a rope. The jury returned an open verdict.

A Child Accidentally Poisoned by Carbolic Acid.

Mr. W. Emsley, Leeds Deputy Coroner, has held an inquest on the body of Ellen Thompson, seven years of age, daughter of a moulder, who died suddenly. In August last deceased suffered from scarlet fever, but had become convalescent towards the end of the month; and on the 24th ult. one of the district sanitary inspectors, named Jos. Thornber, called at the house, and told the mother that he had brought some carbolic acid, which she was to sprinkle down the sink when there was any smell in the house. He asked for something in which to put the carbolic acid, and the deceased's mother brought out a champagne bottle. He refused to use it, and she then gave him two medicine bottles, one of which he almost filled with carbolic acid, at the same time telling her that she was to be careful and keep it out of the way of the children. The mother, however, did not recollect having received the caution. She placed the bottle on a shelf. It appears the deceased had been in the habit of taking coltsfoot wine, which was kept in a bottle that happened to be exactly similar to that in which was the carbolic acid, and on Friday last the child reminded her mother that she had had no wine that day, and said that she would get the bottle and take some herself. Deceased was unable to reach the shelf, but a companion unfortunately took down the bottle with the carbolic acid and showed it to Mrs. Thompson, asking if it was the right one. She was told that it was, and immediately poured out an egg-cup full of the contents. The child simply tasted the acid and then began to scream, and the mistake was at once seen. The child became insensible and died the same afternoon. The jury returned a verdict of "Accidental death," and severely censured Thornber for putting the carbolic acid into a medicine bottle, especially as he had not removed the label on the bottle, and put on the label provided for the purpose by the authorities.

POISONING BY MORPHIA SUBSTITUTED FOR PEPSINE.

Mr. Taylor, Coroner, has held an inquest at the Crown Hotel, Batley, on the body of Mr. Robert Shackleton, borough accountant, who had died from poison administered in mistake. Deceased was subject to dyspepsia, and was in the habit of obtaining a pepsine mixture two or three times a week, at the shop of Mr. Parrington, chemist, Batley. He called there on Tuesday week, and ordered a draught. It was mixed for him by a young man, an assistant to Mr. Parrington, named Scatcherd, who by mistake took down from the shelf a bottle containing morphia, instead of one on the shelf below on which the pepsine was kept. Of this drug he used ten grains. Mr. Shackleton drank off the mixture, and went to a meeting of one of the Corporation committees, at the Town Hall; but the mistake being soon afterwards discovered, he was brought away. Two doctors were called to his aid, and everything done for him that skill and science could suggest. The unfortunate man became in a comatose state; but though he seemed to rally a little on Wednesday, he gradually sank, and died on Thursday night. The jury found a verdict of "Death from misadventure."—*Leeds Mercury.*

THE SALE OF SULPHATE OF ZINC.

At the Marylebone Police-court, on Thursday, Sept. 21st, Elizabeth Oxley, aged 17, described as a servant, was charged with attempting to commit suicide, by taking a quantity of sulphate of zinc.

A police-constable said, on Tuesday evening, the father of the prisoner told him that his daughter had taken poison. He found the prisoner lying on the bed in an insensible condition, and a paper on the table which had contained a quantity of sulphate of zinc, and which her mother said the prisoner had taken. The poison had been procured from Mr. Wimbush, chemist, 195, High-street, Camden-town. Witness did not see on the paper that it was labelled poison. He sent for a cab, placed the prisoner in it, and took her to the nearest medical man, who used the stomach-pump. It was more than an hour and a half before she revived, and she was then taken to the Albany-street Police-station, and thence to the St. Pancras Workhouse, where she had been till that morning.

The mother of the prisoner said that prisoner gave her brother, aged twelve years, a penny, and told him to go to the chemist to get some white copperas; and if he could not get that, he was to get some red precipitate powder. Witness asked her what she wanted with the copperas, and she said her eyes were bad and she wanted to bathe them. The boy returned, and whilst witness's back was turned, she took a glass from the mantelshelf, filled it with water, mixed the powder in the water and drank it off. She became insensible, and the policeman was called. She also said the packet had a red label on, with the word "poison," but she burnt it.

The prisoner, in answer to the charge, said she was very sorry, and if she was discharged she would not attempt to destroy herself again.

Mr. D'Eyncourt said chemists had no right to supply children with poison, and he should remand the prisoner to the House of Detention for a week. The police must have the chemist who sold the poison in attendance on the remand.

TRADE MARKS PROSECUTION.

Mr. Herbert Clarke, known as Dr. Clarke, of High Street, Shoreditch, was on Saturday, Sept. 19, charged on a summons before Mr. Bushby, at Worship Street, under the 25th and 26th Vic., cap. 88, with having forged or counterfeited a trade mark of Francis Jonathan Clarke, and with procuring and using the said forged trade mark to a bottle, and selling the same, contrary to the statute. The complainant is a Mr. Clarke, carrying on business at Lincoln, and is the patentee of a medicine largely advertised as "Clarke's World-famed Blood Mixture." The defendant advertises a medicine which is called "Dr. Clarke's Blood Renovator." The defendant, it was stated by Mr. Salamon in his opening address, had for a long time past misled the public by the style and title of his medicine, by copying the complainant's form of advertising, the style of his bottle wrappers, his trade mark, stamp, and signature. In consequence of complaints the complainant sent his agent to the defendant's shop, and he asked for a bottle of "Clarke's Blood Mixture," and received "Clarke's Blood Purifier."—Samples of the bottles were handed to the magistrate, and it was pointed out that the signature of the defendant was written in exactly similar style, the letters being formed alike. The defendant was known as Davis, and had denied being Dr. Clarke.—A witness, who said his name was John Morgan Davis, the name over defendant's shop, said that he was a chemist, now of the same address as the defendant, High Street, Shoreditch. The business which the defendant had carried on was his, and he had taken it over again during the past six weeks. He had sold it to the defendant four years ago, but because he was not able to pay the money for which the business was sold he had resumed possession. The defendant, he said, was Mr. Clarke.—The witness was cross-examined by Mr. Salamon as to the genuineness of the transaction, and whether it was a sham sale or not, but he refused to say what the terms of the sale were, how much he got, or how the money was secured.—Mr. Bushby thought it curious, and said that he could not withdraw the case from a jury. It did not seem to be altogether clear.—The defendant was then fully committed for trial.—*Standard.*

Obituary.

Notice has been received of the death of the following:—

On the 20th September, 1874, Mr. William George Searle, Chemist and Druggist, of Chorlton-on-Medlock. Mr. Searle had been an Associate of the Society since 1869.

On the 28th September, 1874, Mr. William Farrar, Chemist and Druggist, of Hartlepool.

Notes and Queries.

[412.] TINCTURE OF PHYSALIS ALKEKANGI. —*W. H. Furneaux* wishes to be supplied with the formula for preparing tincture of Physalis Alkekangi.

[*$_*$* We believe that such a tincture is sometimes prepared with proof spirit, the strength being that of the majority of B. P. tinctures,—1 in 8.—ED. PH. J.]

[413.] DISPENSING QUERY.—I should be very glad if any correspondent could inform me what the chemical action is which takes place to throw down a copious muddy sediment from the following mixture:—WM. ROBINSON.

℞	Ferri Tart.	ʒiij ℈j.
	Theriacæ	℥v.
	Spt. Rectificat . . .	℥xv.
	Aquæ	Oj.

Misce.

Correspondence.

*** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Cohesion Figures of Liquids.

Sir,—I am glad to see from the last number of your well-conducted Journal that the above subject is exciting some attention among the pharmacists of the United States, and that a scientific lady has condescended to examine these figures and to describe her observations thereon. The superior delicacy of hand possessed by a lady is likely to be of use, as I have known gentlemen to fail for want of this necessary qualification.

I cannot understand, however, how Miss Kate Crane obtained good figures by allowing the drop to fall through a space of four inches before it reached the surface of the water. In my earliest instructions for forming these figures four conditions were insisted on:—(1) Chemically clean water (not necessarily distilled) in a chemically clean vessel. (2) A vessel of a determinate diameter, always the same. In fact, I had a number of shallow glasses made for the purpose, which I named "cohesion figure glasses," three inches in diameter. These were made clean by means of sulphuric acid, and filled to overflowing with tap-water. (3) A glass rod of determinate size, or a pipette of determinate aperture, in order to insure the same sized drop of the same liquid on all occasions. (4) The gentle delivery of the drop to the surface of the water without any fall whatever.

For want of this last precaution, Miss Crane, as I gather from her descriptions, has not always succeeded in producing the best results. But I must tender her my thanks for her testimony to the value of my test, whether as applied to pure oils or to mixtures.

Some of your numerous readers will probably remember that in March, 1864, I had the honour of bringing this subject before the Pharmaceutical Society. My lecture, and an account of some experiments arising out of it (suggested, I believe, by Professor Bentley), were printed, with illustrative figures, in the Journal for March and April, 1864. My late esteemed friend Professor William Allan Miller, of King's College, was present, and joined in the discussion. He took great interest in the subject, and saw most of my early experiments while on a visit at my house, in August, 1861, and he presided during the reading of my first paper before the Chemical Section of the British Association, at Manchester, in that year. These figures have their highest scientific interest in the fact that they have mainly contributed to the establishment, on a firm basis, of the beautiful theory of the surface tension of liquids.

There is one point in connection with this subject on which I am sorry to have to differ from Miss Crane, and that is with respect to the so-called *oleographs*, or self-printed impressions of these figures on paper. About the end of 1868, Dr. Moffatt was so good as to send me upwards of thirty impressions, illustrative of his process. I regretted at that time (as I wrote in the *Chemical News*) that I was not able to report favourably of them as types of these figures, their chief defect being want of distinctive character. Unless the process has greatly improved (and as I gather from Miss Crane's paper it has not) I must be allowed to retain the opinion then given. The thirty-six oleographs forwarded to me by Dr. Moffatt were so much alike that they might fairly pass for variations of one oil. They consisted more or less of a large disk, perforated with holes, arising from the fact that the oil was left too long before an impression was taken. There is a moment in the existence of every film when the characteristic figure is presented, by which the liquid can be recognized and its purity tested. If this characteristic figure could be seized and fixed at the right moment the process would be of value, for we should then have not only figures of great variety and beauty, but types for comparison. I have published a large number of figures in which the characteristics are presented. Some liquids, such as the oils of lavender, turpentine, coriander, etc., have each two or more characteristic phases. In the *Philosophical Magazine* for June, 1867, I gave the three characteristic phases of oil of coriander. Now, no oleograph of this oil would satisfy me that did not represent these three figures. The third figure of this group would print as a perforated disk (as in Dr. Moffatt's oleographs); but this of itself would be of no value at all, for it would distinguish nothing unless associated with the other two phases which distinguish oil of coriander from all other liquids. Oils of the same family present figures with broad features in common, but with essentially different details, as in the case of castor and croton oils; but if these figures be left but a short time on the water, or other surface, all character becomes lost.

C. Tomlinson, F.R.S.

Highgate, N., September 28th, 1874.

Tincture of Acetate of Iron.

Sir,—Mr. Welborn, in his paper in your last issue, appears to attribute the want of stability of Tinct. Ferri Acet. to the presence of nitric acid in the Liq. Ferri Persulphatis. In this I think he is mistaken. The want of stability is owing to the deficiency of acetic acid, caused, in the first place, by the presence of carbonate in the acetate, and, secondly, by the gradual formation of ethyl acetate, and the consequent abstraction of acetyl from the iron, both tending to promote the production of free oxide of iron.

The addition of a little acetic acid to the preparation before its volume is completed would be found to preserve it from deterioration, if the B. P. and the P. A. (Public Analyst) be so elastic as to admit of such an addition.

William H. Darling.

126, *Oxford Street, Manchester,*
September 28th, 1874.

J. J. Harvey.—As the aim of the writer of the letter complained of was evidently not to injure the sale of any particular article, but to warn his fellow-tradesmen against thoughtlessly falling into a practice similar to that which on more than one occasion has led to annoyance and loss, we must again decline to print your personal strictures on his conduct. As soon as you can state, on proper authority, that the article you manufacture may be sold unstamped, we shall be glad to publish the information for the benefit of the readers of this journal.

T. S.—Your note, with enclosure, has been handed to the publisher.

R. G. B.—The regulations, framed in pursuance of the Order in Council of the 4th June, 1870, were printed in the *Pharmaceutical Journal* for April 15, 1870, p. 828.

W. C. Kidd.—The reaction is represented in the old notation.

A. P. S. G. B.—Titles cannot be obtained from the Pharmaceutical Society by payment, neither are we aware of any that can be so obtained from Apothecaries Hall.

"*Omnibus.*"—A stamp would be required.

"*A Country Druggist.*"—We do not know upon what authority you act as the mouthpiece of "country druggists as a class;" but we do know that what you presume to say in their name does not represent the opinion of more than very few, if any, beside yourself.

"*A Country Pharmaceutical Chemist.*"—Such sales are not "illegal," but we think that considerable discretion should be exercised in supplying such articles to children.

"*A Minor.*"—In section 15 of the Pharmacy Act, 1868, it is enacted that any person "who shall take, use, or exhibit the name or title Pharmaceutical Chemist, Pharmaceutist, or Pharmacist, not being a Pharmaceutical Chemist, . . . shall, for every such offence, be liable to pay a penalty or sum of £5."

J. M.—*Red Fire:* nitrate of strontia, 9 parts; shellac, 3 parts; chlorate of potash, 1½ parts. *Blue Fire:* ammonio-sulphate of copper, 8 parts; chlorate of potash, 6 parts; shellac, 1 part. See also vol. i., p. 357, of the present series of this Journal.

G. C.—The least separation will be secured by rubbing the turps with the yolk of eggs, adding the camphor dissolved in the spirit, shaking well, and, lastly, adding the vinegar gradually, continuing the agitation. It appears to be an imitation of Sir John Long's liniment.

C. B. A.—What you state does not occur if the proper kind of gum is used.

Communications, Letters, etc., have been received from Mr. Darling, Messrs. Cantrell, Davison, and Leslie, Mr. Wilkinson, Mr. J. F. Brown, Mr. Piper, Mr. Tichborne, Mr. Dobson, H. S. D., "Nil Desperandum," "Lapis."

Errata.—On p. 260, col. 1 line 2, *for* "i thyophagi" *read* ichthyophagi; line 41, *for* "Charles I." *read* Charles II.

LINIMENT OF BELLADONNA.

BY CHARLES UMNEY.

When extract of belladonna, made by the complete exhaustion of the root by cold alcohol, is dissolved in spirit of wine in such proportion that one part fluid shall contain an equivalent of one part by weight of the root, or, in other words, if liniment of belladonna (B.P. 1867) be made from the alcoholic extract of the root, instead of from the root direct, even though the quantities be strictly proportionate, the difference in appearance of the two preparations is so marked as to require some explanation.

Haselden (*Pharmaceutical Journal*, 1866, page 17), writing upon this liniment, stated that he had obtained by pressure, after the prescribed volume of the British Pharmacopœia had been percolated, "a considerable quantity of strong tincture, quite equal to that obtained by displacement."

In order to ascertain the extent of the exhaustion of belladonna root by maceration and slow percolation, the following experiments were made:—

The root was dried, and reduced to a "*moderately fine powder*," passing through a sieve of 40 to 50 meshes to the linear inch, for experience had taught me that a "coarse powder," as stated in the British Pharmacopœia, was not well adapted for producing belladonna liniment, for I well knew the difficulty of approaching exhaustion, even with a powder as fine as it is possible to percolate, when the final strength was to be one by weight in one by volume. (I cannot refrain from again* claiming for the U.S. Pharmacopœia a superiority over our British Pharmacopœia in defining the state of division of its powders, which are designated as *very fine* when passed through a sieve *eighty* meshes or more to the linear inch, through one of *sixty* as *fine*, of *fifty* as *moderately* fine, one of twenty *coarse*, and so on.)

100 grammes of this root, thoroughly moistened with spirit, tightly packed in a displacement apparatus, and allowed to digest for three days, was slowly percolated until 100 cubic centimetres was obtained.

The residue was treated with spirit, and similarly percolated until four other portions, each of 100 c.c., were produced.

The extractive these each contained was determined by evaporation and drying at 100° (C.) until the weight was constant. The results were:—

1st percolate . . .	7·58	grammes of extract.
2nd " . . .	4·31	" "
3rd " . . .	3·08	" "
4th " . . .	2·25	" "
5th " . . .	1·54	" "

The first percolate was charged with green colouring matter, which was less perceptible in the second, and almost absent in the other three.

The total extract obtained from the root was upwards of 18 per cent. (18·75) of which—

1st percolate contained . . .	40·4 per cent.
2nd " " . . .	22·9 "
3rd " " . . .	16·4 "
4th " " . . .	12·0 "
5th " " . . .	8·3 "

It would therefore appear that even under very favourable circumstances the root in the liniment of belladonna is not even half exhausted (40 per cent.), at the stage at which the B.P. directs the percolation to be stopped, and the chances are that, in the majority of cases, operating on coarsely powdered root, little more than one-third (33·3 per cent.) is extracted in the first percolate.

If this latter be true, and doubtless it oftentimes is, it would seem, noting the sum of the first and second percolates (63·3 per cent.), that it would be possible under the most favourable circumstances, operating upon very fine powder, to prepare a liniment, from half the quantity of root, almost as strong in extractive at any rate as the present officinal preparation.

I am not prepared to say that each percolate will contain an amount of atropia strictly proportionate to its extractive, but still I imagine there is some alkaloid value in each and every percolate, or the Pharmacopœia would not direct, under "*Atropia*," the exhaustion of *one pound* of root with *five* pints of spirit of wine.

The different appearance of a solution of extract in spirit, and the liniment prepared according to the official directions, is then chiefly due to the imperfect and uncertain exhaustion of the root, and also in a measure to the concentration of the green colouring previously referred to, in the first percolate.

The suggestions I would make, for consideration on some future occasion, when a revision of the Pharmacopœia may be deemed necessary, are, either to substitute *ten* ounces of root in fine powder for the present twenty ounces, and produce finally by the slowest percolation *twenty* ounces fluid of liniment, or to direct a solution of *one* part of alcoholic extract in *ten* parts of spirit of wine.

Either of these would certainly be likely to give more uniform results, under all circumstances, and also lessen the loss of spirit of wine very considerably in the preparation of the liniment.

Laboratory, 40, *Aldersgate Street, E.C.*

* *Pharmaceutical Journal*, 1873, p. 715.

NOTE ON TINCTURA QUINIÆ AMMONIATA, B.P.

BY J. F. BROWN.

There is no necessity for employing heat in the preparation of this tincture, as directed in the Appendix.

If the quinine be diffused through half the given quantity of proof spirit, and then the solution of ammonia, previously diluted with the remainder of the spirit, added, and the whole well shaken, a clear solution will be immediately obtained.

LIQUOR OPII SEDATIVUS.

BY P. WELLS.

Since the institution of the Pharmaceutical Society, papers have from time to time appeared in the Journal respecting the mode of manufacture and the composition of this valuable preparation, but I have failed to note that any one has expressed any belief in the statement of the inventor, the late Mr. Richard Battley, that it was composed of opium and water. Relying on the accuracy of the statement in question, I turned my attention to the preparation of Liquor opii sed. about thirty-three years ago, and at intervals since that time I have manufactured it, with an uniform result, and I now detail the process: I select 12 ounces of the finest Turkey opium sufficiently dry to be reduced to moderately coarse powder, and this I mix intimately with a proper quantity of clean sand.

Before percolation was so well understood as it is now, I thoroughly exhausted the opium with successive portions of water, but of late years I have used the percolator, and have passed water through until it came out nearly colourless.

The liquors are mixed, and after standing a few hours to deposit are strained off and evaporated over a naked fire in an enamelled pan by rather rapid ebullition to about three imperial quarts.

This is allowed to stand in an open jar or any other vessel for fully twelve hours, and then carefully strained through flannel to separate the resin and flocculent matter, and then boiled down to three pints. After standing for twelve hours in a cool place, it is now filtered through paper, and 14 ounces of rectified spirit, 60 o. p., added and made up to four imperial pints with distilled water.

Sometimes I have used 6 ounces of fine dry sherry instead of the water necessary to make up the quantity to four pints.

In about a week the preparation assumes the taste and smell peculiar to Liquor opii sedativus.

A NOTE ON THE BEHAVIOUR OF CERTAIN FLUORESCENT BODIES IN CASTOR-OIL.*

BY CHARLES HORNER.

Some colouring matters derived from woods, not showing any fluorescence when dissolved in water, alkaline solutions, alum, or alcohol, are found to exhibit this phenomenon on treatment with castor-oil; whilst other substances, which fluoresce in alcohol, etc., are observed to show this property with augmented intensity.

To obtain clear solutions, the materials are first boiled in alcohol, filtered, evaporated to dryness, and then heated with the oil. On transferring some of the prepared solution to a test-tube and re-heating, the fluorescence disappears as the temperature approaches the boiling point, but returns on cooling. Moreover, this operation may be repeated without the substances suffering decomposition. Cudbear, camwood, logwood, and turmeric are selected as illustrations of the properties cited.

Cudbear yields a brilliant orange fluorescent light, and is visible in diffused daylight without the agency of a condensing lens, which is necessary to show it in an alcoholic solution.

Camwood exhibits a powerful apple-green fluorescence, although wholly destitute of this property in aqueous or alcoholic media. The spectrum of the fluorescent light is continuous from E downwards, interrupted by two narrow, faint shadings, situated at $3\frac{3}{4}$ and $\ddot{5}$ of Sorby's scale.

With regard to logwood, unless the castor-oil solution be saturated, sunlight and a lens are requisite to bring out its fluorescent character. The colour very much resembles that of camwood, but is distinguished by its spectrum, which is continuous from *b*, but interrupted by two shadings at $\ddot{4}\frac{1}{4}$ and $5\frac{3}{4}$.

Turmeric is well known to fluoresce powerfully in alcohol a yellow green, and in benzole a blue green. In castor-oil, however, the fluorescent light is at least three times as bright as in other fluids, and may be described as a vivid emerald green, evident in the dullest daylight; but if a flat bottle of the solution be placed on black velvet behind rather deep cobalt glass, when the sun is shining, the phenomenon is of a most brilliant description, and without exaggeration may be compared to that produced by the beautiful uranium-glass. The spectrum furnished by the fluorescent light is characterized by transmission of red and green rays, and blue to F, with a faintly perceptible shading at the yellow end of the green.

These facts therefore show that, in studying the phenomena of fluorescence, advantage should be taken, whenever possible, of this valuable solvent property of castor-oil.

* From the *Philosophical Magazine* for September.

REPORT ON THE GOVERNMENT CINCHONA PLANTATIONS IN JAVA.

FOR THE SECOND QUARTER OF THE YEAR 1874.

Although the abundant rains that have fallen were not unfavourable to cinchona culture, they have checked the field work, and rendered difficult the collection and drying of the bark, so that the harvest commenced in May was carried on slowly and with difficulty. Nevertheless, 9,000 kilograms of bark are already collected, and everywhere preparation is made to carry on the collection energetically as soon as the dry weather sets in. Through free labour the gathering becomes more and more difficult; in fact, the wages will probably become a very important item.

The fructifications of *C. Calisaya Ledgeriana* have as yet yielded only a few seeds, and have been disappointing, some of the finest specimens having flowered unproductively. Extraordinary care and attention were therefore devoted to the artificial production of this superior kind, and better results were obtained. Within eight months nearly 13,000 *C. C. Ledgeriana* plants were obtained from slips, whilst 5,400 have already been planted out.

Through the thinning out of the original plantation of 1866-7, 750 trees of *C. C. Ledgeriana* were sacrificed, and thereby 1,500 kilograms of fine bark were obtained, which also was very rich in quinine. The larger gross product which is obtained when more light and air are afforded to the plants has been again very clearly demonstrated by this collection. At Riung-gunung the trees are planted at a distance of from 6 to 7 feet from each other; at Tji-bürrüm, at a distance of from 4 to 5 feet. The average production of each tree in the former establishment was four kilograms, including the root bark, against one kilogram at Tji-bürrüm.

The chemist on the cinchona plantations continues his experiments upon the various kinds of cinchona grown under different conditions and of different ages. His results show that among the smaller varieties of *C. Calisaya* also there is an increased richness in quinine; so that there is a well-grounded expectation that a large portion of this year's collection from *C. Calisaya* plants will yield a product especially suited for the quinine manufacturer.

On the 31st of March last the fourth public sale of Java bark (1873 gathering) took place at Amsterdam. 15,419 kilograms were offered for sale and bought, whilst quite 5,000 kilograms were lost in the steamship Prinz Hendrik, and about 500 kilograms were retained for the Dutch medical department. This product was on the whole favourably reported on by a committee of experts invited to examine it. But the result of the sale has in some measure given rise to disappointment in Java. The manufacturers' bark again fetched an extraordinarily high price, and the bark powder, which last year could only be sold at fl. 0·33 per kilogram, obtained on this occasion fl. 1·11 per kilogram. On the other hand, the price obtained for the greater part of the ordinary Calisaya bark was far below that of former sales.

The more exact descriptive estimates, which were prepared in accordance with the analytical experiments of the chemists connected with the plantations and were circulated for the public sale, were evidently accepted with confidence, and business was facilitated by their use. Acting upon the friendly counsel of one of the most eminent Dutch quinologists, the experiment is to be made of bringing the bark suited solely for pharmaceutical purposes into the market in larger quills and sticks. Probably its value will thereby be enhanced, because in pharmacy its worth is estimated more from external appearance.

In June last the chemist again sought to work up a portion of the small waste bark at Bandong into crude alkaloid. Nearly 1,000 kilograms of the dried product are already under treatment, but the result cannot be stated until the next quarterly report.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 10, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE INAUGURAL ADDRESS.

THE words "fitly spoken" by Mr. GILES, on Wednesday evening, to the students in the Pharmaceutical Society's School of Pharmacy, were listened to with a sustained interest which found its exponent and contrast in the burst of applause that followed his last good wish and admonition. And that interest was heightened when the speaker expressed his gratification that he had been allowed to close a pharmaceutical career commenced as a student in that same school by addressing those students who to-day seek instruction from its professors.

No adventitious circumstances, however, were required to commend the Address to the judgment of the student; the printed page is no less eloquent than was the living voice. Never losing sight of the fact that the occasion was an "Address to Students," and not for a manifesto on pharmaceutical politics generally, Mr. GILES, besides giving much sound advice, succeeded in throwing into a concrete form the thoughts floating in many minds on subjects of vital interest to his hearers. It was judicious to tone down any exaggerated views of the student as to his future calling by linking to the description of pharmacy thirty years ago the reminder that pharmacy is still a trade, although perhaps this is only part of the truth; but it was added that its status "will be best raised by the diffusion of a higher educational tone" amongst those who practise it. It was useful to urge upon him that the time is approaching, probably, when every well-educated Englishman will possess at least an elementary knowledge of the physical sciences, and that if pharmacists are to hold their own, it will be by possessing a relative proficiency in the sciences allied to their art. It was wise to remind him that this was the fleeting, golden opportunity—and probably the only one he would have—for laying a good foundation for that proficiency. And it was kind to tell him roundly that the bugbear "cram" is not an accident of locality; but that it is born whenever the examiner's shadow blocks out the view of what should be the student's goal. Finally, it was well to restore to the well-worn motto its Virgilian form, "Labor omnia vincit."

Mr. GILES sounded no uncertain note of warning as to the future. If the evil which the new examination regulations have been designed to stamp out should prove more than temporary, Mr. GILES sees the "obvious remedy in the establishment of a compulsory curriculum of education at recognized schools as a condition of examination." And it may be added that many others who love the welfare of pharmacy are gradually coming to the same conclusion. Dr. GREENHOW, however, the same evening "ventured to say the days of 'cram' would now be over."

One curious incident of the evening was the almost identical terms in which Professor ATTFIELD and Mr. GILES denounced the moral injury done when a student,—blinded perhaps by over much anxiety to a clear perception of what is honest,—commences what is more or less a methodical attempt to pass for what he is not. This concurrence, however, was only the expression of the opinion of all justly-balanced minds, and it was but a repetition of words spoken by the wise man three thousand years before, "Whoso boasteth himself of a false gift is like clouds and wind without rain."

THE INTERNATIONAL PHARMACEUTICAL CONGRESS.

IN another part of this Journal will be found the Report of Messrs. GREENISH and SUTTON, the delegates appointed to represent the Pharmaceutical Society of Great Britain at the recent Congress in St. Petersburg. It will be noticed that besides the discussion of subjects affecting more particularly Continental pharmacists, some progress was made towards the construction of an International Pharmacopœia, by an agreement as to the principles upon which it should be based. Further the MS. prepared by the Paris Society of Pharmacy was presented, and it has been referred in sections to various members of the Congress to examine and report upon. We have been informed that to Mr. SUTTON has been allotted the portion including the preparations of soda, potash, silver, and gold, and to Mr. GREENISH the preparations of iron. But what will probably affect English pharmacists first, in point of time—although at an interval of four or five years—is, that the Council decided to invite the Congress to hold its next meeting in London. There is every reason to think that the invitation will be accepted, and we believe that such a gathering will have an important and beneficial influence on English pharmacy.

THE YORKSHIRE COLLEGE OF SCIENCE.

WHEN the founders of the Pharmaceutical Society first undertook the task of raising pharmacy from the low position it held in this country thirty-three years ago, they rightly judged that one powerful lever would be found in the diffusion of a knowledge of the scientific principles upon which the practice of pharmacy should be based. There were in those days many persons who looked askance at their proceedings, and would have been well content to follow the "rule of thumb" without disturbance;

unfortunately, too, this class has still its representatives in the present day. The signs of the times, however, show that in seeking to base their art upon science, pharmacists will not be singular, only they have had the good fortune to commence the work rather earlier than some of their neighbours. The earlier attempts to encourage the supplementing of a technical training by a scientific education, which would foster the application of scientific principles in manufactures, did not meet with much encouragement from the classes they were intended to serve. But the apathy of past years is fast disappearing, and the demand for such instruction—especially in chemical science—is now becoming so great that, although increased accommodation has been provided at South Kensington and other schools, it is still barely equal to what is required.

The Yorkshire College of Science is the latest outcome of a widely-spread feeling that if England is to maintain her lead in the arts and manufactures, scientific teaching must be placed within the reach of her workers. According to its prospectus, a copy of which has been sent to us by the Honorary Secretary, Mr. Richard Reynolds, of Leeds, this College is established to supply instruction in those sciences which are applicable to the Manufactures, Engineering, Mining, and Agriculture of the county of York; also in such arts and languages as are cognate to the foregoing purpose. But, although pharmacy is not specially mentioned in the prospectus of classes, some of the courses would, undoubtedly, be valuable to any pharmaceutical students who may be able to avail themselves of them.

The first session will commence on Monday, October 26, 1874, and end on Friday, July 23, 1875; it will be divided into three terms. There will be a class for the study of Experimental Physics, meeting twice a week through the entire session under the charge of Professor A. W. Rücker, M.A., Fellow of Brasenose College, Oxford: Fee, £2 12*s.* 6*d.* Professor Thorpe will deliver a course of lectures, extending through the first and second terms of the session, on Inorganic and Organic Chemistry: Fee, £4 4*s.* Also a course of lectures on Laboratory Practice, Qualitative and Quantitative, on Thursday afternoons, during the first and second terms: Fee, £1 1*s.* There will be further a laboratory course of Practical Chemistry in the College Laboratory, under the supervision of Professor Thorpe: Fee for students working six days a week, £17 17*s.*, and in proportion for shorter periods. The other courses embraced in the programme are Mathematics, Geology and Mining, and Textile Industries. The promoters hope to be able to add to these subjects hereafter. We believe that prospectuses of the classes, etc., may be had on application to Mr. Henry H. Sales, Secretary, Leeds.

Mr. W. Dittmar, F.R.S.E., Demonstrator in the Chemical Laboratory of Owens College, Manchester, has been appointed to the Chair of Scientific Chemistry in Anderson's University, Glasgow, where he succeeds Dr. Thorpe, recently appointed Professor of Chemistry in the Yorkshire College of Science.

Dr. Andrew Fergus, who recently showed his interest in the pharmacy of Glasgow by delivering a lecture before the Chemists and Druggists' Association, has been elected President of the Faculty of Physicians and Surgeons in that city.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, October 7th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Brown, Frazer, Greenish, Hampson, Owen, Radley, Rimmington, Robbins, Sandford, Savage, Schacht, Shaw, Stoddart, and Williams.

The minutes of the previous meeting were read and confirmed.

The late Mr. George Edwards.

The President said he could not commence the business of the day without alluding with great regret to the death of Mr. George Edwards, of Dartford, a former member for many years both of the Council and of the Board of Examiners, and a gentleman who had on many occasions rendered valuable services to the Society. Mr. Edwards was a member of the Council from 1847 to 1869, and again in 1871, when he was chosen Vice-President, an office which he had previously filled in 1855. He died on Sept. 13th, aged 66. The President begged leave to move that a letter of condolence be sent to Mrs. Edwards in the name of the Council.

The Vice-President seconded the motion, which was carried unanimously.

The late Mr. Henry Deane.

The Secretary read the following communication, which had been received from the Pharmaceutical Society of Massachusetts, relative to the late Mr. Henry Deane.

"Massachusetts College of Pharmacy,
"Boston, July 28, 1874.

"*To the Pharmaceutical Society of Great Britain.*

"At the regular July meeting of the Board of Trustees of the Massachusetts College of Pharmacy the following resolutions were unanimously passed:—

"'Whereas the members of this College have learned with sincere sorrow that Henry Deane, of London, departed this life April 4, 1874, and

"'Whereas we, in common with the pharmacists of Great Britain, mourn the loss of our friend, who has for so many years maintained so high a rank in his profession as to be regarded one of the ablest and wisest leaders in all matters relating to the progress of pharmacy, and

"'Whereas Henry Deane was an honorary member of this College, and well known to us by his valuable contributions to pharmaceutical science, by his purity of life, by his genial disposition, by his great moral and professional worth; therefore be it

"'Resolved, thatin the death of Henry Deane, pharmacy has lost an honoured, respected, and devoted representative; society an honest, high-minded, and cultivated gentleman; and his family one who in all the relations of husband and father was most tender-hearted and affectionate.

"'Resolved, that to the afflicted family of the deceased, and to our brethren of the British Pharmaceutical Society, we tender our earnest, heartfelt sympathy for their affliction and bereavement.

"'Resolved, that we will cherish the memory of Henry Deane as that of a just and noble man, whose good work in all the varied relations of life is an example well worthy of our emulation.

"'Resolved, that copies of these resolutions be sent to the family of our deceased friend, and to the Pharmaceutical Society of Great Britain, and that they be spread on our records.'

"Very respectfully,
"George F. H. Markoe,
"Corresponding Secretary."

The Secretary was requested to acknowledge the letter, which was directed to be entered on the minutes and published.

Mr. SANDFORD, in connection with this subject, said he was glad to announce that he had now received, within a few pounds, the sum required for the portrait of Mr. Deane, to be placed in the Council-room. He hoped therefore, with the co-operation of two or three other gentlemen, to immediately make arrangements for getting the work executed.

THE CONGRESS AT ST. PETERSBURG.

Mr. GREENISH presented the following report with regard to the recent visit to St. Petersburg of a deputation from the Pharmaceutical Society of Great Britain.

"*To the President and Council of the Pharmaceutical Society of Great Britain.*

"Gentlemen,—The delegates appointed by you to represent the Pharmaceutical Society of Great Britain at the fourth International Congress, to be held in St. Petersburg, from the 12th to the 18th of August, arrived in that city on Monday, the 10th, and, with other delegates, occupied apartments engaged for them at the Hotel Demuth. In the evening of Wednesday the 12th, there was a social gathering of all the delegates, when they were introduced to each other by members of the Organization Committee. The number of delegates was 17, representing 12 societies:—

"Austria, Dr. Von Waldheim, Vienna; Professor Godeffroy, Vienna.

"Bohemia, Herr Dittrich, Prague; Herr Janauscheck, Prague.

"Denmark, Herr Madsen, Copenhagen.

"England, Mr. Greenish, London; Mr. Sutton, Norwich.

"France, M. Méhu, Paris.

"Russia, Professor Dr. Trapp, St. Petersburg; Herr Rennard, Secretary Pharmaceutical Society, St. Petersburg (not a delegate); Herr Jordaen, St. Petersburg; Professor Dragendorff, St. Petersburg; Director Kymenthal, Moscow; Herr Frederking, Riga; Professor Torno, Kief; Herr Theegarten, Odessa.

"Hungary, Herr Pecker, Buda Pesth.

"Poland, Herr Lilpop, Warsaw.

"The room was decorated with flags of all nations, and the delegates distinguished by a white ribbon. On the morning of Thursday, the 13th, the business of the Congress commenced. The chair was taken by his Excellency Privy Councillor Trapp, Director of the Pharmaceutical Society of St. Petersburg, who opened the Congress by a short address. Four delegates were then told off to examine the credentials, which, being done, the election of officers took place, with the following result:—President—Dr. Von Waldheim, of Vienna. Vice-Presidents—Messrs. Madsen, of Copenhagen, and Trapp, of St. Petersburg. Secretaries—Messrs. Rennard, of St. Petersburg; Méhu, of Paris; Sutton, of Norwich; and Janauscheck, of Prague.

"It was unanimously determined by vote that the business language of the Congress should be German. The third question on the programme was taken first, the others being referred to committees for consideration, previous to their discussion in open congress. That question was, 'Is it necessary that the Professorship of Pharmacy should be held only by a pharmacist?' To understand the bearing of this question, it may be necessary to remark that in Germany there are no schools devoted to pharmacy alone, as that of Great Britain. The universities supply professors in every branch of science, the same professorship including materia medica and pharmaceutical chemistry, and the chairs are sometimes given to those who may know little practically of pharmacy and its requirements, the pharmacists themselves having no voice in the selection.

"Your delegates expressed the opinion that the word 'necessary' should be altered to 'desirable.' They did not consider it 'necessary,' but 'desirable,' that the professorship should be held by a practical pharmacist. In the alteration of the word to 'desirable' they were supported by those who subsequently addressed the meeting. Your representatives did not fail to state that for the chairs in the school of pharmacy of Great Britain the Council choose their own professors, and that each of the professors had received the advantage of a pharmaceutical education. They pointed out that, therefore, as regarded this subject, the pharmacists of Great Britain were in a different position to those on the Continent, but at the same time they expressed an opinion on the general bearing of the question. It was unanimously resolved that it is most desirable that the professors of pharmacy be pharmacists, and that materia medica and pharmaceutical chemistry should form separate professorships.

"In the afternoon the committees were occupied with the consideration of some of the other questions, and framing reports upon them for the next day's Congress.

"Friday, the 14th, was occupied with the reading of several scientific papers, and discussions thereon.

"Saturday, the 15th. The question No. 1 in the programme came on for discussion: 'How far does the personal responsibility of assistant pharmacists extend in the exercise of the duties of their calling?' This question involved the responsibility of assistants in case of errors in dispensing. On this subject there seems to exist no definite pharmacy law on the Continent, and it is the general wish that the relative responsibility of assistant and employer should be well defined. There was some discussion as to whether only examined assistants or examined assistants in the position of managers should be held responsible, and it was finally resolved that, for the purity of all drugs, and the quality of pharmaceutical preparations, the proprietor should be responsible; that he should, in no case, be able to shirk his personal responsibility; that if the assistant is aware of a drug used in the pharmacy being adulterated he should be equally responsible with the employer; that the proprietor should be also responsible for the apprentice; that all assistants legally qualified to dispense prescriptions should be personally responsible for any mistakes committed by them, and also that when in the position of manager, in the absence of the principal, they should be responsible for the errors of the apprentice.

"On this question your delegates stated that in Great Britain if an assistant, by an error in dispensing, caused injury to or the death of a person, that assistant was criminally responsible, but that the master was also liable to damages in any subsequent civil action, and that no arrangement among pharmacists could override the general law of the land, as embodied in Lord Campbell's Acts, according to which the master is responsible for the acts of his servants. But your delegates added it was a question which had engaged the consideration of pharmacists in Great Britain, who were desirous of influencing public opinion thus far, that if a legally qualified assistant in dispensing a prescription committed a mistake which resulted in the injury or death of a patient, the fact of the proprietor having employed such an assistant, and taken all other reasonable precautions, should operate favourably in mitigation of damages in any subsequent civil action.

"Question No. 2 on the programme was: 'What is the best mode of organizing the Apothecaries' Committee of Revision?' The Revisions Commission is that body whose duty it is to examine the drugs and preparations in the establishment of the apothecary. In large cities it is usually composed of two pharmacists, one medical man, and one chemist, and in provincial towns the commission consists only of one medical man. It is considered that medical men and also pure chemists cannot be proper judges of drugs and pharmaceutical preparations, and after much discussion it was resolved that in the Committee of Revision appointed by Government there ought to be one practical pharmacist, whose duty it shou'd be to make the examination of any suspected drug; that this pharmacist ought to be elected by the pharmaceutical body and not appointed by Government, several pharmacists being named by that body, from whom the Government should choose one; and that, if there should be a difference of opinion on any subject, the difference should be submitted to a Government Commission, composed of medical men and examined pharmacists in equal proportions.

"Your delegates remarked that practically in Great Britain there existed no such institution as this for examining pharmaceutical preparations and drugs in the shops of pharmacists, and therefore English pharmacists had no direct interest in the question before the Congress. Yet since the delegates believed that the effect of decisions in questions affecting pharmacy could not be altogether localized, but that their influence, directly or indirectly, for good or evil, must be more widely felt, and as they recognized in this discussion an effort on the part of pharmacists to shake themselves free from the control of medical men and pure chemists, so that in all matters relating to pharmacy the pharmacists themselves may be more largely represented, or have the entire control, they had no hesitation in stating that in these efforts the Continental pharmacists had the entire sympathy of the pharmacists of Great Britain.

"Question 4 in the programme: 'Has not the time arrived for instituting an international pharmacopœia?' On this subject your delegates held, that although they did not consider that the time had arrived for instituting an international pharmacopœia, yet it was very desirable that in all active medicinal preparations there should be an effort made to establish uniformity of strength. As regards the issuing of a pharmacopœia, and the preparations contained therein, the pharmacists of Great Britain had at present no power of decision. To illustrate this part of the subject, the first paragraph of the preface to the 'British Pharmacopœia' was read to the Congress, and the composition of the General Medical Council explained. Your delegates added, that the subject had engaged the attention of British pharmacists, and it was hoped that no future pharmacopœia, or additions to the pharmacopœia, would be compiled without the presence of some pharmacists chosen by the Council of the Pharmaceutical Society, or otherwise to assist the Pharmacopœia Committee in their arduous labours.

"After much discussion on the different points in connection with the international pharmacopœia, it was resolved that the best thanks of the Congress should be given to the Pharmaceutical Society of Paris for the suggested international pharmacopœia, of which they sent a manuscript copy. It was decided also that it is desirable that an international pharmacopœia should be compiled; that each country should form its own pharmacopœia; but that the Congress wished that these separate pharmacopœias should be based on the principles of the international pharmacopœia.

"The Congress named a commission to examine the preparations described in the Paris work. The reports from those appointed on the commission are to be sent to St. Petersburg before the 1st December next, and the committee in St. Petersburg will then send the revised work to the pharmaceutical societies of all countries; the cost of transcribing or printing is to be paid in proportion by each society (probably £1 each). It is hoped that the Governments of the several countries interested will institute a commission to approve or otherwise of the international pharmacopœia, so that a small condensed international pharmacopœia shall be the ultimate result. The Congress desired to submit for the consideration of any such commission the following recommendations:—

"1. That the international pharmacopœia should be in Latin.

"2. That the metrical system of weights and measures should be adopted where absolute quantities are required, but that in the preparation of chemicals or galenicals proportional parts only should be used; all temperatures to be given on the centigrade scale, and specific gravities all to be taken at 15° cent.

"3. That the nomenclature should be on one principle. Many of the delegates wished that the committee should be recommended to adopt the nomenclature of Berzelius. There was great division on this point, but the majority were in favour of the proposition.

"4. That the names of drugs adopted in the international pharmacopœia should be as simple as possible, consistent with being definite.

"5. That the minimum of the active principle of narcotic drugs permitted should be definitely stated.

"6. That tinctures and galenical preparations should be made on one principle—for instance, rhubarb 1 part, alcohol 10 parts—and with the greatest simplicity, avoiding unnecessary ingredients.

"7. That in all chemical preparations the maximum of permitted impurity should be stated. Ex., chloroform contains alcohol; it should be definitely stated how much will be permitted. It was not thought necessary that preparations of this kind should be required to be absolutely pure.

"Your delegates took part in the committees for the consideration of the several questions previously to their being openly discussed, and on every question they were heard in full Congress. When the subject was one in which they considered Great Britain had no direct interest, but where the progress of pharmacy or the emancipation of the pharmacist was involved, they expressed in general terms their sympathy with their colleagues in the object they had in view.

"At intervals during the sittings of the Congress the following papers were read on scientific subjects:—'The Electrolysis of Water,' by M. Janauscheck; 'On Some Alkaline Chlorides,' by Professor Godeffroy; 'The Spectroscope Applied to the Detection of Poisons in Cremation,' by Herr Popl, jun., St. Petersburg; 'Tannin and its Salts,' by Professor Dragendorff; 'Conversion of Grains to Grammes,' by Professor Waldheim; 'Aloin from various Aloes not identical, some Amorphous, others Crystalline,' by Professor Dragendorff. There was also shown by Professor Dragendorff an interesting collection of drugs from Turkestan. A description of these will be found in 'Buchner's Repertorium.'

"At the close of the Congress the question as to the next place of meeting was discussed, and an invitation from the United States that it should take place in Philadelphia was communicated. Your delegates stated that they had no authority to invite the Congress to London, and explained that the question was brought before the Council, and postponed to a future meeting for discussion. It was suggested to them to telegraph for instructions on this point, but they considered that the subject could be more satisfactorily discussed on their return. They expressed a wish, however, that London should be named, pending further instructions on the subject, and they added, that should an invitation be sent from the Pharmaceutical Society of Great Britain, and that invitation be accepted, they felt satisfied that this fourth International Congress in St. Petersburg would not exceed in hospitality the fifth International Congress in London. Your delegates cannot close this report without recording their sense of the great hospitality shown to them by the Russian pharmacists. The presence of delegates from Great Britain was especially appreciated, and they know nothing that would give more satisfaction to their colleagues on the Continent than a hearty invitation from the Pharmaceutical Society of Great Britain to hold the fifth International Congress in London. Thus, while cementing old friendships, an opportunity would be afforded of forming new ones, and at the same time advancing the cause of European pharmacy.

"At the close of the Congress the President, in an able and eloquent address, reviewed the work done, thanked the several committees for the assistance afforded him and declared the duties of the Congress closed. A cordial vote of thanks was unanimously passed to the President for the ability and courtesy which he had exhibited, and which had contributed so much to the general good feeling which prevailed, and the satisfactory termination of the Congress.

"In conclusion, your delegates, on their way through Sweden, and also in St. Petersburg and Moscow, availed themselves of the opportunities afforded them of visiting several pharmacies, and making some inquiry into the conditions under which pharmacy is pursued in those countries; these form no part properly of this report, but they hope at a future time to bring some of the points which bear on British pharmacy under the notice of the Pharmaceutical Society.

"Thomas Greenish,
"Francis Sutton."

It was then resolved unanimously—

"That the report of the delegates to the International Pharmaceutical Congress be received, entered on the minutes, and printed in the Society's Journal and Transactions; and that the thanks of the Council are due and are hereby tendered to the delegates for their valuable services and their excellent report."

Mr. Greenish expressed his regret that his colleague, Mr. Sutton, was not present, but he was sure the vote of thanks would be received by him, as it was by himself, with very great pleasure. He might say that they left England with a great sense of responsibility, since they went as representatives of a pharmacy which could scarcely claim an existence of forty years, which was still hardly recognized by the Government, and not yet fully appreciated either by medical men or the public. On the other hand they had to meet men representing a pharmacy which had been in existence for probably two centuries, during which time it had been nursed, protected, and privileged by Government, and assisted by the most systematic education—men who had succeeded in raising pharmacy as an art to pharmacy as a science. These gentlemen, therefore, not only occupied a high social position, but were men of high scientific attainments. He was quite sure, however, that nothing would give these gentlemen greater satisfaction than to meet English pharmacists in this country. He would therefore move—

"That the International Pharmaceutical Congress be invited to hold their next meeting in London."

He was sure, from what he had heard when in St. Petersburg, that it would be a serious disappointment to many Continental pharmacists if such an invitation were not received. He only wished the Council could have heard the shout of satisfaction from the assembled body when the subject was mentioned. He believed it would be one of the best things possible for English pharmacy, and would give it a stimulus which would be very useful by being thus brought into contact with men of such scientific attainments and position.

Mr. Hampson had much pleasure in seconding the motion.

Mr. Williams considered it very important that this motion should be supported, and thought it the duty of the Society to take advantage of such an opportunity as this. He could not but be sensible of the deficiencies of English pharmacy, and the only ground which could arise for hesitation in this matter, was the doubt whether it was really in such a position as to be able worthily to receive such men. However, he understood that the next Congress would not take place for five years, and as the difficulty he alluded to would probably decrease every year, he hoped the Council would adopt the resolution, and that the pharmaceutical body generally would bear in mind the duties they would have to perform.

Mr. Schacht most sincerely hoped this Congress would be held in England on the next occasion, but he wished to know exactly what was meant by giving such an invitation. If it implied extending hospitality to the members of the Congress in the same way as if a private individual invited a friend to visit him, it was doubtful how far a changing body like that Council was justified in issuing it.

Mr. Greenish said he had had some conversation with the President of the Congress on this subject, and his decided opinion was that the only hospitality requisite or desirable was that extended when the meeting was held in Vienna, viz., one dinner to the members.

Mr. Brown did not think there could be any misunderstanding as to the real meaning of the invitation, any more than in the case of the other scientific congresses which now took place every year.

The resolution was then passed unanimously.

Elections.

MEMBERS.

Pharmaceutical Chemist.

Smith, Thomas James ....Newark.

Chemists and Druggists.

Aspinall, James ....Whitworth.
Clause, Samuel Ruthbrook ......Faversham.
Prust, Richard ....Cardiff.
Telfer, Henry Vaughan ....Leytonstone.
Worth, Edwin ....Bournemouth.
Yardley, Edward ....Ruabon.

ASSOCIATES IN BUSINESS.

Modified.

Price, John Rhys ....Chippenham.

ASSOCIATES.

Minor.

Alldridge, William Edward......Birmingham.
Challinor, Samuel McMillan ...Bolton.
Fingland, James ....Thornhill.
Hulme, George......................Longton.
Robinson, Edward ....Birmingham.
Thomson, James Hood............Berwick-on-Tweed.
Watt, George Adam...............Hartlepool.
Webb, Frederick Brookes ......Birmingham.

APPRENTICES OR STUDENTS.

Armstrong, George Clarke ......Sunderland.
Bayfield, Gabriel Thomas.........Norwich.
Chadwick, George Nicholas......Dewsbury.
Clarke, Ethelbert ....Maidstone.
Dickson, Samuel Clark............Edinburgh.
Feaver, William ....Truro.
Price, David ....Llandilo.
Singer, Robert ....Insch.
White, Woolmer Rudolph Donati...Landport.

Several individuals who had neglected to pay their subscriptions in proper time were ordered to be restored to their former status on payment of the subscription for the current year, and a fine.

Finance.

The report of this Committee was read and adopted, and various accounts were ordered to be paid.

Benevolent Fund.

This Committee had held a meeting at which some of the applicants for relief had attended, and now made a report including a recommendation that the following grants be made:—

£15 to the widow of a member, £5 at once and the remainder to be placed in the hands of a member of the Council for application in his discretion.

£30 to the widow of a member who has five children dependent upon her, the eldest aged eight years, the object of the grant being to get one of them into an institution.

£20 to the widow of a registered chemist and druggist at Westminster.

£10 to a chemist and druggist at Sheffield, in distress from continued illness.

£10 to a chemist and druggist in London, in distress from serious illness.

Two other applications were deferred until the Committee had seen the applicants.

Mr. Brown said he noticed that large sums were now being voted by the Committee, and it was evident that, like indiscriminate alms-giving, this would do more harm than good, unless the greatest care were taken that only proper objects were relieved, and that the aid was given in such a way as to permanently benefit the applicants. No doubt many cases of real distress did occur, but some experience as a Poor Law guardian had made him somewhat incredulous in such cases except after full inquiry. He did not oppose the granting of relief, but only wanted care to be taken, and to have some assurance that the machinery adopted for making inquiries into these cases was really competent to discover any attempt at imposition.

Mr. Owen said the case in which the largest grant was proposed had been deferred from the previous meeting in order that the Committee might see the applicant personally, and he believed every gentleman present took the very greatest care not to recommend any grant without being thoroughly satisfied of its necessity. In the particular case referred to, it was considered useless to make a small grant only.

Mr. Greenish remarked that at the previous meeting it had been decided that the Committee should see the applicants, if possible, before making any grants.

Mr. Robbins said this plan had been put in practice for the first time on the previous day, and he believed it would prove very useful. He quite saw the necessity for each case to be carefully looked into.

Mr. Williams said it was rather a serious matter to make a grant equal to a year's annuity; and he had some misgivings whether the practice of seeing the applicants personally would not place those in the country at a disadvantage.

The Vice-President said he could bear testimony to the care and painstaking of the Committee in the distribution of the funds, but he should be very pleased if Mr. Brown would allow his name to be added to the Committee. He might add that the Committee took every pains possible to satisfy themselves that every applicant who came before them had good grounds for the application. He had the fullest confidence in the Committee that no country application would suffer by the arrangement to require a personal interview with those applicants who resided in London, and his experience for some years had shown him that relief had been as freely given to persons in the country as to those in the metropolis.

Mr. Baynes, a country member, wished to state that the country members generally had full confidence in the Committee, and he was satisfied that the general feeling was that they were doing the best they could with the money placed at their disposal.

Mr. Hampson wished in some degree to support what had been said by Mr. Brown with regard to the care which ought to be exercised in making these grants, for he thought they ought to be even more careful in the future than they had been in the past. It was quite possible that other means than those already employed might be adopted to ascertain the genuineness of the cases which came before them, and it had occurred to him that they might utilize some officer of another society, accustomed to the investigation of such cases. He knew such a course had been adopted in Manchester with very good effect. He did not mean for a moment to say that they had distributed the fund without due care, but it was impossible to take too much pains in such matters.

Mr. Brown wished to add that he did not desire at all to call in question the administration of the benevolent fund, and it was quite in accordance with a former suggestion of his own, that grants made to individual cases of distress should be larger in amount than they had been, as more likely to be permanently useful. But as the amounts increased it was necessary that greater care should be exercised, and therefore he thought it might be worth considering whether they might not avail themselves of some other machinery, such as that of the Charity Organization Society, for investigating the cases that came before them.

The report was then unanimously adopted.

House.

The report of this Committee, stating that the principal part of the repairs, etc., which had been in progress in the house had been completed, was received and adopted.

Mr. Greenish called attention to the gas fittings in the museum, and the room above it, which he considered defective, causing not only a waste of gas, but an unnecessary amount of heat in the room. The matter was referred to the House Committee.

Pharmacy in Ireland.

The Secretary, having read a communication received from the Chemists and Druggists' Association of Ireland on the subject of extending the Pharmacy Act to that country, the Council resolved itself into a committee to consider this communication, and ultimately the following resolution was unanimously carried :—

"That it is desirable to extend the provisions of the Pharmacy Act to Ireland, and that the Secretary be instructed to inform the Chemists and Druggists' Association of Ireland that, though this Council cannot undertake to frame any measure for this purpose, should such be submitted to the Pharmaceutical Society or Parliament, every consideration would be given to it; and in the meantime the following gentlemen are appointed to conduct, in conjunction with the Secretary, a friendly correspondence with the Chemists and Druggists' Association of Ireland respecting the provisions desirable to be embodied in legislation : The President, Vice-President, Messrs. Betty, Brown, Greenish, Hampson, and Sandford."

Report of the Board of Examiners.

The Board of Examiners for Scotland reported that during the month of September they had held five meetings, and examined as follows :—

SCOTLAND.

September, 1874.

Examinations.	Candidates. Examined.	Passed.	Failed.
Minor, Sept. 22nd...	17	3	14
" " 23rd...	15	6	9
" " 24th...	17	8	9
" " 25th...	19	8	11
" " 28th...	7	3	4
	75	28	47
Modified " 28th...	4	4	0
	79	32	47

The Secretary also read the report of the deputation appointed to visit the North British Branch, on the occasion of the last examination, expressing generally great satisfaction with the arrangements made in Edinburgh for conducting the examinations, etc., and making suggestions for the improvement of certain matters of detail in connection with the institution there. The report was received, and the thanks of the Council voted to the deputation.

Mr. Hampson asked if Dr. Maclagan, the Government assessor, still continued to ask students questions respecting the use of the microscope?

The Vice-President said that during the three days the deputation was present Dr. Maclagan was unwell and not able to attend; but he believed he might answer the question in the negative.

Mr. Williams said he should like to hear the candid opinion of the deputation as to the value of the new premises in Edinburgh, and whether they were equal to the position and dignity of the Society?

The Vice-President said the premises themselves were all that could be desired; the only exception which could be taken to them arose from the fact of their being situated above a ground-floor used for business purposes. But as that was not considered an objection by the members in Edinburgh it was not for the deputation or the Council to complain, and probably the use of conspicuous door-plates, etc., would meet all the necessities of the case. As far as the rooms were concerned nothing could be better.

A letter having been read from the Honorary Secretary of the North British Branch, stating that money was required for current expenses, a grant of 100*l.* was made accordingly.

The Proposed Monument to Scheele.

The Secretary read a letter which he had received from the Acting Consul-General for Sweden and Norway, drawing attention to an address issued by the pharmacists of Sweden, and published in the Stockholm newspapers, inviting subscriptions for erecting a monument to the chemist Scheele, in his native town; any surplus being devoted to issuing a complete edition of his works.

The President said unfortunately the Society had no money at its disposal for such a purpose.

Mr. Greenish said he would recommend any who were not thoroughly acquainted with the works of Scheele to read a lecture delivered about a year ago by Dr. Tilden on his life and discoveries.

Mr. Williams said the Council officially could not do anything in this matter, but many gentlemen, no doubt, would be glad to contribute in their individual capacity. Probably the best plan would be to insert the communication in the Journal, and state that subscriptions would be received by the Secretary or the President. At the same time the occasion might be taken advantage of to invite subscribers to the memorial to Baron Liebig, which was not supported as it ought to be.

Mr. Brown said he believed the fund for the Liebig memorial was suffering for want of publicity; it had never been advertised in the large manufacturing districts of England, where he believed it would meet with very general support.

The Manchester Chemists and Druggists' Association.

Mr. Brown said he thought the time had come when this Association had a fair claim to a considerable grant from the parent Society. He had often opposed small grants to provincial Associations, for he believed many had made the mistake of applying at the outset instead of waiting until they had accomplished a certain amount of work, and then coming to the Society for recognition of what they had done. The Manchester Society had been established for many years, and since its formation in 1868 it had spent between £600 and £700, besides more than £60 in the formation of a library, and this was a fair guarantee that they had been in earnest in the work they had undertaken. This work resolved itself, primarily, into educational arrangements for the young men of the district, and hitherto these had been conducted entirely at their own expense; but they found that the number of young men who availed themselves of these facilities was not sufficiently large to properly remunerate the very efficient teacher whose services they had been fortunate enough to secure, and it had been necessary during the last session to give him a considerable grant in addition to the fees. This amount he thought they might fairly ask the parent Society to reimburse them. He did not ask them to vote a sum at once, but simply that the matter should be referred to the Pharmaceutical Education Committee, when he would attend before it, and show good reasons why they should recommend the Council to take such a course. If they did not do so he might again bring the subject before the Council itself. The amount he asked for was £50, which would, of course, be required annually,

Mr. Baynes said he cordially agreed in the spirit of Mr. Brown's speech, especially as the Hull Association had only a week ago passed a resolution to much the same effect.

Mr. Williams asked why the application could not be made, in the usual way, to the Pharmaceutical Education Committee.

A considerable discussion ensued on this point, Mr. Brown stating that he did not consider that, under the existing regulations, his application could properly made, in the first instance, to the Committee. Ultimately, however, after consulting the regulations he withdrew his motion, in deference to the generally expressed opinion of the Council, stating that he would make the application in the ordinary way to the Committee.

PHARMACEUTICAL MEETING.

Wednesday Evening, October 7th, 1874.

The Opening Meeting of the Session 1874-5 was held at 17, Bloomsbury Square, on Wednesday evening last. The chair was taken by the President, Mr. Thomas Hyde Hills.

The following list of Donations to the Library and Museum was taken as read, and the thanks of the Society were voted to the donors:—

'Proceedings of the American Pharmaceutical Association, 1873,' from the Association; 'Smithsonian Reports, 1871-2,' from the Smithsonian Institution; 'Third Annual Report of the Alumni Association of the New York College of Pharmacy,' from Mr. P. W. Bedford, Secretary; 'The Edinburgh University Calendar, 1874-5,' from the University; 'The Glasgow University Calendar, 1874-5,' from the University; 'Statistical Tables of Patients, 1873,' from St. Bartholomew's Hospital; 'Zwelfer's Animadversiones in Pharmacopœiam Augustanam, 1675,' from Mr. F. Andrews; 'Introduction to Pharmaceutical and Medical Chemistry,' from Dr. Muter.

Specimens of Sulpho-Carbolate of Sodium, from Mr. Hampson; Iron containing Titanium made from the Iron Sand of South Australia, an Emu's Egg, and Specimens of Quandang Stones, from Mr. Percy Wells; a Specimen of the Silphium Root of Cyrenaica, from Vice-Consul Henderson, of Bengazi; Fine Specimen of Larch Bark, from Mr. F. J. Hanbury; Specimens of Myristic Acid, Myristicate of Barium, and Myristicate of Sodium, from Prof. Flückiger; Specimen of the Wood of the Titi Tree of Honduras, from Mr. F. J. Chard.—For the Herbarium: Specimen of Artemisia Cina, from Prof. Dragendorff; Podophyllum Peltatum, Tulipa Sylvestris, and Holosteum Umbellatum, from Mr. Corder; Rheum Officinale in flower, from Mr. D. Hanbury; Colchicum Autumnale, from Mr. J. A. Jones.

Professor Redwood's Report upon the Chemistry and Pharmacy Class.

The Chairman then called upon Professor Redwood, as the senior professor, to present his report in reference to the Chemistry and Pharmacy Class.

Professor Redwood said the duty he was now called upon, in conjunction with his colleagues, to perform, was always a pleasant one, and not less so on this than on any former occasion. With regard to the class under his especial charge he could report very favourably in every respect. He had never had a more attentive, more industrious, or altogether a better conducted class than that of the last session. He had delivered two courses of lectures, the first terminating at the end of February, as to which he had already reported to the Council that the conduct of the students was everything that could be desired, and that the progress made by them in their studies, as far as he could judge by the weekly and other examinations, was quite satisfactory; so much so, indeed, as to satisfy him that a lecture course of five months' duration—which was about the length of the courses in all the great schools—was better for the students than a long and wearisome course of ten months, such as they had been previously accustomed to. His experience, indeed, was that before the termination of such a course the interest and application of the students too often began to flag. The course which ended in February consisted of sixty lectures, and leaving out those who entered after the course commenced, and one or two who left before it ended there was an average of more than 55 out of the 60 lectures attended by each student—a result superior to any he had ever before experienced. The attendance also at the weekly examinations throughout the course was unusually good, indicating an interest on the part of the students in the subjects treated of; and the proportion of those who entered as competitors at the examinations for prizes was greater than it had ever been on any former occasion in his experience. He had also reported to the Council in equally favourable terms on the second course. With regard to the prize examinations, there had been at the end of February an examination confined to students who had attended the first course, to whom a bronze medal was offered. Fifteen students presented themselves, and of these, six acquitted themselves in a sufficiently creditable manner to have entitled them under ordinary circumstances to some mark of distinction; the Council, however, had only offered one prize, and therefore nothing more could be given, though several students had been induced to compete in the hope that certificates of merit would be awarded. The successful competitor was Mr. James Kemble, who gained 90 per cent. of the possible number of marks. At the conclusion of the second course in July there were two examinations, one open to all students, for which a silver medal and certificates of honour and merit were offered, and the other confined to students of one course, a bronze medal only being offered. In the first examination there were thirteen competitors, seven of whom had obtained some mark of distinction. That these were all good men might be inferred from the fact that while the highest on the list obtained 90 marks out of 100, the lowest obtained as many as 70. The names were as follows:—Mr. William Henry Symons stood first, and obtained the silver medal; next came Mr. William Ayton Gostling, Mr. Harry Alma Thomas, and Mr. Alexander Whyte, all of whom came very nearly up to the first; and these gentlemen obtained certificates of honour. Then came Mr. Arthur Pearson Luff, Mr. Henry George Greenish, and Mr. William Arthur Thirlby, who were entitled to certificates of merit. In the examination for the bronze medal there were fewer competitors than on the previous occasion, arising from the fact that it was now known that no certificates would be awarded, because students soon came to know amongst themselves those who were likeliest to succeed in getting the only prize offered, and those who had not great confidence in themselves declined to compete. The successful candidate was Mr. William Henry Symons, who although only a one course man, had gone in for both examinations, and obtained the bronze as well as the silver medal. He had only to say further that he hoped those gentlemen who had really worked assiduously and well during their studentship, and who, he believed, had richly merited the rewards they had obtained, might be stimulated thereby to add further credit to the institution which was now conferring these marks of distinction upon them, and to advance by their future labours the cause of pharmacy which the institution had so deeply at heart.

The President then distributed, with a few appropriate words in each case, the prizes to the successful candidates, whose names are above mentioned.

The following were the questions for these examinations:—

The Bronze Medal.

Chemistry and Pharmacy.

Hours—Two to Five, p.m.

1. Describe the method of determining the specific gravity of a solid substance, such as wax, which is insoluble in water, and lighter than water.
2. Explain the phenomenon of capillarity.
3. Describe and explain the phenomenon of fluorescence.
4. How much water is required in a refrigerator for condensing the vapour of a gallon of water in the process of distillation? State the temperature of the water when introduced into, and removed from, the refrigerator, and mention the data on which the calculation is based.
5. Describe the sources and mode of production of carbonate of potash in the different states in which it is met with in commerce, or required for use as a chemical reagent.
6. Describe the pharmacopœia process for diluted phosphoric acid; explain what occurs in the process, and why the arrangements indicated are required.
7. What is the composition of acetic acid, and the strength of the different forms of this acid ordered in the pharmacopœia.

The Silver Medal and Certificates.

Hours—Ten to One, and Two to Five.

Morning Paper.

1. What is the value of the gramme weight, expressed in grains? What are the relations existing between the gramme, decagramme, and centigramme?
2. What is the weight of a fluid ounce of nitric acid, B.P.?
3. Name two or three articles that undergo liquid diffusion readily, and others that diffuse slowly or not at all.
4. What are the latent heats of water and of steam, and how are these latent heats determined?
5. What are the specific heats of water, oil, and mercury, and how are they determined?
6. Describe the principle of the action of the siphon.
7. Explain the meaning of the terms, *digestion*, *maceration*, *percolation*, *displacement*, *elutriation*.

Afternoon Paper.

8. Describe the production of oxygen gas, its characters and properties, and means by which it may be identified.
9. How is peroxide of hydrogen obtained, and what are its properties and composition?
10. Describe methods by which the decomposition of water may be effected, representing the products and reactions.
11. By passing chlorine gas into solution of caustic potash, either chlorate or hypochlorite of potassium may be produced. Explain the conditions that determine the formation of these products respectively.
12. What general characters apply to the group of ligneous, saccharine, and amylaceous bodies, and in what cases and under what conditions are some of these converted into others?
13. Describe the production of alcohol, ether, aldehyd, and acetic acid. Explain the relations of these to each other and their compositions.

Professor Bentley's Report on the Botany and Materia Medica Class.

Professor Bentley next gave his report as to the Botany and Materia Medica Class, commencing by saying that, although he had, in common with the rest of the world, taken a short vacation at the end of the summer, he found himself more pleasantly occupied when addressing his class in that institution. Dr. Redwood had so fully entered into the subject of the changes in the arrangements of the School of Pharmacy that he would not occupy time by going over the same ground again, though he most cordially supported everything which his colleague had said with regard to the conduct of the students—their diligence, and the progress they had made during the past year. There had never been a session in which he was more satisfied with the proportional attendance during the lectures, and especially during the examinations; and he could also say that all those awards which the Council had been recommended to make had been honourably obtained. The conduct of the students had been admirable, not only in that institution, but also at the gardens of the Royal Botanic Society, where they might perhaps have more excuse for taking recreation; he was happy to say, however, on this occasion, as he had done for twenty-five years, that whilst there they only thought of the work they came to do, and did not attempt to play until they got outside the gates. In the first course the bronze medal had been honourably obtained, with a high standard, by Mr. William Ayton Gostling; there was a good competition, and he should have liked to recommend to the Council several other competitors for decoration, had there been any distinction in the shape of certificates to award. With regard to the prizes delivered at the conclusion of the session, there was again a bronze medal for the five months' course, which was also honourably obtained by Mr. Alexander Whyte. There, again, there was a smaller competition, because the students knew pretty well the respective merits of their associates, and as there was but one prize open to them, the competition was necessarily limited. The prizes awarded for the whole ten months were only given after a searching written examination, and also a *vivâ voce* examination in systematic and practical botany. The silver medal was obtained by one of the Bell scholars, Mr. Arthur Pearson Luff, who, he was quite sure, judging from the very high merit he had exhibited on the present occasion, would maintain the credit of that name which was so much endeared to all in that Institution. Mr. William Arthur Thirlby and Mr. Alexander Whyte also obtained certificates of honour; the first being but very little behind Mr. Luff, the latter, he believed, having obtained 116 marks out of 125, and Mr. Thirlby 113; Mr. Whyte also obtained a very good proportion of marks. Certificates of merit were also awarded to three students who most honourably distinguished themselves, namely, Mr. W. A. Gostling, Mr. W. H. Symons, and Mr. Henry George Stacey. All these gentlemen might be called up by the President, with the fullest confidence that the progress of pharmacy would not deteriorate in their hands.

The following were the questions given at the conclusion of the first course in the examination for the bronze medal:—

Botany and Materia Medica.

Hours—Ten till One.

1. Define the following:—parenchyma, prosenchyma, chlorophyll, raphides, prickle, spine, tuber, tubercule, rhizome, and bulb.
2. What are the distinctive characters of roots and stems? Give a general sketch of the structure of an acrogenous stem.
3. Describe generally the structure of the seed, and explain the process of germination.
4. What are the geographical and botanical sources of Peruvian and Savanilla rhatany? Give the general characters of the two kinds, and mention the official preparations of rhatany in the British Pharmacopœia.
5. From what plants is Alexandrian senna derived? What are the common adulterants of this kind of senna, and how may they be detected?
6. How is scammony obtained? What are the characters of pure scammony? With what substances is it adulterated, and how may they be detected?
7. Distinguish between "mealy" and "non-mealy" sarsaparillas. What kind of sarsaparilla is official, and what are the preparations of the British Pharmacopœia?

The following were the questions for the examinations at the conclusion of the session:—

The Bronze Medal.

Materia Medica and Botany.

Hours from Ten till One.

1. Define the following:—epidermis, cuticle, hair, gland, stoma, vitta, lenticel, sting, herb, shrub, spine, and tendril.
2. Describe the general properties and structure of the cell-membrane or cell-wall.
3. Give a general sketch, in writing, of the distinctive characters of the stems of acotyledonous, monocotyledonous, and dicotyledonous stems.
4. Define the following:—bract, inflorescence, pollen, placenta, thalamus, ovule, seed, and germination.
5. Describe the physical and chemical characteristics of virgin scammony; mention the substances commonly employed to adulterate it, and the means by which such adulterations may be detected.
6. How is aloes obtained in the greatest state of purity? Describe the distinctive characteristics of socotrine, hepatic, and Barbadoes aloes.
7. What are the distinctive characters of aconite and horse-radish roots? Give the botanical names of the plants yielding them, the natural orders to which they belong, and state their properties, active constituents, and official preparations.

The Silver Medal and Certificates.

Botany.

Hours from Ten till One.

1. Describe the different kinds of woody tissue, and mention the plants and parts of plants in which they are respectively found.
2. Describe the structure of the bark of a dicotyledon, and show how it differs from the so-called bark of a monocotyledon.
3. Define the following terms:—decurrent, amplexicaul, connate, pinnate, pinnatifid, ligule, decussate, conduplicate, serrate, mucronate, pedate, and equitant.
4. What is the fruit? How would you distinguish small fruits from seeds?
5. Give the essential characters of the following natural orders, and enumerate the official plants which they respectively contain:—Cruciferæ, Malvaceæ, Umbelliferæ, Atropaceæ, Scrophulariaceæ, and Liliaceæ.

Materia Medica.

Hours from Two till Five.

1. What are the official substances in the British Pharmacopœia derived from the Menispermaceæ? Describe their botanical and geographical sources; their physical and chemical characters; and enumerate their official preparations.

2. What are the botanical and geographical sources of jalap? Describe the physical and chemical characteristics of the official jalap and of Tampico jalap; and show how jalap resin may be distinguished from scammony resin.

3. Describe the physical and chemical characters of nux vomica seeds and bark. Mention the characters by which the latter may be known from cusparia bark; and enumerate the official preparations of nux vomica and their respective doses.

4. Give the general characters and botanical sources of areca nut and larch bark, and mention their uses and official preparations.

5. Describe the characters of croton seeds; state their botanical and geographical sources; the manner in which croton oil is obtained, and the differences between East Indian and English croton oil.

The President having distributed the prizes to these gentlemen, called upon Professor Attfield to present his report.

Professor Attfield's Report on the Practical Chemistry Class.

Professor Attfield said he should, as usual, take as the basis of his remarks, regarding the class of practical chemistry, the report which he had had the honour to present to the Council at the close of the last session. During that session 93 pupils had attended the class, the average period of work being nearly four months each pupil. Those figures, however, scarcely conveyed an adequate idea of the amount of time which the students had spent in the laboratories, because some of the gentlemen had studied two or three days a week, or two or three hours daily; he would, therefore, endeavour to present the results in a different form. Thus, supposing it were the practice for every student to work the whole of every day; then, during last session, the average period of work of each pupil would have been 2·8 or nearly three months. Again, supposing that all students worked for three hours a day (which was now the usual time given to practical chemistry by the junior students, who found, if they worked all day in the laboratories, they had not sufficient time for their other studies), then the 93 students would have worked for no less a period, on the average, than 5·6, or nearly six months each. He did think it was a matter for congratulation, that inasmuch as the Minor examination could be prepared for, and was prepared for by the great majority of the many hundreds of candidates who now annually presented themselves, in one month or perhaps two repeated one-month courses of instruction—he could not say education—and that the majority of candidates did successfully pass the Minor examination after such a preparation, considering this fact, it should be a matter of congratulation to the Council and members of the Society, who had spent so much effort and money in the cause of real education, to find that last session so many as eighty or ninety students deliberately, and knowing what had just been stated, came to the Society's lecture room and laboratories, and spent no less than five months in gaining their education. If they could only get the chemists and druggists throughout the country who were interested in this matter, and who employed assistants and apprentices to recommend their young men, even as a matter of investment, to study, not for single months in all the subjects, but after working thoroughly at "Prescriptions," "Practical Dispensing," and "Pharmacy" in the shop, to then undergo at least a five months' course in theoretical and practical chemistry, botany, and materia medica, then the Society's school and the two or three schools at present open in the provinces might not only become self-supporting, but in time they might hope to arrive at what was equivalent to, if indeed not actually a compulsory course of five months' study, before the Minor examination could be passed. And when that was accomplished, it was to be hoped there would be found in pharmacy a sufficient demand for a longer course to justify the Council in reverting in the Society's central school to a ten months' course of lectures. He felt confident that such a time would come, though it might be distant, and there would then be a few, or at all events a larger number than now of gentlemen, who, while remaining in pharmacy, would devote two or even three years to the prosecution of their studies, and so be able to conduct pharmaceutical research. Thus only would they keep abreast in real education, and in the highest walks of pharmaceutical science, with the pharmacists of other countries in Europe and America. He had already referred to the attendance last session as being very good, under the existing limited demand for even such a moderate educational course as the Council had organized, and added on that point that the absence columns in the attendance book were only about 15 per cent. of the whole. He was also glad to report that the quality of the demand for chemical knowledge had greatly improved during the past two years, and especially during the past session. Three and four years ago he was constantly met in the classes by that disheartening question to any teacher really anxious to educate, "Will this be wanted for the examination?" But he was glad to say it was not so now. At that time, if he set certain students to make, say, oxygen gas or chlorine water, and returned in a short time expecting the whole affair to be in operation, he would find the apparatus dismounted, and no chlorine water made. On looking into the matter it would appear that the apparatus was so badly constructed that the chlorine, instead of going into the water, had all escaped into the air. On mildly but firmly suggesting that the operation should be repeated until it was successful, he would be met with the argument, "Well, but if I have not succeeded in making chlorine water, I know how to make it, and the very fact of my failure has so impressed the thing on my memory that I am sure no examiner could puzzle me on the subject." Of course, he had had to admit that this argument was sound so far as it went, but at the same time reminded such students that if they conducted all their studies on the same principle, although they might perhaps pass an examination in honours, they would not be able to carry on such operations as they might be called upon to perform in the course of business; that, still worse, they would be sailing under false colours, their moral perception would be damaged, and their sense of right and truth would ultimately be completely destroyed. To have to make such statements, and indeed to have to entertain such matters at all, was very disheartening to a teacher; but though he had met with them repeatedly three years ago, and still oftener four years ago, they had scarcely made their appearance last session, and hence he was able to say that the quality of the demand for instruction was improving. He would repeat the statement, that those who had come to his classes had been men who knew perfectly well that they could, so far as preparation for the examination was concerned, have obtained all that was necessary in a much shorter space of time; but, with their eyes open, they had preferred to come to the classes instituted by the Society, and to attend for five months, in order to obtain such knowledge as should be useful to them, not only when before the board examiners, but in their after life. The pupils who attended for the short periods were generally men who had previously worked at practical chemistry, or whose short special term was only an instalment of a long period. At the close of the session the examination for prizes was duly held, and various actual operations conducted, extending over two days. The candidates were permitted to use books or memoranda, for it was not his province to test the men's memories. He would briefly state the four operations required to be performed—1. Of what official *pilula* are the accompanying "two pills" composed? (That sounded pharmaceutical, but it was really chemical.) 2. What salts are present in "the aperient medicine" supplied to you? 3. How much sulphur is contained in the accompanying specimen of "impure precipitated sulphur"? 4. Ascertain the proportion of real acid in the sample of "diluted hydrocyanic acid." There was at the foot of the printed paper a note which was meant to be very suggestive, stating that manipulation as well as results would be scrutinized, because a man might hit on the right answer to a question by what was called a "fluke," but unless he were a good and thorough worker, he could not properly conduct operations under the eye of his examiner. Even in examinations in practical chemistry it was quite possible for a man to give an hour's sound work to a task, and then not be quite so near the truth as another man who had finished all operations in a quarter of an hour, and jumped at a conclusion; but still he who was not quite so exact in the result would be infinitely more worthy of reward. There were nine competitors, a smaller number than usual, owing to the fact that by a regulation passed last year the minimum period of study qualifying a student to compete was five months. Heretofore, three full months had qualified a candidate to compete for a certificate, and five for a medal. Under this regulation, only eleven qualified students remained in the laboratory at the end of July, and of these nine presented themselves, one retired, and three obtained less than 60 marks, 100 being the standard. The remaining five obtained places as follows. The first was a student, who, if he might be permitted to say so, was not a brilliant man; not one of those who, as had sometimes so appropriately been said, went up like a rocket and came down like its stick; but a plodding man, who, since he had finished his work at the end of the session, had been to South Kensington and taken a scholarship at the College of Chemistry. This gentleman obtained the full standard number of marks, 100, which he believed was the first instance of such a distinction in the laboratories since he had been Professor of Practical Chemistry. This first prizeman was Mr. Arthur Pearson Luff, whose name had already more than once been heard as a prize taker. Next to him came a student who had gained more than the number of marks qualifying for a silver medal, but there being only one of silver, he has to be content with a bronze medal. This was Mr. W. A. Gostling, who obtained 90 per cent. of the full number of marks. The next candidate's work was perfect as far as it went, and he, Mr. A. F. Sainsbury, having obtained 75 marks, would receive the second bronze medal. Then came two gentlemen who obtained certificates of merit, Mr. A. J. Carter with 70 marks, and Mr. W. A. Thirlby with 65.

The following were the questions for this examination:—

Practical Chemistry.

Hours—Ten to Five each day. Books and Memoranda permitted. Standard Number of Marks, 100.

1. Of what official *pilula* are the accompanying "two pills" composed.
2. What salts are present in "the aperient medicine" supplied to you?
3. How much sulphur is contained in the specimen of "impure precipitated sulphur" placed before you?
4. Ascertain the proportion of real acid in the sample of "diluted hydrocyanic acid."

Note.—Manipulation as well as results will be scrutinized.

The Herbarium Prize.

Professor Bentley, being requested by the President to make his report with regard to the Herbarium Prize, said he need scarcely remind young students that prizes were given each year by the Council for the best collections of British plants. He was sorry that on the present occasion they had not had more collections sent in for competition, as nothing could be better practice for, or more useful to, young students in the country than spending the early hours of the morning in collecting plants. A great deal had been said, and with truth, as to the difficulty which apprentices had in carrying out such an enterprise, but at the same time, although he did not like to speak of himself, he knew perfectly well that nearly all his knowledge of botany had been gained between the hours of four and eight in the morning, and therefore he would urge upon all young apprentices the importance of thus practically making themselves acquainted with the study of plants. He regretted that only one collection had been now sent in, and hoped that this would be the last time he should have to make such an announcement. It might, perhaps, be accounted for by the fact that for several years collections of very high merit had been forwarded for competition, and he was afraid at the time that this might act as a discouragement to others, from the idea that, unless they could reach an equally high standard, it would be useless for them to attempt to compete. He hoped that feeling would not prevail in future, because, whether a silver or bronze medal, or a certificate was awarded, in any case it was a considerable distinction, and was well worth striving for. He had now to announce that the Council had, on his recommendation, awarded the bronze medal to Mr. Thomas William Nettleship, an apprentice, for his collection; and he had honourably obtained, and well deserved, such a distinction. In conclusion, Professor Bentley said that young students, in collecting plants, should bear in mind that not only the number of specimens should be attended to, but that the merit of the collection, in a great measure, depended on the character of the specimens collected, and he would therefore urge particularly on all those engaging in this work, not only to strive to obtain a large number of plants, but also to look particularly to the fact that those specimens should be properly named;

and that they should be good typical specimens—not a leaf to represent a species, or a leaf and a bad flower, or a plant without fruit—but a specimen which exhibited in itself all the characteristics of the species.

The Pereira Medal.

The Pereira Medal had been awarded to Mr. Arthur Pearson Luff, to whom the President now presented it, adding a few kindly words of congratulation.

The following were the questions for this examination:—

The Pereira Medal.

Hours—Ten a.m. to One p.m.

CHEMISTRY.

1. How would you determine the composition of water? Explain minutely the apparatus used for its synthetical and analytical examination.

2. What are the simplest forms belonging to the regular or cubic system of crystallography? Name some of the substances whose form may be referred to this division.

3. Describe and give the methods for preparing the following:—the hydride, chloride, and alcohol of the methyl series. The hydride, iodide, and carbonate of the ethyl series.

4. How would you separate gold and platinum from a solution containing the two metals?

BOTANY.

Hours—Two p.m. to Five p.m.

1. Give the botanical character of the sugar cane, and a short account of its natural history.

2. Are the starch granules of wheat, barley, and maize identical in their appearance, and, if not, how do they differ?

3. Name and describe the various forms of æstivation, with an example of each.

MATERIA MEDICA.

1. Socotrine, Barbadoes, and Natal aloes each yield an aloin: describe the action of nitric acid on these aloins respectively.

2. State if Aconitum napellus and Aconitum ferox yield the same alkaloids, and describe the method of preparing them.

3. Describe the manner in which cochineal is cultivated, and give the natural order to which it belongs.

The Prize of Books.

The Prize of Books, competed for by those who had passed the Minor examination in honours during the year, was presented to Mr. Arthur Pearson Luff.

The following were the questions for this examination:—

The Prize of Books.

Hours—Eleven a.m. to One p.m.

State the best method of dispensing the following prescriptions, assign reasons for the same, and write the labels in suitable language:—

℞ Potassii Iodidi
Potassii Bromidi āā gr. xv.
Ferri et Quin. Citrat. gr. xxx.
Sp. Chloroform. ʒij.
Aquæ ad ℥vj.

M. ft. mist cujus cap. cochleare mediocre ex aquæ vel vini semicyatho vinoso, bis terve die per septimanam integram.

℞ Ext. Nucis Vomic. gr. $\frac{1}{2}$.
Ferri Sulphat. gr. i$\frac{1}{2}$.
Pulv. Rhei gr. ij.

M. ft. pil. ter quaterve die inter cibos sumend.

State specific gravities of chloroform, sp. ætheris nit., alcohol, spiritus rectificatus, and spiritus tenuior.

Describe and explain the B. P. process for making pyroxilin.

State the B. P. processes for making syrup of rhubarb and syrup of tolu.

State the B. P. process for making Linimen:. potassii iodidi c. sapone, and suggest any improvement that might be made.

The Jacob Bell Memorial Scholarships.

The President then announced that the Jacob Bell Memorial Scholarships for the Session had been awarded to Mr. William Henry Vernon and Mr. George Green.

The following were the questions for this examination:—

Hours—Four to Six p.m.

CHEMISTRY AND PHARMACY.

1. State the action of nitric, sulphuric, and hydrochloric acids upon metallic iron, and show the nature of the changes which occur by equations.

2. How would you make liquor potassæ and liquor plumbi subacetatis? By what methods would you determine the purity and strength of these preparations?

3. Write the composition, in symbols, of sulphate of copper, sulphate of zinc, nitrate of lead, nitrate of mercury, red precipitate, and red lead.

4. Describe all the processes that you know by which oxygen may be prepared. State the properties of this element.

BOTANY.

5. Describe the following:—"Corm, bulb, rhizome, tuber, tubercle, perianth," and give examples in support of your definition.

6. Describe minutely the flowers of the common "buttercup, daisy, and crocus."

Hours—12 to 3 p.m.

Latin.

1. Translate the following into English, and parse the concluding sentence of the quotation—

"At domus interior gemitu miseroque tumultu
Miscetur; penitusque cavæ plangoribus ædes
Femineis ululant; ferit aurea sidera clamor.
Tum pavidæ tectis matres ingentibus errant,
Amplexæque tenent postes, atque oscula figunt.
Instat vi patria Pyrrhus; nec claustra, neque ipsi
Custodes sufferre valent."

2. Translate the following into English—

Resina flava aut ex flavo fusca, opaca aut diaphana, fragilis, in fractura nitens, manu tractata emollescens, odoris terebinthini, in spiritu fere tota solubilis.

Arithmetic.

3. Reduce to decimals $\frac{7\cdot75}{9}$ of $\frac{2\frac{1}{2}}{2\frac{7}{9}}$ of $\frac{20}{31}$.

4. Show that if $1\frac{1}{12}$, $2\frac{2}{15}$, $3\frac{3}{20}$, $4\frac{4}{27}$ be added together, (1) as fractions, and (2) as decimals, the results coincide.

5. If 15 horses and 148 sheep can be kept 9 days for £75 15s., what sum will keep 10 horses and 132 sheep for 8 days, supposing 5 horses to eat as much as 84 sheep?

English.

6. Write from 30 to 40 lines on the value or otherwise of competitive examinations.

*French and German.**

7. Translate into English the following—

"Vous fûtes spectateur de cette nuit dernière,
Lorsque, pour seconder ses soins religieux,

* The candidate is at liberty to choose French *or* German. He is *not* required to show a knowledge of *both*.

Le sénat a placé son père entre les dieux.
De ce juste devoir sa piété contente
A fait place, seigneur, aux soins de son amante ;
Et même en ce moment, sans qu'il m'en ait parlé,
Il est dans le sénat, par son ordre assemblé."

8. Render into good *German* the following sentences—He has lived in the country. She has dwelt in town. It has rained all day. We have danced, and you have laughed at it. They have had a good father, and have always loved him.

The Hill's Prize.

The Vice-President (Mr. Alexander Bottle) said the Secretary had put into his hand a list of prizes which he probably thought the President would prefer not to read. It would be within the recollection of most of those present that a year or two ago Mr. Hills invested a certain sum of money as a fund, out of which to present a prize to the best man at each of the Minor examinations, and though his well-known liberality was exceeded by his modesty, it was but right that the names of those who had obtained these prizes should be mentioned. They were as follows :—Frederick Hearne, James H. Spencer, Evan John Howell, Alfred Wood, James West Knights, Alfred Coleman, Edward R. Marsh, John Overton, Charles R. Riley, Jabez Abraham Jones. He would only detain the meeting one minute longer, to assure the students that prizes of equal value would be awarded next year, and to urge upon them to be unremitting in their efforts. They had heard from Dr. Attfield that one student had actually attained perfection, and nothing short of this should be their aim.

The Inaugural Sessional Address.

The following address to the students about to commence their studies in the school of pharmacy was then delivered by Mr. Richard William Giles, of Clifton :—

Gentlemen, — Students of the Pharmaceutical Society's School of Pharmacy,—

My first pleasing duty is to bid you heartily welcome to these Halls. Welcome in the name of the School, of the Society, and of the brotherhood of pharmacy throughout the kingdom, who look to you and to those who may come after you with like aspirations, to take up and to carry on the work in which they are now engaged, to sustain the edifice which they have laboured to construct, to advance the standard of English pharmacy, and to bear it to the front in friendly emulation with the civilized nations of the world. But better welcome than words can give may be read in the ample provision here made for your guidance in those studies which are the foundation of scientific pharmacy. You have but to survey the museum, the library, the lecture-room (in which we are now assembled), and the laboratories of this institution, to see what infinite pains, what generous expenditure, what practised experience, have been bestowed to make your welcome complete. You have yet to learn what accomplished teaching animates the whole, and to experience the kindly co-operation of the professors, which I undertake to assure you will not fail those who diligently follow the course of instruction marked out for them. These preparations are all for you, and the only return desired is that you shall so employ them that they may contribute to your own happiness, honour, and prosperity. The constant aim of this Society, the single purpose of its School, the only use of these sessional addresses (if, indeed, they may aspire to any usefulness), is to promote pharmaceutical education, and thereby to increase the welfare of the pharmaceutist, and to give improved accommodation to the public.

It was not always so. There were dark days before the Pharmaceutical Society rose to be a power. It may encourage you to appreciate the opportunities which you enjoy, and stimulate you to make good use of them, if I briefly compare the conditions of a few years ago with the circumstances of the present time. Pharmacy had probably sunk to its lowest point of degradation ; its professors were commonly wanting in the training necessary for conducting it scientifically ; an opinion (still unfortunately prevalent) that a smaller capital sufficed to establish a chemist's shop than was required for the stock of other trades, attracted men of small means ; and, so far as my observation allows me to judge, the quality of the chemists of that day was inferior to that of those who preceded them ; the shops were more numerous and less important, and the business was done upon a less liberal scale. Happily *Latin* was popularly supposed to be indispensable, and although the quantity was usually homœopathic and the quality "canine," this superstition was the sole foundation upon which pharmacy could rest its claim to a status above the unscientific trades, and should accordingly have secured for itself our respect and veneration. It was an ungrateful return for this good service that the first Pharmacopœia in the compilation of which the pharmaceutical body were officially represented should have proved the occasion for abandoning the Latin text for the vulgar tongue ; but in the meantime our classical pretensions had been preserved by the institution of the Preliminary examination.

In those days, pharmacy had no corporate existence; its members were not characterized by gregarious instincts ; they might properly have been described as solitary and sedentary ; they had no central home, no wandering conference ; there was no school where the art and mystery of pharmacy was scientifically and systematically taught ; there was no pharmaceutical literature, there was no demand for any ; each man worked out the narrow problem of his life beneath his own peculiar vine and fig-tree, and left his neighbour to do the like.

Yet this period of deep depression could produce such men as Allen, Bell, Paine, Morson, Deane, Savory, Squire, and others of whose names we may be justly proud. Where there is a will there will always be found a way, and it would be impossible to refer you to a more pleasing illustration of this good old proverb than the autobiography of the late lamented Henry Deane. Truly there were giants in those days, but the average stature was the measure of a dwarf. It is not, therefore, wonderful if the general body of chemists and druggists failed to commend themselves to the confidence of the medical profession ; they also failed to impress the public with any exalted respect for their attainments. The natural consequence was, that they held a precarious position, and were in chronic fear of hostile legislation. A panic, produced by an accidental aggravation of this state of apprehension, led to the establishment of the Pharmaceutical Society, and now, after a period of thirty years, we are met to-night to carry out that system of compulsory qualification (the bugbear of my youth) which has been brought into operation mainly by the instrumentality of the Society which at first sight seemed intended to thwart it. We may truly say, "Tempora mutantur"; may we not thankfully add, "Nos mutamur ab illis"?

It would be foreign to our business this evening, to follow minutely the political history of the Pharmaceutical Society—suffice it to say that it is the history of the progress of English pharmacy in its era of greatest activity; but I am sure that you will bear with me while I pay a just tribute of gratitude to the clear-sightedness of the distinguished men who led that important movement, and who had the sagacity and elevation of mind to make *education* the basis of their Association. They had the wisdom of unselfishness, and instinctively perceived that stability might be given to a temporary combination by identifying it with a scheme of permanent public utility. In the natural course of events there are but few of them who now remain to us, but amongst the many treasures of this Institution there are none more cherished than the life-like portraits of those worthy founders of scientific pharmacy in England, whose names are hallowed memories to us, and will long survive as household words familiar to those by whom we, in our turn, shall be succeeded.

But I must not grow garrulous over reminiscences of the past, forgetting that you are young and that your interest is in the future, while it is many years since I sat where you now sit, when these memories were passing events. But for this I would fain dwell a little longer upon the school as I then knew it, upon the many valued friendships which date from that well-remembered session, and the professors whom I learnt to revere so truly—Fownes, Pereira, Thompson, Redwood! It is no small honour to our Society to be able to connect its traditions with these distinguished names; it was a priceless advantage to its early growth to have had such men associated with it. It is time, however, to turn from these retrospects to more practical concerns, and to consider how I may best interest you in the work that lies before you, and how I may encourage you to make profitable use of the coming session, in which you doubtless hope to complete your technical training, and to accomplish your preparation for a life of honourable duty.

It is customary upon occasions similar to the present for the speaker to depict in glowing colours the attractions of science, and to expatiate upon the exalted pleasures which reward those who penetrate into the ever-varied wonders of nature, and by diligent observation of phenomena, which to indifferent observers appear incongruous or contradictory, to resolve them (as the tendency of all scientific research is) into common laws of simple harmony. No loftier exercise of the intellect can be imagined than this; it raises humanity to the highest eminence to which it can attain—the appreciation, namely, of the works of God, and of the unity and beneficence which his works unfold. By such example the student is appropriately exhorted to enrich his mind also with the knowledge which these pioneers of science have accumulated for the common good.

Such language would of right belong to one who had traversed the wide domains of science, and drank deeply of its ennobling springs, or, more distinguished still, had extended its domains in paths peculiarly his own. He alone could touch with magic power those sympathies within you which no weak echoes of his nobler strain may hope to stir. But candour compels me to confess that I have not trodden these sublime heights, and I stand abashed at the presumption of attempting to portray them. I dare not soar with borrowed wings, but rather will I invite you to wander with me in the lowly plains, talking at ease of things familiar, and hoping that even so you may find encouragement to do with all your heart the work to which your hand is set.

First, then, let us make sure that you rightly understand the objects for which you are here. I take it for granted that it is your intention to make pharmacy your vocation, and that you will be willing to devote a few moments to the consideration of its character and scope before we go on to speak of the scientific education which is a necessary part of its preliminary training.

Pharmacy is a trade. This was well and honestly said by Mr. Ince, at Nottingham. Pharmacy is a trade—more momentous than other trades—charged with graver responsibilities—demanding a higher morality, and qualifications similar to, if not absolutely identical with, those which belong to the professions—but still a trade; and it will be well for the comfort of those who propose to follow it that they should learn from the first to accept it on these terms. In spite of sentimental yearnings after the dubious status of a profession, it is satisfactory to know that men who have been the brightest ornaments and the most eminent representatives of pharmacy have frankly accepted this position, and *we* may do the like without compromising our dignity or proving recreant to our order. The responsible nature of our business imposes upon us a professional standard of ethics, and it follows that this demands a corresponding elevation of status; but it would expose us to merited derision, if we sought to invert the natural order by which these results are attained. The status of pharmacy will be best raised by the diffusion of a higher educational tone amongst us, which must, in the end, command respect.

Again, pharmacy has a scope wider than the duties of the shop, though even these should be extended beyond their customary restricted range; it makes visible pretensions to the sciences of chemistry and botany, and must be gauged by its fulfilment of these pretensions. Although of late years we have made some progress, we have not done more than keep abreast of the age, which has equally awakened to the importance of scientific knowledge. It now forms part of the curriculum of all good schools, and is the most characteristic feature of the educational activity of the present era. As the results of this change become developed, we may anticipate that every well-educated Englishman will possess at least an elementary knowledge of the physical sciences; and a relative proficiency in those sciences which are allied to your calling will be required of you. The pharmacist of the future will be expected to know and to be able to assist others in exploring the flora and geology of his neighbourhood, and generally to take part in its local scientific associations. He will no longer be able to assume a virtue if he has it not, for his pretensions will be seen through and derided. He will be forced up (or trodden down) by the pressure of the crowd. He must be competent to act as the intelligent coadjutor of the physician, assisting him in investigations demanding the application of chemistry, which is *his* legitimate department. He will frequently be consulted upon questions relating to the chemistry of common life: in sanitary matters, such, for example, as the chemistry of disinfectants, he is the natural adviser of the medical profession and of the public. Minor analyses will be brought to him, which would probably not find their way to the public analyst, while this appointment is itself open to him if sufficiently qualified; and I hold that under a satisfactory condition of pharmacy it would be for the public convenience, as well as for our credit and advantage, that it should generally be filled by a pharmaceutical chemist There are already instances in which it is honourably held by members of our body, notably in my own city. Such are some of the considerations which challenge your attention at the time when you are about to qualify yourselves—not for the pharmacy of the past, but for the advancing pharmacy of the future. It seems probable that greater changes are impending than we have yet seen, and you will do well to lay your foundations wide and deep in preparation for the superstructure, whose exact form and dimensions you cannot with certainty foresee.

With these prospects before you, you are about to enter upon a short course of systematic study—so short, that without the previous preparation which this school, in common with every advanced school, presupposes, it would be altogether insufficient, and under the most advantageous conditions it can only be regarded as a bare minimum. It is understood that you have passed a satisfactory Preliminary examination in the usual school subjects, that you therefore possess an average degree of intelligence, and have *learned how to learn* by the mental discipline inculcated at some good school. The test of the Preliminary examination is as indulgent as the case permits, perhaps too lenient; but it is to be hoped that the Society will be enabled before long to delegate this office entirely to such hands as will give assurance of efficiency; for it is obvious that the subjects of the Preliminary examination are no part of the curriculum of a pharmaceutical education, but that it is an ordeal to be passed as a condition precedent to apprenticeship. It is further assumed that you have spent an apprenticeship, or at least some considerable part of it, in a pharmacy where you have already become familiar with the drugs, chemicals, and preparations ordinarily employed in medicine, that you know their physical characters, and have some general acquaintance with their properties and behaviour, *e. g.*, as to solubility, crystallizability, etc., and that you have learnt the officinal names, which more or less accurately indicate their chemical constitution and natural relations. In all probability most of you have extended this information, acquired in the routine of shop duties, by some amount of study in the way of scientific reading and attendance at lectures. In fact, you have made with little effort considerable progress in the vocabulary of chemistry and botany, but you want the grammar which shall consolidate these disconnected words into a living language. If you have come here, as I trust you have, honestly bent upon learning your grammar like good boys, that you may speak hereafter like wise men, I venture to promise that you shall not go away disappointed. I hope that you will make this session memorable by your attention to its duties, that you will be constant in attendance at lectures, never permitting yourselves to miss a single one, for it breaks the thread and interrupts the continuity (as I know by bitter experience, for did I not miss one myself?), that you will work diligently in the laboratory, following the course which is as systematically progressive as the courses of lectures, and that you will not fail to supplement these recreations—for such you will find them—by steady reading at home in connection with the subjects of the day. I beseech you not to neglect this last exercise, for you can never read to so much profit as when the subject is vividly impressed upon your senses by the tangible operations of the day, and when it is presented to your apprehension in its proper order of sequence.

I would not be the one to press study upon you to an excessive extent, for I believe there is true wisdom in the homely saying that "All work and no play makes Jack a dull boy;" but it is equally true that there is a time for all things, and this is pre-eminently your time to study, for in all probability it is the golden opportunity which will never return to you again. Ten months, as I have said, is a very short period in which to acquire that moderate amount of proficiency in pharmaceutical science absolutely necessary to enable you to make a respectable figure in after-life. If any one amongst you thinks differently, let him reflect how grievously he would depreciate the dignity of pharmacy, which it should be our aim to exalt. What status could we dare to claim on the score of so much scientific education as it would be possible to compress into a period of six—or would you say three months? Every good thing is worth its price, and none may hope to win the laurel without the dust of the strife. But this is not strictly true; there are, alas! those who do this, who aspire to the laurel without braving the dangers of the fight, and unfortunately they do often succeed in carrying off some dead leaves, which they wear with the complacency of conquerors. You will be at no loss to understand that I speak of those misguided youths—students we cannot call them—who give themselves up to the manipulations of the professed "crammer," and conspire by means most unworthy to elude the penetration of the examiners, and to obtain a certificate of qualifications which they know full well they do not possess. The object of examinations is to exclude the unqualified; the scarcely disguised object of "cram" is to pass the unqualified through. Whether at our own school or elsewhere a term of one, two, or three months is totally inadequate for the preparation which pharmacy requires of its disciples, and utterly insufficient to afford that amount of qualification which public opinion demands. Every school is, of course, subject to be abused by candidates who—caring only for the specious pretensions of a certificate—enter for these short periods, and it is only when the school wilfully lends itself to the abuse that it can fairly be held responsible. The cramming system does this, and is working so much mischief to *bonâ fide* education, that it is the bounden duty of all honest men to unite in stamping it out. Its operations are widespread; wherever examinations prevail (and where do they not?) this noxious parasite springs up and poisons the air. In the universities, the professional colleges, the army, the navy, the civil service—everywhere the evil is rampant and, it must be admitted, triumphant; and everywhere the wail of examiners, cheated with open eyes, goes up. To show that our examiners are not more easily imposed upon than others, I will read a short extract from an article upon "cramming" in a popular periodical :—

"The disgusted examiner gradually recognizes that he is not conversing with George Griffin, jun., but with Dr. Varnish, M.A., etc., etc., who speaks all languages, knows something of everything, and is growing rich apace by preparing young gentlemen for the civil and military service of their country. Mr. Griffin is there in the body, certainly, with pink ears and heated forehead, and his preceptor is as undoubtedly absent; but nevertheless the examiner cannot but feel that all his efforts are as thoroughly baffled as if the young man were a medium, and Dr. Varnish held him under some as yet unknown mesmeric influence. There is no getting at the lad's real brain, no finding out what he will be, when at no distant date he shall have forgotten Varnish and all his works. As it is, that subtle instructor of youth has armed him at all points; he is a pattern pupil, and has absorbed exactly such information, and no more, as will help him through the ordeal before him. If caught tripping on one subject, he is comfortably bolstered up on all the rest, and as the defeated examiner grudgingly sends in his name at the top of the list, he is forced to acknowledge with a sigh that Varnish is a very clever fellow."

This graphic sketch conveys the painful impression that the newly-developed idea of universal examinations, which was doubtless expected to give encouragement to education, has had a contrary effect; that it has diverted attention from education to fix it upon examination—that it has overwhelmed the substance in its own shadow, and invested the shadow with the semblance of reality. The pharmaceutical crammer is equal to the occasion; he tempts unwary youths (ignorant, let us hope, of the full extent of the deception in which they are about to take part) with the flattering assurance that he will qualify them for the examinations in five weeks! and forthwith commences a carefully digested course of unmeaning jargon, of which, I am told, the following is a specimen, "Three—one—five, catch 'em alive; one—two—three, out goes she"! And this, by some inscrutable property of association, is said to enable the candidate for pharmaceutical honours to remember (till next examination day) the respective constitution of carbonate of magnesia and carbonate of zinc! but for all useful purposes, for all that makes knowledge convertible into power to be utilized in after-life, he is as ignorant as he was before.

Lest you should ever be tempted to avail yourselves of these meretricious devices, and to wander from the rugged track which leads to knowledge in pursuit of some softer, enervating road, I will furnish you with a talisman of power, if you will only trust to it. I pray you in your hour of weakness to remember—and not to pervert—the old, the wise, the manful maxim, "Labor omnia vincit."

It is told of a Bristol worthy, that he was one day found seated in a well-stored library, deep in perusal of a book, and being complimented by his visitor upon this evidence of tastes not previously suspected, he is said to have replied in reproachful accents, "Yes, Mr. D., here I sits all the day, and I reads and I reads, *but nobody is any the wiser.*" If nobody was any the wiser, we may at least hope that nobody was any the worse, which is more than can be said for the votary of "cram." He is none the wiser for a miserable mockery of education, but he is the worse for the fraud in which he has been an accomplice, for the dishonour which he does to his profession, and for the deception of a career based upon false pretences.

Some hope may be derived from an explanation which is at least plausible of the present excessive development of pharmaceutical "cram;" it might have been foreseen that the substitution of compulsory qualification for voluntary, would create a panic amongst those who had committed themselves to the vocation of pharmacy without sufficiently counting the cost. In spite of frequent warnings and repeated opportunities of grace, many young men now find themselves in this false position, and are dismayed at the prospect of examinations which they would not allow themselves to be persuaded would become obligatory upon them. They feel that they are not prepared to pass legitimately, and they jump at any help that offers without criticizing it too closely, like drowning men catching at straws. If this be a just interpretation of the present unsatisfactory aspect of pharmaceutical education which embarrasses our examiners and disheartens our professors, we may hope that the magnitude of the evil at least is temporary, and will die out when the present crisis is passed; but if this hopeful anticipation should not be realized, strong measures must be taken to put it down. We cannot afford to sacrifice the labours of thirty years to an ugly fetish, nor will we consent to do it. The obvious remedy is the establishment of a compulsory curriculum of education at recognized schools as a condition of examination. The principle is generally adopted elsewhere; it prevails at the old universities, at the medical schools, at the more recently established Veterinary College, and in the Continental schools of pharmacy; and there is no feature of our system which our Continental brethren view with so much disapproval (not to say contempt), or regard as such a fatal blot upon its efficiency, as the absence of a prescribed course of study. I cordially agree with them, and speaking here without official reserve, and without the fear of implicating the higher powers (I may also say, without much fear of offending them), I express my deliberate conviction that a compulsory curriculum must sooner or later be adopted, and the sooner the better. This, and this only, will solve the difficulties of what we have been pleased to call "provincial pharmaceutical education," but which should be more broadly spoken of as "national pharmaceutical education," without distinction of place; and it may even turn out that "cram," over which we now groan, may prove to be a blessing in disguise by hastening this consummation so devoutly to be wished.

It may seem to you that I have wasted a good deal of virtuous indignation; that this outcry against "cram" may be very just, but that it is out of place upon the present occasion, and you may be disposed to resent the application of such a homily to *you*. My young friends, I am not sure that you are all as virtuous as you look, though I sincerely hope that your "ingenuous countenances" do not belie you. There are degrees in "cram," and, though I may not suspect you of its barefaced enormity, you may perchance be tainted with its vices in some milder degree. I ask you, then, pointedly—What brought you here? Did you come impelled by an Englishman's sense of duty, by the honest desire to qualify yourselves for your future life, to do that which lies before you in a manful and exemplary manner,—and in due time to submit the validity of your qualification to the test of fair examination? Did you so? If you can answer this home question.

with a loyal "Aye"! then I am authorized in the name of this Institution to bid you the heartiest God-speed, to lead you to its most favoured seat, and to promise you abundant success; but anything short of this is a step on the road to "cram." If you come here making the examinations the first object of your heart's desire, and the pursuit of knowledge subordinate to that low end—then I am constrained to warn you that you cherish a mischievous delusion which is parent of "cram." You confound the shadow with the substance, and "will come to fight with shadows and to fall," in your own esteem and in the opinion of others.

It is my duty to urge you, with all the cogency which I can command, to qualify for the highest grade in pharmacy; to be satisfied with nothing short of the Major qualification, which I unhesitatingly assert is fairly within reach of all who make proper use of the opportunities of this school. It may be that the Major qualification is not absolutely imperative, that the Pharmacy Act recognizes the inferior grade, and confers upon it equal trading privileges; and if your ambition were limited by Act of Parliament, you might contend that the Minor qualification accomplished all your wishes. But this is not the language we hope for from you. To whom can we look if not to the pupils of our own School to uphold the highest standard of pharmaceutical education? The Minor qualification may suffice for some,—it is no fit goal for you; and I have addressed you to little purpose if your aspirations soar no higher. Let me once again entreat you to seek knowledge for its own sake; it will beautify that which would otherwise be merest drudgery; it will invest your daily avocations with a new meaning, and will enable you to restore to pharmacy those interesting processes which a former era relegated to alien hands while it retained only that which was monotonous. Even in the lowest view of your worldly prospects, it would be a blunder to forego the higher qualification. Nothing is more likely than that your advancement in life may be determined by the nature of the qualification you can claim, and you may hereafter bitterly lament your unwisdom if you do not avail yourselves of the present opportunity.

Let me exhort you to place confidence in yourselves, though you may be conscious that your abilities are not remarkable. The practice of holding up exceptional talent for general imitation is not only unfair but demoralizing in its effect, and I will not follow it. I have the highest respect for honest, painstaking mediocrity, and believe that we need covet nothing to which it cannot attain. 'Arma virumque' sang the poet of old, and I too will sing not of *heroes* but a *man* equipped—equipped with such weapons as this school and his own manhood can furnish; arms of proof for the battle of life—not the tinsel weapons forged only to glitter in a fancy skirmish with examiners. Be of good courage, my young friends, and take comfort from the reflection that the best, if not most brilliant, part of the world's work is done, and done well, by respectable mediocrity; and in all probability the greatest happiness as well as the greatest usefulness is achieved by those who may safely be trusted with lucifer matches on the banks of the Thames.

I may not pass over, though I can only briefly touch upon, one other topic of the hour in which your subordination as students, and your behaviour as gentlemen, are concerned. I refer to the admission of lady-students to the lecture classes of this school. It is not my business in this address, still less does it become you, to question the policy by which the internal administration of the Pharmaceutical Society is governed. Your duty is to respect the regulations which you find in force; and if it were not that ill-advised demonstrations have been made elsewhere, it might not seem necessary to allude to so small a matter. If I were to express an opinion upon the general question, it would probably be that, if the ladies were allowed to have their own way in this as they are in most other matters, the present 'Tempest' in the pharmaceutical teapot would prove to be a veritable 'Much Ado about Nothing;' and I for one can neither fear nor hope that any concessions which we may make will realize the poet's dream—

> "Pretty were the sight
> If our old halls should change their sex and flaunt
> With prudes for proctors, dowagers for deans,
> And sweet girl graduates in their golden hair."

As it is, I have but to ask you to behave towards the lady-students whom you may meet here during the session with the respectful courtesy which characterizes the conduct of a gentleman to a lady under all circumstances. The position of the lady-students is somewhat novel, and (connected with recent events) will excuse me for cautioning them that the assertion of "equal rights" is inconsistent with claims for special privileges, and they must be prepared to defer to the same discipline as other students, and to accept, without contention, the Examiners' estimate of their qualifications.

Gentlemen, I have now brought my "rustic oration" to a close. It has so far outgrown my intentions that I will not further abuse your patience by a formal peroration. I will, however, make one personal appeal to your generous impulses. The past Presidents of the Pharmaceutical Society have always been men of eminent position, and have usually brought some special qualification for their important office. The President of the present time is the most popular of Pharmaceutists, as repeated Council elections have testified. I need not remind you that an enduring popularity is not the result of accident. Mr. Hills owes the affectionate esteem with which he is regarded to a large-hearted liberality which is part of his nature, and which we will not stop to praise; but his special characteristic is the deep and sustained interest which he has ever taken in pharmaceutical education and the welfare of pharmaceutical students. It is in your power to render him the most appropriate return by making his term of office distinguished by the success of this central school of pharmacy. You can strengthen the traditions of the school, and impress the mark of your diligence upon its work, to be a model for those who come after. Thus early in your career you may do something for pharmacy, and I feel sure that you *will* do it.

I now commend you to the experienced guidance of your professors, with warmest good wishes for your success here, and for the welfare, happiness, and prosperity of your future lives.

Gentlemen,—farewell to-night! but we look to hear of you again.

Dr. Greenhow, in proposing a vote of thanks to Mr. Giles for his admirable address, desired especially to commend it to the attention of his young friends for the sound, sensible advice it contained; and to urge upon them to prepare themselves, not by cramming to pass an examination, but by honest persevering study to fit themselves for duties they would be hereafter called upon to fulfil. Their calling had been termed by the lecturer a trade, and certainly it had trade associations connected with it. It was, however, a skilled trade of the very highest order, and approached very closely indeed to the character of a profession. No doubt there had been a good deal of cramming on the part of candidates who had come forward for examination, as was evident from the fact that so many had failed on their first attempt to pass. But this was inevitable, not only when the society was first established as a voluntary institution, but still more so when by virtue of an Act of Parliament examination was made compulsory. Under such circumstances it was essential that the examinations should not at first be too stringent, but they had been gradually increasing in stringency, and with the present month a new mode of examination would come into operation, which he believed would go far to defeat the cramming system. The examination would not really be more stringent, but more practical; one which should really test the competency of candidates; the object being to ascertain, for the protection of the public, that persons intending to become chemists and druggists were really qualified for the business they were proposing to undertake. He ventured to say that the days of cram would now be over, and that in a very few months those who, actuated by less earnestness of purpose, were anxious only to obtain a qualification, would find that they could not succeed in their object without really working hard at the subjects in which they were to be examined.

The resolution having been carried by acclamation,

The President, referring to what had been said of him by Mr. Giles, said he always considered it one of his greatest privileges to be able in any way to assist the cause of pharmaceutical education, and he trusted full advantage would be taken of what had been done by the founders of the society. In his early days, there were only about three books from which information could be derived, and no institution offering such facilities for study. The young men of the present day had assistance offered by the Pharmaceutical Society, on which its founders had expended upwards of £150,000, and he hoped they would endeavour to make good use of it.

Mr. Giles, in acknowledging the vote of thanks, said he would take this opportunity of publicly thanking the Council for the honour they had done him in inviting him to address the students, his sense of satisfaction being increased by the circumstance that this occasion happened to coincide with his retirement from the pharmaceutical business. He could not but feel very grateful to them that the last act of his pharmaceutical career was one so gratifying to his own feelings.

The President drew attention to two books presented to the society by Professor Dragendorff, of Dorpat, through Mr. Greenish: (1) 'Materialen zu einer Monographie des Inulins;' (2) 'Die chemische Werthbestimmung einiger starkwirkender Droguen und der aus ihnen angefertigten Arzneimischungen;' also to a specimen of *Artemisia Cina*, presented by the same gentleman.

The Chairman announced that the next evening meeting would be held on Wednesday, November 4.

EXAMINATIONS IN LONDON.

October 9th, 1874.

Present—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

MAJOR EXAMINATION.

Two candidates presented themselves for this examination, and failed to pass.

MINOR EXAMINATION.

Seven candidates presented themselves. *Five* failed. The following *two* passed, and were declared qualified to be registered as Chemists and Druggists:—

Davey, Thomas Sercombe ....Exeter.
Kempster, Frederick Augustus ...Clapham.

These names are arranged in order of merit.

MODIFIED EXAMINATION.

Twenty-seven candidates were examined. *Thirteen* failed. The following *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Black, Felix ....London.
Brown, Joseph ....Liverpool.
Edmonds, George ....Ryde.
Girvan, John ....Glasgow.
Hill, John ....London.
Hilton, Frederic Henry ....Waterloo.
Lewis, Thomas ....London.
Lincoln, Nathaniel ....Norwich.
Lloyd, James.........................Chester.
Maule, William Preston ....Chard.
Mount, James ....London.
Samuel, James Burck ....Brighton.
Wavell, Charles Hoad ....Ryde.
Williams, Thomas ....Chester.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

"*Syrupus.*"—(1) See an article in vol. iv., p. 142. (2) A formula for Lacto-phosphate of Iron and Lime will be found in the same volume, p. 610.

G.—Beta maritima.

G. C. Druce.—Pimpinella magna.

"*A Well Wisher,*" *etc.*—The grievance has been so fully stated recently in this Journal that it is not desirable at present to insert any more letters respecting it. We think that just now more may be done towards removing it by remembering that the consent of both parties is required for the completion of the bargain.

T. M. J.—'Tomes's Dental Surgery,' published by Churchill.

"*Local Sec.*"—(1) By placing them in a limited enclosure with some odoriferous substance. (2) Mr. Ullmer, Old Bailey. (3) "Burnt" linseed or nut oil.

G. Dobson.—We cannot accept the distinction you would thrust upon the Journal, of "being the mouthpiece of our rulers." Neither does any such antagonism exist as is implied by your wishing to address "those at the head of the other side." Further, what you call "impracticable" has been accomplished over and over again. Under these circumstances it is not thought advisable to insert your letter.

F. W. Branson.—We are unable to say which is the best.

Communications, Letters, etc., have been received from Mr. G. Matthews, Mr. Thorp, Mr. Armstrong, Mr. Fox, Mr. Beach, Mr. Dowman, Mr. Pitman, Mr. Fairlie, Mr. Whyte, Mr. Talbot, Mr. Barnet, Mr. Brown, Mr. Barclay, Mr. Monkhouse; J. W. W., W. J. S., L. A. R., A Young Pharmacist, Chemicus, Mac, Erin, Inquirer, Nemo, Vir pro Bono Publico, Caution.

Notice.—In consequence of the great length of the report of the Society's meetings we are compelled to postpone notice of several communications.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from page* 263.)

UVÆ URSI FOLIA.—The leaves of *Arctostaphylos Uva Ursi* have no very remarkable structural peculiarities, and may be dismissed with a very short comment. The upper and the lower epidermis have the same general arrangement of cells, and these are pretty regular in size, excepting near the midrib. They are four to six-sided, with rounded corners, sometimes nearly round, and present when seen in the isolated epidermis, a tolerably regular pattern of rounded off squares or pentagons. There are no stomata on the upper surface. The stomata on the lower surface are curiously grouped. The grouping is determined by the network arrangement of the veins of the leaf. The guard-cells are two in number. The inner tissues of the leaf, beneath the epidermal compressed cells and superposed thickening, are several layers of vertical chlorophyll-bearing cells, and the spongy parenchyma, with the vascular system and its wood-fibres. With the wood-fibres are small square cells, each of which contains a small prismatic or lozenge-shaped crystal of some lime salt. The wood-cells are frequently stained with an astringent brown colouring matter, and form a wedge extending from the rib-bundle to the surface of the leaf.

It does not appear to be practicable to mount sections of these leaves permanently.

MATICÆ FOLIA.—The exceeding thinness of these leaves, and their tesselated arrangement, render it very difficult to make transverse sections of them, and there is nothing whatever special in the inner tissues of the leaf until we come to the structure of the midrib and veins. The epidermis is composed of small cells, and is remarkable for the small amount of cuticle substance superposed on it. It is furnished with multicellular hairs, pointed, sometimes capitate, and slightly marked with nearly round punctations on the lower surface of the leaf. The epidermis of the upper surface is very white, and composed of loose cells, with little cuticle. The structure of the midrib is somewhat anomalous, a character common in the Piper family. Four to eight vascular wedges are arranged in a loop three-quarters around a medulla situate much nearer the upper than the lower surface of the leaf. Above the portion of the medulla left exposed by the opening of the loop is situated a bundle of woody parenchyma, composed of long, square-ended cells, much thickened by a semi-ligneous substance that swells considerably in water, but does not dissolve. It would appear to be nearly pure cellulose modified towards lignin. Outside this is a small layer of parenchyma and the epidermis. Outside the vascular wedges are layers of porous parenchyma cells, and round these variously sized bundles of wood, parenchyma, and the external cells.

The vascular wedges are composed of large porous vessels; spiral vessels, with large thick spirals, sometimes one to three, right or left-handed, sometimes one right and another left-handed in each tube; and of wood-fibres and long cells containing various colouring and aromatic matters and octahedral crystals.

The parenchyma between the vascular wedges and the bundles of woody parenchyma is chiefly composed (not entirely) of large round or oval cells, much thickened and marked with bold distinct oval pits.

The structure of the midrib is thus seen to be very characteristic, and to consist really of (1) a ring composed of epidermis; (2) of parenchyma; (3) a ring of bundles of woody parenchyma, separated by masses of the last; (4) a complete ring of modified parenchyma, consisting of the porous cells described, and ordinary parenchyma cells; (5) of vascular wedges arranged in a loop; and (6) of an excentric medulla.

It may be worth while noting that the structure of the aerial stem of *Artanthe* consists of a looped arrangement of vessels, and more or less modified parenchyma, but differs from the midrib and petiole in many respects, as is quite usual.

TABACI FOLIA.—The structure of the veins and midrib, and the character of the epidermis and its appendages, are the important features in the leaves of the tobacco plant.

The cells of the epidermis are rather large, and have waved outlines. The stomata are rather large, and occur on both the upper and the lower surface, being most numerous on the latter. The hairs on the surface, are, however, the most characteristic; they are multicellular glandular capitate, with a peculiar crook or twist.

The structure of the midrib, as is well known, is remarkable for the horseshoe arrangement of its vessels and wood-fibres, and the peculiar character of the parenchymatous tissues generally.

As the plant has no very special interest to the pharmacist (unless he be a smoker), it is, perhaps, hardly worth while to go more minutely into the structure of its leaves, which have already been very fully described by other writers.

SENNA (TINNIVELLI).—The structure of the leaves of *Cassia elongata* may be taken as the structure of the true sennas, as the other species have but slight differences in details of structure from this. The upper epidermis and the lower are furnished with great numbers of small stomata, stiff unicellular pointed hairs, much consolidated and rugose; and their cells are small. Certain of the hairs spring from a slight elevation of the cuticle, composed of dark-coloured cells grouped round the base of the hairs.

The structure of the sub-epidermal layers is exceedingly simple, and of the usual type; but the vascular system is highly developed. The midrib and primary veins are of the usual character. With their woody fibre-cells are disposed, in strict linear order, great numbers of lozenge-shaped crystals of a lime salt. The secondary veins, groups of spiral vessels with little or no woody fibre, ramifying in the parenchyma of the leaves, have, however, none of these crystals; but a great number of sphæraphides are associated with them, and, more particularly, distributed in the parenchyma between the loops or interspaces of this spiro-vascular system. Having regard to the thinness of the leaves, these inorganic constituents are very numerous.

HYOSCYAMI FOLIA.—The section of the midrib presents a somewhat similar horse-shoe arrangement of the vascular system to that found in tobacco; but the investing layers, and particularly the epidermal appendages, present considerable differences when carefully compared with tobacco. The midrib is made up of spiral and annular vessels of considerable size and thickness. The associated fibre, or woody parenchyma is very slightly thickened, and with it are associated oblong cells containing an amorphous or semi-granular substance. These cells and their contents are somewhat similar to those described by me in the petiole of *Cinchona succirubra*, but nothing but chemical analysis will enable us to say how far their contents are identical.

The secondary vascular system is very highly developed, and consists of spiral vessels, which divaricate again and again until a fine net-work is produced, chiefly composed of single spiral vessels, which ultimately terminate in the parenchyma in small club or swollen ends. In the interspaces of these vessels are great numbers of exceedingly small crystals.

Stramonium. Belladonna.—Certain points in these leaves, the existence of amorphous substances in special cells similar to those in Hyoscyamus, require prolonged and careful study, and must furnish the subject of a prolonged investigation on green leaves.*

Fruits and Seeds.—The microscopical examination of many fruits and seeds is of considerable importance, both to the analyst and the botanist. The microscopical characters of many fruits, those of the Umbelliferæ and Compositæ, for example, are of the first importance in drawing up the general characters of species and genera, and in some cases will alone enable one to determine the species with any degree of accuracy. The more minute microscopical characteristics are of equal importance to the analyst in many cases, such as the adulteration of pepper with grains of Paradise, or of mustard with capsicums. Such microscopical examination as the botanist requires is usually of a very simple kind. In the case of the fruits of the Umbelliferæ, for example, it suffices to make a simple section, and view it with a very low power. The analyst, on the other hand, must make himself fully familiar with the microscopical appearance of all the tissues that enter into the constitution of the fruit or seed concerned. The fruit, of course, consists of two portions—the seed and the enveloping tissues, or *pericarp*. The latter may, following De Candolle, be divided into three groups of tissues—the *epicarp*, or their outer rind, the *mesocarp*, or middle layer, and the *endocarp*, the innermost layers. All these vary much in their relative development, the two latter most, and frequently all are so closely related that it is difficult to distinguish the one from the other. Each of these tissues has characters of its own, and should be separately examined. In the case of such fruits as have all their tissues in a soft state this is a very easy process. Mere sectionizing with a sharp razor will suffice to prepare the tissues for examination, but when, as very frequently happens, the mesocarp or endocarp is much hardened, as in the shell of the cocoa-nut and the fruits of many palms, in the fruit of star anise and the endocarps of stone fruits generally, a different and tedious process has to be gone through. We may take the cocoa-nut shell as a typical instance. Vertical and longitudinal sections are required. For the former we cut as thin a slice as possible with a fine saw (such as are sold by dealers in watchmakers' tools), and carefully rub down one surface on a fine Canada oil-stone until it has become perfectly level and smooth. We then cement it to a glass slip with hardened Canada balsam (the balsam should be just hard enough to be indented with difficulty by the finger-nail, not hard enough to be brittle), and rub down the free surface on a piece of grit or rag-stone, until it is nearly thin enough, and carefully finish on the fine stone. When it is nearly thin it is as well to look at it every half-minute lest the process be carried too far. It has to be mounted in balsam, and it is desirable that the balsam should be so viscid as not to fill up the air and oil canals in the shell, otherwise their details will be obscured. Longitudinal sections may be made by the simple process of grinding, and sections in many cases should be made at different thicknesses. The really difficult "shells" to sectionize are those that are just too hard to be cut, and yet not hard enough to grind. This, however, occurs more frequently in seeds (as areca, the "stones" of dates, and strychnos) than in pericarps. Where it does occur the only plan is to soak the tissues in warm water for a considerable time, and cut as good sections as possible with a *cheap* razor. Mappin's shilling razors are about the best I have used. Their temper is sufficiently good to keep a sharp edge, but not so high as to cause the edge to "fly" against hard substances. An expensive, highly-tempered razor is the worst of all razors for sectionizing hard substances.

Seeds differ widely in their general structural details. We may roughly divide their tissues into those of the seed and the seed-coats.

The testa or seed-coat frequently consists of several distinct layers of cells, each of which has its characteristic features. Of these the outermost is usually the most interesting, and is frequently very beautifully marked. The following points respecting it should be ascertained. Is it membraneous, as in certain orchids? If so, does the membrane extend unequally over one or more sides, as in the seeds of certain climbers? As very beautiful seeds of this kind, may be named the seeds of the common British orchids, where the seed appears in a delicate membraneous bag, *Eccremocarpus*, sandwort (*Lepigonum marinum*), the anomalous seeds of *Sphænogyne speciosa*, where the seed appears to be a perfect plant, and in the exquisitely beautiful seeds of *Nemesia versicolor*, which seem to be dressed with delicate lace ruffles. Instead of being membraneous, this outer seed-coat may be tough and roughened by various protuberances arranged in more or less complex and beautiful patterns. Amongst seeds in which these obtain, I may name those of caryophyllaceous plants generally. The roughening may take the form of waved ridges (toadflax and snapdragon), or finer ridges, as in a very large number of seeds, or the surface may be reticulated more or less distinctly, as in the seeds of poppy and many other plants. Or, and this is a feature of very considerable importance, the outer coat may be furnished with hairs, as in a species of *Alyssum*, in *Ægle*, and a few others. The inner layers of the testa consist of very variously shaped cells, and will be described as they occur in the seeds that come under my notice in these articles.

Coriandri Fructus.—We may here neglect the structure of the chaff or husk-like seed vessel, and confine ourselves to the structure of the *mericarps* within it. These are of course of the great umbelliferous type, but present strong points of individuality. We notice first on superficial examination that each mericarp has *five* depressed ridges, which

* I should be glad to receive fresh specimens for this purpose. They may be addressed to me at 8, Hawthorne Place, New Wortley, Leeds. My object is to get leaves from as many localities as possible. Two or three leaves from each will fully suffice.

are more or less wavy, and *four* other ridges prominent and nearly straight. There are no *vittæ* except two small ones in each mericarp near the commissures. The outer integument of the seed consists of long, narrow, semi-ligneous fibres, disposed in a very irregular and interlaced manner. Within this is a loose layer of parenchymatous tissue, and within this the seed with its contents of oil and protein stuffs. These cells are of varied character. Near the exterior of the seeds they are compressed and angular. In the interior they are much larger, less angular, but still by no means spherical, and have well thickened walls presenting a very definite outline.

NEUTRAL HYDROBROMATE OF QUININE.*

BY M. BOILLE.

Two years since the author brought under the notice of the French Academy of Medicine an acid hydrobromate of quinine. Further investigation of its properties has led him to the preparation of the neutral hydrobromate, which he considers to be far superior to the official quinine sulphate, both as to solubility in water and richness in quinine. The neutral hydrobromate is prepared by double decomposition of bromide of barium and neutral sulphate of quinine, and is thus easily obtained pure and free from chloride; the great solubility of bromide of barium in alcohol facilitating the removal of any chloride, which is insoluble. The two salts are dissolved separately in alcohol, and the solutions filtered. The neutral sulphate of quinine solution is gradually added in slight excess to the bromide of barium solution, until a precipitate ceases to form. The solutions, diluted with water, are distilled to recover the alcohol, afterwards filtered, to separate the sulphate of quinine which has been precipitated by the water, and then concentrated sufficiently to induce rapid crystallization. The addition of water is indispensable for the concentration and crystallization; the hydrobromate, being soluble in alcohol in all proportions, re-dissolves as the alcoholic liquor is concentrated.

Neutral hydrobromate of quinine is also obtained easily by dissolving hydrate of quinine in weak hydrobromic acid. Upon cooling the salt forms beautiful nacreous crystals; re-dissolved several times in water, it crystallizes in the basic state.

Neutral hydrobromate of quinine has for its formula:—

$$C_{20}H_{24}N_2O_2,HBr,H_2O.$$

	Experiment.	Theory.
Water	4·80	4·25
Bromine	18·26	18·91
Quinine	75·20	76·59

The formula for acid hydrobromate of quinine is:—

$$C_{20}H_{24}N_2O_2,\ 2(HBr),\ 3H_2O.$$

	Theory.	Experiment.
Water	10·00	10·00
Bromine	24·62	28·84
Quinine	60·00	50·60

The crystallization of the acid hydrobromate of quinine in well-defined regular facets distinguishes it from the hydrochlorates, which crystallize silky in filaments. The former crystals do not become resinous in the presence of an excess of hydrobromic acid, and are prepared by dissolving quinine in an excess of hydrobromic acid; they are soluble in water and alcohol.

The solubility of neutral hydrobromate of quinine is stated by the author to be very remarkable, it being soluble in five times its weight of water. This solubility of the neutral salt he considers to be a property of high therapeutic value, as it should be better tolerated than the neutral sulphate, and more active, being more quickly absorbed. More soluble and more rich in quinine than the acid sulphate, he thinks it might re-place the latter advantageously in various liquid preparations, without causing the least irritation of the mucous membrane. Further, it combines the properties of bromine and the salts of quinine, whilst its easy absorption allows of its internal administration. On the whole M. Boille considers that its properties give it a great superiority over all other compounds of quinine.

* *Journal de Pharmacie et de Chimie*, vol. xx., p. 181.

AMERICAN EUPATORIA.*

BY DR. J. M. BIGELOW.

The genus Eupatorium in the United States comprises about thirty-two species. Three have been found exclusively in the eastern States, five in the southern States, and eleven in the Far West. Four species have been found common in the three grand divisions of the States, and nine are common to the eastern and southern States. Of those known to possess medicinal or toxicological properties, one (*E. sessilifolium*) is exclusively eastern, one (*E. incarnatum*) is exclusively southern, four (*E. perfoliatum, rotundifolium, teucrifolium,* and *aromaticum*) are common to the eastern and southern States, while two (*E. purpureum* and *ageratoides*) are common to the whole United States.

Eupatorium perfoliatum is officinal. Its history and properties are well described in Wood and Bache's *United States Dispensatory*. *Eupatorium teucrifolium* and *sessilifolium* possess similar properties, but appear to be milder in their operation than *Eupatorium perfoliatum*. The root of *Eupatorium purpureum* has bitter, aromatic, and astringent properties, and enjoys the local reputation of being an excellent diuretic, besides its tonic properties.

Burnett, in his 'Outlines of Botany,' mentions that *Eupatorium rotundifolium* is useful in consumption. It grows in dry soil near the sea-coast, from Rhode Island to Louisiana.

Eupatorium incarnatum and *E. aromaticum* contain an aromatic principle, similar to, if not identical with, coumarin, first obtained by Guibourt from *Coumarouna odorata*, Aub. (*Dipterix odorata*, Schub.), or Tonka bean. This principle, or one very similar, seems to pervade many plants, such as *Melilotus officinalis* and *M. cerulea*, *Asperula odorata*, *Trifolium melilotus*, *Anthoxanthum odoratum*, *Liatris odoratissima*, and probably many others. It is, without doubt, this principle which gives fragrance to *Eupatorium incarnatum*, *E. purpureum*, *E. aromaticum*, *E. odoratum*, etc. *Liatris* is a genus of composites, very closely allied to *Eupatorium*, and all species with aromatic fragrance and tuberous roots have long been known to possess active diuretic properties.

Professor Lindley, as long ago as 1848, mentioned the fact that bloody urine from inward contusions had been cured by coumarin, obtained either from the flowers of melilotus or the Tonka bean. This principle, besides being diuretic, is decidedly antispasmodic, and has been used by Dr. Cooper, of Philadelphia, in cases of pertussis.

There is a large class of troublesome diseases connected with inflammation and irritability of the bladder, in which the coumarin obtained from these plants—reasoning from analogy and the little experience we have already had of this substance—might be expected to produce decidedly beneficial results. Dr. Cooper gave to children of five years five to eight grains in a dose, prepared in the form of a fluid extract, with the happiest soothing effect upon the nervous system, which renders it worthy of a more extended trial.

Professor Wood ('United States Dispensatory,' p. 389, 13th ed.), with regard to the peculiar bitter principle of

* *Detroit Review of Medicine*, and *London Medical Record*.

the *Eupatorium perfoliatum*, remarks that, when the peculiar principle is isolated and satisfactorily determined, the name eupatorin will be proper; but he does not seem to remember that there are other species of *Eupatoria*, possessing other and very different properties, and that some of them may have a peculiar principle isolated and satisfactorily determined before the *E. perfoliatum*, and will then be entitled to priority in the name. Under these circumstances, it would be manifestly improper to apply it to the peculiar principle of *Eupatorium perfoliatum*. Already we see eupatorin (*perfoliatum*) and eupatorin (*purpureum*) advertised; but as yet neither of them is entitled to the name, as both are only concentrations of the several proximate principles, and not one peculiar to either of them. Eclecticism has a great penchant for the application and appropriation of scientific names; and among a large number of absurdities, we see *cerasin* and *prunin* advertised, which, if true alkaloids, as their names scientifically indicate, would be one and the same thing.

Eupatorium ageratoides, known popularly in some regions as white snake-root, is used by the eclectic physicians of Ohio as an antispasmodic, diuretic, and diaphoretic. In cases of nervous disease it is given in drachm doses, in the form of infusion.

But the greatest interest centred in this plant results from its having been suspected of being the cause of trembles in cattle and milk sickness, a severe and sometimes fatal disease of very local extension, making its appearance in the early settlement of isolated regions in the south-western portion of Ohio. It pervaded also portions of Indiana, Illinois, Kentucky, and Tennessee. Like the old-fashioned tertian ague, it has disappeared entirely upon the clearing up and cultivation of the land, which also destroyed the abundant prevalence of the weed. The late Wm. S. Sullivant, a distinguished botanist of Ohio, writing upon this subject in 1840, says that "this weed, hitherto considered harmless, has lately become the suspected cause of the fatal disease among cattle, commonly called the 'trembles.' The disease prevails in many localities in the western States, and is always accompanied by another equally fatal to the human species, known by the name of 'milk sickness.' It is generally believed they are both produced by the same cause originally, whatever that may be. A prevailing opinion is that some vegetable produces it. The poison-ivy (*Rhus toxicodendron*) has been strongly suspected by many, among them the late Dr. Drake, of Cincinnati. Mr. John Rowe, of Fayette County, Ohio, asserts that he has been successful in investigating this obscure subject. It was with the *Eupatorium ageratoides* that experiments on some cattle were made by him, in the presence of highly respectable witnesses. The disease was produced, and the cattle died from it. An account of the experiments, together with the certificates of the witnesses, was published in the *Ohio State Journal* of 1840. The details were not given as particularly as could be wished."

Mr. Sullivant was careful to ascertain that this was the plant used in those experiments, and also examined and identified specimens procured by Mr. T. Roberts, who was well acquainted with all the circumstances. He was assured also by Dr. Drake, of Cincinnati, to whom Mr. Rowe sent specimens, that it was the *Eupatorium ageratoides*. A difficult point to settle in this case is, that this plant, and likewise the poison-ivy, are very abundant in many places where these diseases are not, and never have been known. Mr. Sullivant was better acquainted with the geographical botany of the west than any other individual; and, never having seen or heard of any plant peculiar to such infected localities, he therefore concludes that the origin of the disease will not be traced to any particular plant, and especially the plant in question, as it is found growing in the east, west, north, and south.

Although not directly related to our present subject, it may not be uninteresting to refer to a South American plant of this genus—*Eupatorium glutinosum*. Professor Lindley remarks that the famous vulnerary, Matico, said to be derived from *Artanthe elongata*, a piperaceous plant, is really, according to Mr. Hartweg, the *Eupatorium glutinosum*. The following is the memorandum of Mr. Hartweg addressed to Professor Lindley on the subject: "Matico is the vernacular name applied by the inhabitants of Quito to *Eupatorium glutinosum*, or the 'chessalonga' in the Quichua language. It forms a shrub three to five feet high, and is common in the higher parts of the Quitinian Andes, where its properties were discovered some years back by a soldier called Mateo, better known under his nickname Matico (Little Matthew), who, when wounded in action, applied accidentally the leaves of some shrub to his wound, which had the immediate effect to stop the bleeding. This shrub happened to be the chessalonga, which has since been called, in honour of the discoverer, Matico. That it is the true Matico of the inhabitants of Quito and Riobamba I have not the slightest doubt; both the leaves and specimens have been gathered by myself, and, upon comparing the latter with Kunth's description, I found them to agree exactly with his *Eupatorium glutinosum*." Mr. Hartweg was a botanical explorer of considerable distinction, having collected many rare plants in California.

The 'United States Dispensatory' only refers to the Peruvian Matico (*Artanthe elongata*); but if the two should appear in market, as is not unlikely, it is important that the discriminating prescriber should know how to distinguish them.

Besides the Eupatoria above enumerated, we have eleven or twelve western species, of whose properties little or nothing is known. One among them, *Eupatorium Berlandieri*, common all over Texas, New Mexico, and extending into eastern Mexico, Dr. Gray says, is aromatic, and nearly allied to *Eupatorium aromaticum;* so that, if further known, some might be found worthy of a place in the materia medica.

BURNLEY CHEMISTS AND DRUGGISTS' ASSOCIATION.

The annual dinner of the above Society was held on Thursday evening the 1st inst., at Rawlinson's Hotel, Burnley. The Ex-President (Mr. Thomas) occupied the chair. After the usual loyal toasts, Mr. Fletcher proposed the "Success of the Burnley Chemists and Druggists' Association." He said he was glad to state that the Society had made progress during the past twelve months, and he hoped the time would soon come when the disadvantages which it had had to contend against would receive attention from the trade at large, and would be entirely removed.

The President (Mr. Crawshaw), in responding to the toast on behalf of the Society, spoke of the contrast between the past good old days and the present condition of pharmacy. He referred to the great advancement of education and the passing of the Pharmacy Act of 1868, which, he said, had, and would, improve the condition of each one connected with the trade. He pressed upon the members of the Society to work harmoniously together, casting aside the selfish and prejudiced feelings which tended to hinder the progress of societies, and hoped that the chemists in the surrounding districts would unite with the Society, as by so doing they would not only benefit themselves, but the trade in general.

Mr. Hitchin, in proposing a toast to the visitors, said he was sorry to see so few present from the neighbouring towns. He hoped each one would see the advantage of joining the Association, and that as each year rolled on they might be able to report increasing power, position, and brotherly feeling.

Mr. Hay, of Nelson, in responding for the visitors, said it afforded them great pleasure to be present, and they would be glad to join the Society in hopes of maintaining higher prices and shorter hours.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 17, 1874.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL NEOPHYTES AND THE PROVINCIAL ASSOCIATIONS.

BEARING in mind the old adage, "*Quot homines tot sententiæ*," we do not expect that the opinions uttered in these editorial columns will always meet with universal acceptance. In fact, in some instances the object sought may be best attained when such opinions are challenged and disputed; for active thought of any kind is preferable to apathetic indifference, as being more likely to remove the fogs of prejudice and inexperience which more or less cloud the perception of the clearest-sighted among us. When, therefore, the recent articles on the subject of the examinations were inserted it was with the full expectation that they would be the cause of protests, and the expectation has not been unrealized. One writer denies that the apprentice or assistant, as a rule, has the time to allow him to "bend his own glass tubes, make his own thermometer, and fit up his own apparatus." Another condemns the examiners and all their works, and answers the questions,—"Could an examining body have asked less? are they asking for the wrong things? are they seeking to catch me with their guile, or setting traps, or placing stumbling-blocks before the unwary?—with a decided affirmative. Whilst others lament that the stringency of the examinations has outstripped their opportunities and ability to obtain the necessary education.

Granting that hours of business are long, we demur to that fact being put forward as sufficient evidence of the impracticability of study. There is no royal or easy road to pharmaceutical knowledge; therefore, whilst earnestly urging employers to render the way as easy as possible, it is well to remind intending travellers that they must be prepared to suffer personal inconvenience, and not to expect the sacrifice to be all on one side. Admitting, too, that examiners are apt to put questions not exactly in accord with the wishes of the examinee, the correctness of the imputation angrily thrown out is not a necessary sequence, and we do not care to discuss it. We think it would be more profitable to consider the objection that the stringency of the examinations is not in accord with the opportunities of those who have to undergo them, as well as the question whether the means which do exist are so used as to encourage the creation of others.

What are the facts of the case? Scattered throughout the country are various pharmaceutical societies, many of which have in connection with them classes or some other organized facilities for supplying to the pharmaceutical student that scientific knowledge which is to help him in systematizing the practical information obtained in the performance of his ordinary duties, and fit him for a certificate of proficiency as a chemist and druggist. If only a fair measure of success attended these organizations, there is little doubt but that they would be multiplied. Nevertheless, the number is stationary, and promises to grow less. Why? The old proverb ran, "*Ubi mel, ibi apes.*" But in many places these educational blossoms are almost deserted by bees, and but little of the honey is ever hived. In other words, rooms and teachers are provided, but pupils are not forthcoming. Our columns this week testify to the fact that it has been proposed to wind up one Association; not because it lacked teachers, funds, or accommodation, but because those for whom the classes were provided failed to avail themselves of them. In another instance "the effort to sustain a Pharmacopœia class was not successful.' The officials of a third Association also lament that all their efforts to promote pharmaceutical education have been "in vain." In fact, the conditions that might have been expected to obtain are reversed, and, instead of a rush of eager applicants for the boon, those who provided it have had to urge its acceptance upon individuals, who have replied with an indifferent refusal.

This result is certainly ominous of trouble in the future; but the greatest sufferers by far will be those whose short-sighted *laissez faire* leads them to neglect the assistance which has been so generously offered to them. In their own interest, and in the interest of others who do not yet enjoy opportunities like those neglected by them, we would urge them to "turn over a new leaf," and let the new session be prolific of encouragement to such as have been sparing neither in their time nor money in the cause of pharmaceutical education. This much is certain: all who aspire to enter within the pale of pharmacy must work at some time or other, and they will then need assistance, which may not always be within their reach. It would be foolish to expect any lowering of the standard; for it cannot be expected that men who have already attained a position will baulk their hopes of a brilliant future for English pharmacy out of consideration for others who have thus early shown the white feather.

CINCHONA CULTIVATION IN ST. HELENA.

ABOUT eighteen months since, MR. OSWALD READE described in this Journal (vol. iii., p. 903) what he saw during a visit to the cinchona plantations in the Island of St. Helena. Notwithstanding that the experiment had been described to him as a failure, MR. READE arrived at the conclusion that the cultivation of the red cinchona in the island would be a success were it well looked after. It is, therefore, satisfactory to learn that the abandoned plantations have recently been the subject of correspondence between the authorities and Dr. HOOKER, and the *Gardeners' Chronicle* quotes the following from a St. Helena paper:—

"We understand that measures are being adopted in earnest to increase the plantations, and advantage taken of the present favourable season to strike cuttings and plant out all available young plants. We are also happy to hear that the plantation is not to be, as before, strictly confined to one locality, but that the trees are to be tried in various situations, and that no difficulty will be made in allowing private individuals to procure cuttings or plants whenever they can be spared. A good quantity of the bark has been collected, to be forwarded to England for examination and analysis. So far as appearance and taste go, this is precisely similar to the Peruvian bark of commerce. . . . . It is very satisfactory to find that our present governor is alive to the importance of this cinchona business, which we may now fairly consider to have got beyond the stage of experiment, since it appears there are now on the spot, neglected for three years, some three hundred trees, all in full vigour of leaf and blossom, from six to twelve feet high, and with stems three or four inches in diameter, and bark a quarter of an inch thick. Let us hope that Governor JANISCH will continue vigorously to propagate these valuable trees on all the Government lands which are found suitable. Then, when his term of office shall expire, he may have the satisfaction of knowing that he has earned the same title to public gratitude as is said to be due to the man who makes two blades of grass to grow where only one grew before. And as it may be hoped that Mr. JANISCH'S government may endure for a considerable period, it is most important that he should have taken up so warmly this question of cinchona trees, it being a well-known fact that every new governor takes up a new hobby, and no one was ever yet known to carry out the plans of his predecessor. The only exception is our present governor, who is now carrying out the plan of clothing the central ridge of our island with the trees that yield quinine, after the plans of his predecessor, Sir CHARLES ELLIOTT. But even this exception is qualified by the fact that Sir CHARLES'S immediate successor reversed all his arrangements, and allowed the plantations to go to waste, and, besides, Mr. JANISCH was Sir CHARLES'S Colonial Secretary."

FEMALE DISPENSERS.

THE *Lancet* states that the Woolwich Board of Guardians, having advertised widely for a dispenser, received only one application for the post, and that from a lady. The Guardians, however, considered her to be ineligible on account of her sex.

ARTIFICIAL VANILLIN.

AT a recent meeting of the French Academy of Sciences, Dr. A. W. HOFMANN announced that his two pupils, Messrs. TIEMANN and HAARMANN, who discovered vanillin in the products of a reaction commencing with the juice of the pine (see vol. iv., p. 996) have established a flourishing industry based upon that discovery. The juice of a tree of medium size yields a quantity of vanillin of the value of one hundred francs, and it is found that the wood is not injured by the extraction of the juice.

MR. ROBERT S. G. PATON, Ph.D., F.C.S., has been appointed Public Analyst for the Borough of Stirling.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the 25th session of the above Association was held at the Royal Institution, Liverpool, on September 24th, 1874. The chair was occupied by the President, Dr. Charles Symes.

Several donations to the library were announced, and Mr. Edward Pritchard was elected an associate.

The Hon. Sec., Mr. Jas. T. Armstrong, then read the annual report :—

"The report of your Council for the past year completes the history of the operations of this Association for the first quarter of a century of its existence, and your Council feel they are not saying too much when they state that the character which it has established during that period will enable it to bear favourable comparison with any society of a similar nature and with a kindred aim. They feel that while it has not been free from fluctuations it has had, on the whole, a successful career, and they trust that its future may be even more prosperous than its past.

"During the past session 13 members and 3 associates have been admitted, and this makes the members at present on the books 155, comprising—honorary members, 14 ; members, 125 ; associates, 16.

"The attendance at the ordinary general meetings has been good, and at a special meeting at which ladies were present, and Mr. Edward Davies, F.C.S., delivered a lecture, there was a numerous attendance.

"The work that has been done at the ordinary general meetings may be classed under four heads, viz : scientific chemistry, pharmaceutical chemistry, discussion on the working of the Adulteration Act, and one on the best means of promoting pharmaceutical education. The number and character of the papers read show that this Association is equal in this respect to any association of a similar nature.

"Much time has been devoted, both in Council and at the ordinary meetings, to discussions on the working of the Adulteration Act, resulting in the decision not to take any public action in the matter.

"In compliance with a requisition signed by twenty members, an extraordinary general meeting was held on March 26th, to consider some alterations in the rules as proposed by Dr. Cook and Mr. Hallawell, but after a long discussion nothing definite was settled, it being understood that the subject would be again brought forward at the annual meeting.

"Your Council feel that they have done all in their power to promote pharmaceutical education and the welfare of the students. Not only did they cause a special meeting to be held, at which students were invited to come forward and say what they required in this matter, but also a meeting of the Association was purposely given to them, at which Dr. Symes read a paper on "Study," and Mr. Jas. T. Armstrong, F.C.S., read another on "Pharmaceutical Education." Your Council greatly regret that all this has been in vain.

"There has been during the past year a change of the librarian, and your Council feel with good results, for the books are kept and delivered in a much better manner than they have been for some years, and things are in every way differently managed.

"The museum has received several additions in the form of donations, amongst which might be named a collection of specimens illustrating additions to the British Pharmacopœia, from Messrs. Evans, Sons, and Co., and some botanic specimens from the Exhibition, 1862, which have only now come to hand; very few of these, however, were available.

"Mr. Edward Davies, F.C.S., has during the past session conducted the chemistry class as usual, and with very fair success.

"The following gentlemen were appointed during the past year to attend the meetings of the Pharmaceutical Conference in London: Messrs. Sumner, Shaw, and Mason.

"The following gentlemen retire in rotation from the Council, but are eligible for re-election: Messrs. Abraham, Shaw, Sumner, and Redford.

"The report of the finance of this Association as presented by your treasurer shows a deficit of £5 2*s.* 9*d.*"

The Treasurer then read the following financial statement:—

The Liverpool Chemists' Association in Account with John Shaw, Treasurer.

Session 1873-4.

Cash Received.

	£	s.	d
Balance from 1873	6	2	7
77 Members' Subscriptions	38	10	0
4 ,, ,, half session	1	0	0
9 ,, ,, arrears	4	10	0
3 Associates' Subscriptions	0	15	0
Microscope Fees	0	3	0
Library Fines	0	6	11
Balance due to Treasurer	5	2	9
	£56	10	3

Cash Paid.

	£	s.	d.
Rent	10	10	0
Tea, Coffee, and Attendance	12	6	8
Insurance	1	0	0
Books and Periodicals	2	16	1
Printing and Stationery	15	4	6
Directing and Delivering Circulars	8	9	6
Collector's Commission	1	13	6
Librarian	4	0	0
Secretary's Expenses	0	10	0
	£56	10	3

Examined and found correct,

Joseph Hallawell, } Auditors.
Thos. F. Abraham, }

September 24, 1874.

The usual annual business having been gone through, the President closed the meeting by saying that he hoped the next session might be a very prosperous one.

NORWICH CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting of the above Association was held September 25th, Mr. E. Nuthall, President, in the chair. In opening the meeting the President said, there was little occasion to detain them with his remarks, as the position of the Society would be shown by the reports which would be read to them, and the questions they would have to consider had been laid before them in the circular convening the meeting. In the face of the fact of a circulation of about 70 notices resulting in so small an attendance, at a meeting of such primary importance, he thought there could be no doubt as to the advisability of bringing the Association to an end. After reading letters from Messrs. Caley, Corder, and Thompson, honorary members, expressive of regret at their unavoidable absence, and still more at the contemplated dissolution of the Society, he explained that the Treasurer would be unable to present a duly audited balance-sheet, owing to this meeting being held before the termination of their financial year.

The Treasurer, Mr. W. J. G. Butler, stated that at the end of the present month there would be a deficit of 12*s.* 7*d.*, if they excluded the grants earned by the science classes. From this source £16 would accrue to the Society.

Secretary's Report.

"The preceding year has been the least satisfactory of any. The Council recognized during the previous years (1872-73) the necessity for some course which should invigorate the proceedings of the Association, and with this view obtained permission from the members at their last annual meeting to conduct classes in chemistry and botany in connection with the Science and Art Department. These two classes form the only satisfactory features of last session. At the outset, an influential Committee was got together by the President, consisting of the Rev. Hinds Howell, Dr. Beverley, and Messrs. T. Pinder, C. Williams, and F. Sutton, but owing to the short time intervening between this formation and the commencement of the classes, only four outsiders were induced to attend, whilst the attendance of members numbered 11. Out of these students an average of 10 attended the chemical, and 8 the botanical class, and 7 presented themselves in the former, and 3 in the latter subject at the May examination, all of whom passed viz.: 7, 1st class; 3, 2nd; 5 of chemistry class also passed in laboratory practice. This success results in the Science and Art Committee claiming £16 from the department, which sum, through the kindness of the class teachers and the Committee, is entirely at the disposal of this Association. The Council would here recommend that this sum be thus disposed of, viz., a portion to be devoted to the purchase of books, to be presented to the class teachers as a slight recognition of their services, and that, in the event of the Association being dissolved, the balance, after paying all claims upon the Association, be handed over to the Science and Art Committee for the carrying on of such classes. And here the Council desire to express their deep sense of the loss that has befallen the Association, in the death of Mr. G. Tooke, who, from being one of the most diligent pupils at the classes, had risen to be an exceedingly energetic teacher of chemistry. The class, which had at the outset of the session been conducted by Mr. Tooke, was ably carried on by Mr. Woolnough, who had kindly volunteered to fill the gap, but he was now unfortunately lost to the Association, through leaving Norwich. Mr. W. Piper conducted the botany, Mr. Nuthall assisting both the teachers.

"The remaining features of the past year require very brief notice. Trade classes in chemistry, materia medica, and pharmacy, conducted severally by Messrs. Nuthall, Caley, and Butler, were discontinued on account of the apathy of the members.

"During the past year two additions have been made to the library, but there have been no further funds available for the purpose. The circulation of books during the winter months was fairly satisfactory, but during the summer there has been little or no demand.

"The number of members and honorary members on the books of the Society during the four years of its existence has been:—

	70-71	71-72	72-73	73-74
Members	42	36	25	20
Honorary members	19	21	13	11"

In the discussion which followed it was stated that there were about fifty assistants and apprentices in the city, the greater portion of whom had not yet passed the Minor examination, and consequently there should be fair field for the work of the association.

Upon considering the financial prospects for another year, it was shown that no fear need be entertained as to the ability of the Association to pay its way. It was therefore resolved, on the recommendation of Mr. Robinson (hon. member), that the meeting be adjourned until Wednesday, September 30th, and, in the meanwhile, all connected with the trade in the city should be personally canvassed, not only as to their willingness to join the Society, but also as to their attendance at the classes. This task was undertaken by Mr. Robinson and the President. After the usual vote of thanks to the Chairman, the meeting adjourned.

The adjourned meeting was held September 30th, when there was a marked increase in the attendance. After reading a letter from Mr. Cubitt (hon. member), expressive of his desire to assist in the reconstruction of the Society, the President briefly reviewed the proceedings of the last meeting. He then reported that the personal canvass undertaken by Mr. Robinson and himself had been very satisfactory. From employers, with one sole exception, they had heard nothing but wishes for the future success of the Society. They had not met with quite so much encouragement from the apprentices, eleven of whom had declined to give a decided answer as to whether they would join the Society; but of these eleven seven had not yet passed their Preliminary, so, perhaps, could not be expected to be so ready to enrol themselves as students. Still they had already the promise of nine new active and four honorary members, and there were yet several to be canvassed. Under these circumstances they would have amongst them about thirteen whom they might depend upon as students.

The question, then, for decision was whether that number of students was sufficiently large to justify the continuance of the Association. There was no question as to funds; they had a balance in hand of £11, and a further income of £30 from subscriptions and hire of rooms to science classes. If the Association should be continued, the Council would be able to offer a more attractive programme than at any previous period; indeed, the retiring Council had drawn up a complete scheme of classes, etc., which they would recommend their successors to adopt. He might mention that chemistry would be made a very important item, and in the face of so large an income they were prepared to fit up some benches for practical work on the part of students. To conduct courses of practical chemistry, including all the testing required for the Major and Minor examinations, they had received promises of assistance from a doctor of science, and a gentleman recently connected with a London laboratory. Further, it was proposed to invite some London professors to give occasional lectures.

Mr. Corder (honorary member) thought that under the conditions laid before them by the President there could be no doubt as to the advisability of carrying on the Society, as he felt sure that the want of such an Association would be more than ever felt now that the stringency of the examinations was so much increased. Speaking from experience as an examiner, he must say that he found that candidates from the country, especially from such places as possessed similar Associations to their own, were much better prepared than those who had depended upon a few months' "polish up" at a London school.

Mr. Caley (honorary member) said it was frequently to be noticed that many failed to value a thing until it was lost to them. He hoped that this would not be the case with regard to this Association. For his part he thought their future was clear, and exhorted members to enter into study with more heart, assuring them they would find great pleasure in the acquisition of knowledge, quite independent of passing any examination.

Mr. Cassey moved, and Mr. Robinson seconded, that the Association be continued.

In supporting this proposition, Mr. Butler noticed that certain hints had been thrown out as to whether the Society did sufficient for its members. He thought such opinions could only obtain with those who confounded the work of the teacher with that of the student. All students should bear in mind that, however able and energetic a teacher might be, attendance at the classes would be simply thrown away did they not supplement their class-work by home study.

After a little further discussion Mr. Cassey's proposition was carried unanimously. In reply to a suggestion from Mr. Corder, that honorary members be associated with members in the management of the Society, the President stated that in order to do so it would be necessary entirely to reconstruct the Association, which must then become the Norwich Chemists' and not the Norwich Assistants' Association. Still, he should be glad to hear the advisability of such a step discussed, and should wish to pursue any course that would lead to the strengthening of the Society.

Mr. Corder said he hoped he should not be misunderstood. He had no desire to see the Association cease to exist as an assistants' society, but had been desirous of strengthening the Council's hands as much as possible. A desultory conversation on this point resulted in its being resolved, on the motion of Mr. W. Piper, seconded by Mr. W. H. Symons, that the Association be carried on in future as a Chemists' Association.

After several divisions, it was further resolved that the Council be enlarged to eleven, of whom four should be employers and seven employed.

Upon the motion of Mr. Fox, seconded by Mr. T. C. Pitts, it was then resolved to adjourn the meeting until that day week, for the purpose of acquainting those members of the trade not present of the change in the constitution of the Society.

At the adjourned meeting the rules of the Association were revised, so as to meet the requirements of the altered *status* of the Society, and the following gentlemen elected to serve on the Council for the ensuing year:—Mr. Edwin Nuthall, president; Mr. O. Corder, vice-president; Mr. W. J. Gooch Bush, treasurer; Mr. G. C. Fox, secretary; Mr. W. H. Cooke, Mr. J. Cossey, Mr. W. G. Piper, Mr. J. Robinson, Mr. W. H. Symons, Mr. J. Watson, Mr. T. C. Pitts.

Since this meeting a programme for the winter classes and the subjoined statement of accounts for 1873-4 have been circulated amongst the members:—

Dr.

	£	s.	d.
Balance in hand	2	16	6½
Cash from 20 Members	10	10	0
" " 11 Hon. Members	5	15	6
Donations	1	11	6
Fees, etc., from Science Classes	17	10	6
Fines	0	1	0
	£38	5	0½

Cr.

	£	s.	d.
Rent	10	0	0
Poor Rates and Borough Rates	3	2	6½
Gas Rate	1	10	8
Chemicals and Apparatus	1	5	6
Printing	2	2	9
Cleaning Rooms	2	19	6
Firing	0	17	6
Presentation to Science Teachers	3	0	0
Stamps	0	2	3
Science and Art Directories	0	2	0
Sundries	0	7	2
Cash in hand	12	15	2
	£38	5	0

Examined,

A. J. Caley,
J. Watson.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The inaugural meeting of the twentieth session of this Society was held in the West Hall, Anderson's University, on the evening of Wednesday, the 30th of September. The President, Mr. John Currie, sen., pharmaceutical chemist, occupied the chair.

The first instalment of books for the library were exhibited to the members, which included 'Watts' Dictionary,' 5 volumes and supplement; 'Bentley's Botany;' 'Fownes's Chemistry;' 'Proctor's Pharmacy;' 'Thorpe's Quantitative Analysis;' 'Sutton's Volumetrical Analysis;' 'Royle's Materia Medica,' etc.

Several new members were proposed and introduced to the meeting.

The President afterwards delivered the following opening address:—

"Gentlemen, as the winter session of the Chemists and Druggists' Association is about to commence, it is customary for the President to deliver an address on some useful object bearing upon the interests of the trade. The topic I have chosen to speak upon is the present aspect of the trade, with reference not so much to employers, but chiefly with regard to assistants and apprentices already in the business, or to those who have some intention of joining it. But, first of all, I may be permitted to take a review of the proceedings of the Association during last session. We found then that the membership, and the revenue from that source, were much the same as that of the previous year. The attendance at the ordinary meetings was good, and a general interest in the welfare of the Association was manifested. The assistants' meetings were also well attended; several essays were read on different subjects by members, and followed by interesting and profitable discussions. At intervals during the winter the Association was favoured with lectures of a scientific kind by several medical friends. The first of the series was delivered by Professor A. Wood Smith (now of Anderson's University), on the Blood, its constituents, circulation, and the functions it performs in sustaining life. The second lecture was given by Dr. Nairne, on the Brain and nervous systems. The third lecture was delivered by Professor J. E. Thorpe, then of the Andersonian University, on the discoveries of the late Dr. Graham, of the Mint, showing the constitution of the atmosphere at various elevations. The fourth and last of the series was delivered by Dr. Fergus on the very important subject of pure air and water. The Doctor's remarks bore chiefly upon the contamination of water with organic matter, as a fruitful source of disease, such as gastric fever, diphtheria, etc.

"At some of the meetings it was suggested that a library should be formed for the benefit of the Association. I need scarcely say that this was heartily responded to, and a committee was appointed to carry it into effect. The City and suburbs were accordingly canvassed, with the gratifying result that a sum of nearly £40 was suscribed. It was felt that a microscope was almost as necessary for conducting investigations in the sphere of botany, chemistry, etc., and the Committee was authorized to procure one. It was, however, found unnecessary to buy one, Messrs. Evans and Co., of Liverpool, having generously presented the Association with an instrument of excellent quality, and sufficiently powerful for the purpose.

"Reference should be made to the Price List published by authority of the committee which the Association appointed for that purpose about two years ago, and which has been revised twice since. From the testimony of the trade, it has worked well, has met with general approval, and been found very useful in establishing a somewhat higher tariff for medicines in ordinary demand, and specially in the dispensing department, thereby securing better remuneration for the pharmacist. It is to be hoped that there will be a strict adherence to the Price List, and that in a short time there will be uniformity of prices throughout the kingdom.

"So much for the past session; let us now consider what aspect the trade assumes at present, and what may be its probable future. For some time back employers have had difficulty in procuring suitable assistants, arising, no doubt, to a considerable extent, from the fact that a superior education is now required, and certain examinations have to be passed before they can commence business as chemists or druggists. The effect has been, that not a few good assistants have left the business altogether, and others have been deterred from joining it. Then there has been of late a tide of commercial prosperity which has risen so high that many have been induced to join some more lucrative, although, it may be, less honourable, calling than our own. This is certainly to be regretted, but not to be wondered at. When this tide has ebbed somewhat, however, and things assume their ordinary course, and when the higher position the trade is likely to take is duly considered then the prospective advantages of the business will not fail to recommend themselves.

"In the meantime employers must submit patiently to a little inconvenience, and, at the same time, assistants and apprentices, not discouraged by the difficulties which lie in their path, must address themselves to meet and successfully surmount them, and that just in the usual way of attendance on the prescribed course of regular and systematic instruction. The Preliminary examination should be got over without delay; then classes of botany, chemistry, and materia medica should be attended, either at the University or the Andersonian; any other method of getting up these subjects will only end in waste of time, probable failure, and expense. I would remark that while we are glad to see so many young men entering as candidates for the various examinations here and elsewhere, we cannot fail to be painfully struck with the large number of failures—amounting to upwards of 40 per cent., or nearly a half. I hope that this state of matters will soon be obviated, and that the young men of Glasgow and the West of Scotland will take a high position in these examinations, and that not a few will pass with honours. Let me remind you of the facilities you now have of obtaining information. You have a library which promises to be large and well stocked with books on every subject which you require to study. You have a microscope with which to conduct your various investigations; and to these let me add the advantage you enjoy of easy access to the Andersonian or Glasgow University, a privilege that very few country assistants have. I would strongly recommend you to avail yourselves of your opportunities, and show your appreciation of them.

"Your Council have been devising means not only for assisting you in your studies, but also of providing for your recreation during the winter; they therefore expect a fuller attendance at the meetings, and also an increased membership. You will find that by frequently meeting together and exchanging opinions you will materially assist each other. A good deal has been said of late years to the prejudice and disparagement of the drug trade, as if the time had gone by to make much of it. I cannot sympathize with any such idea. I hold that our trade is a good one, if properly prosecuted. And by the legislative enactments obtained by the Pharmaceutical Society it now holds a higher position in the estimation of the medical faculty and the general public than it did. After the experience of many years, I will only say that if any well-educated man will engage in the trade, learn it thoroughly in its details, and pass the examinations required, provided he be steady, diligent, and attentive, and prudent in managing his business, although it may not be his lot to make a fortune, he will, under ordinarily favourable circumstances, make an honourable as well as a comfortable living."

Mr. Currie was frequently applauded in the course of his remarks, and at the close, after a few remarks from Mr. Kinninmont (one of the Board of Examiners), who refuted the idea that the new regulations would make the examinations more difficult to pass, a hearty vote of thanks was awarded to the President for his address.

A committee was afterwards appointed to arrange for classes for students and apprentices to be held throughout the winter months. It was also decided that the annual festival should take place on the 20th January next.

Mr. J. M. Fairlie (Secretary), as one of the delegates to the Pharmaceutical Conference meeting at London in August last, gave a brief report of the proceedings, drawing special attention to the more interesting of the papers read, and urged the members to enrol themselves as members of the Conference. He also stated that in all likelihood the Conference would meet in Glasgow in 1876, and he hoped the Association would look forward to giving the members of the Conference a hearty welcome on that occasion.

It was intimated that the next scientific meeting of the Association would be held on October 28th, when the

President of the North British branch of the Pharmaceutical Society would deliver a lecture on "Chromatic Phenomena of Crystallization," with illustrations, and that at the opening meeting of the assistants' section on 14th October, the President, Mr. J. C. Hunter, A.P.S., would deliver a lecture on the "History of the Microscope."

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the above Association was held at Birmingham, on Friday evening, October 2nd, the President, Mr. Thomas Barclay, in the chair. There was a good attendance of members and associates.

The Secretary (Mr. W. Jones), having read the minutes of the previous meeting, which were confirmed, gave a statement of the accounts which was accepted, after which the President introduced Mr. Dewson, of the Queen's Hospital, as a teacher of pharmacy, etc., and spoke very highly of his professional attainments and capabilities for imparting knowledge to students. It was resolved, in the interests of the Association, to secure the services of Mr. Dewson, who was warmly received by the meeting, to conduct classes in connection with the Association.. A committee was formed to make the necessary arrangements.

Mr. H. W. Jones, one of the deputation to the Pharmaceutical Conference, then read his report, in which he detailed the proceedings of the Conference; he also noticed the principal events which had occurred in the pharmaceutical world during the previous three months. Various prosecutions were discussed. It was shown that three out of the four prosecutions instituted against chemists, during the recess of the Association, had been dismissed,—the citrate of iron and quinine case on the explanation of Mr. Howard, whose firm supplied the article; the scammony case, on the certificate and evidence of Dr. Attfield; the arrowroot case, on the certificates of Dr. Redwood, Dr. Voelcker, Mr. Stoddart, and Messrs. Southall; a fine being inflicted only in the sulphate of quinine case, in which the alleged adulteration consisted of the addition of a salt of cinchonine. Mr. Jones exhibited Horsley's tubes for analysing milk, and showed, in the tubes, samples of pure and adulterated milk, with the variable amounts of butter-oil. A specimen of Liq. rhamni frangulæ was also exhibited. In illustration of remarks made in reference to "carnivorous plants," specimens of the round-leaved sundew (*Drosera rotundifolia*), and the pitcher plant (*Sarracenia purpurea*), were shown. A discussion followed the paper, in which the President, Messrs. Lucas, Churchill, Grieves, A. Southall, Homer, and others took part.

It was resolved to hold the usual annual soirée, and a committee was appointed to make the necessary arrangements. The affair promises to be, as usual, a brilliant success.

BRISTOL PHARMACEUTICAL ASSOCIATION.

At a meeting of the above Society. held on Monday, October 5, Mr. G. F. Schacht, F.C.S., was re-elected president; Mr. Charles Boorne, vice-president and treasurer; and Mr. John Pitman, honorary secretary.

The following gentlemen constitute the Council for the ensuing year:—Messrs. G. F. Schacht, R. W. Giles, W. W. Stoddart, C. Boorne, C. Townsend, J. Stroud, R. C. Cuff, E. Player, J. Taplin, J. Boucher, G. W. Isaac, and John Pitman.

The Council have issued a circular announcing that they have made arrangements by which they are enabled to offer to their fellow members and associates the following complete course of instruction in chemistry and botany for the session 1874-5:—

Chemistry.—A course of lectures by Mr. Coomber, F.C.S., on Inorganic Chemistry, every Tuesday, at 8 p.m., commencing October 20th. A course of lectures by Mr. Coomber, F.C.S., on Organic Chemistry, every Thursday, at 8 p.m., commencing October 22nd.

Botany.—A course of lectures by Mr. Leipner, on botany—elementary, systematic, and physiological—every Monday, at 8 p.m., commencing October 19th.

At the conclusion of the session, in May next, an examination will be held in each subject, at which every student is required to present himself. In connection with that examination the Council intend to offer a series of prizes, particulars of which will be shortly communicated.

Tickets for either of the two subjects—chemistry or botany—will be five shillings for members and associates, provided the holder complies with the condition of presenting himself for examination, and shall have attended not less than 20 lectures in each course, in accordance with the regulations of the classes; otherwise the fee will be ten shillings. Students are earnestly advised to abstain from entering for more courses than they can reasonably expect to follow up.

Tickets for the above lectures may be obtained of the following gentlemen:— Mr. Boorne, Union Street, Bristol; Mr. Stoddart, North Street, Bristol; Mr. Schacht, Clifton; Mr. Isaac, White Ladies Road, Bristol; Mr. Pitman, Redcliff Hill, Bristol, who will give any further information which may be desired.

A course of practical laboratory instruction will be conducted by Mr. Coomber, on Friday evenings, at the laboratory in Nelson Street. The fee (inclusive of apparatus and chemicals) will be £1 1*s*. per quarter. Tickets to be obtained of Mr. Coomber only.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The fifth general annual meeting of the members of the above Association was held on the 5th inst., for the purpose of electing the officers and committee for the ensuing year, when the secretary (Mr. Hedley) being called upon, read the following:—

Report.

"Your committee, in presenting this its fourth annual report, would congratulate you upon the continued existence of the Manchester Chemists' Assistants' Association; at the same time, it is a matter of deep regret to announce that the interest taken in it by the members has not been so great as such an institution demands.

"It feels assured that a little more energy on the part of the assistants would be productive of much good to themselves and to the Association, inasmuch as they would be brought into social intercourse with each other, a state of things very much to be desired amongst any body of men, and which they are sorry to say does not at present exist to any great extent amongst chemists and druggists.

"During the session there have been eight meetings held, at seven of which papers were read by members as follow:—On Opium, by Mr. W. Lane; Phosphorus, by Mr. Pidd; Mercury and its Salts, by Mr. Strickland; Leaves, by Mr. Roebuck; Light, by Mr. Hurst; Heat, by Mr. Slinger; The Progress of Pharmacy, by Mr. Davidson. At the eighth an instructive lecture, which will ever be remembered by those who had the pleasure of listening to it, was delivered by Mr. Siebold on "The Constitution of the Organic Bases," with reference also to organic analysis. Your committee regrets that the effort to sustain a Pharmacopœia class was not successful, and, in consequence, the class was discontinued.

"Your committee is happy to say that in a financial point of view the Association has not yet become insolvent, there being a balance in the hands of the treasurer. On retiring from office, your committee desires to express a wish that the Association may long continue to prosper, and be in the future what it has hitherto been—'an Association for improvement both in intercourse and instruction.'"

The report being unanimously adopted, the election of officers and committee was next proceeded with, resulting in the re-election of Mr. Lane as president and Mr. Booth as vice-president, Mr. Clegg as secretary and treasurer (vice Mr. Hedley, resigned), and the following gentlemen to serve on committee, viz.:—Messrs. Davidson, Hedley, Illsley, Kennerley, Roebuck, and Sanders.

The president then delivered his annual address, giving the history of the Association from its origin up to the present time, in the course of which he warmly eulogized the services rendered to the Association by Mr. Siebold (the mention of whose name was received by the members with applause), and concluded by urging upon the members the necessity of such an Association, and the advantages to be derived from it, and expressing a hope that the attendance at the meetings of the forthcoming session would be such as to ensure lively and animated discussion on the subjects brought forward.

A vote of thanks to the retiring officers and members of the committee concluded the business of the evening.

Proceedings of Scientific Societies.

AMERICAN PHARMACEUTICAL ASSOCIATION.

(Concluded from p. 252.)

The second and third sitting of the twenty-second annual meeting of this Society was held in the Liederkranz Hall, Louisville, Ky., on the 9th September. The officers and committees for the ensuing year were then nominated. Among them were the following:—

President, Professor C. Lewis Diehl, Louisville; Vice-Presidents, Joseph Roberts, Baltimore, W. T. Wenzell, San Francisco, A. R. Bayley, Boston; Treasurer, C. A. Tufts, Dover; Permanent Secretary, Professor J. M. Maisch, Philadelphia; Reporter on Progress of Pharmacy, Professor C. Lewis Diehl, Louisville; Local Secretary, S. A. D. Sheppard, Boston; Executive Committee, George W. Kennedy, W. McIntyre, J. L. Lemberger, C. A. Heinitsh; Committee on Legislation, Professor John M. Maisch, F. L. A. Greve, R. B. Ferguson, George J. Luhn, A. G. F. Streit, S. S. Garrigues; Permanent Committee of the Pharmacopœia, Professor G. F. H. Markoe, Professor P. W. Bedford, A. B. Taylor, Professor J. Faris Moore, A. E. Ebert, W. H. Crawford, J. C. Wharton, Professor C. Lewis Diehl, Professor R. H. Stabler, Professor J. F. Judge, Professor W. T. Wenzell, Paul Balluff, William Saunders, C. A. Tufts, M.D., C. H. Dalrymple.

It was then resolved that the officers of the Association be empowered to enter into correspondence with any international body that may have been created for the purpose of effecting a unification of the plan upon which the different pharmacopœias have been constructed.

It was also resolved, that the executive committee, with the approval of the president and treasurer, be empowered to publish annually, with the proceedings, the likeness of one or more departed members, and that for the forthcoming volume, Professor William Procter, jun., be selected.

It was further resolved, that a committee of three be appointed by the president to report at the next meeting upon the possibility of the publication of a table of maximum doses, and to devise a plan by which physicians can distinctly indicate unusually large doses in their prescriptions.

The committee on the drug market presented their report, read by the chairman, Professor P. W. Bedford. In alluding to the imports of drugs, chemicals, dye stuffs, etc., it was stated that the total imports for the year ending June 30, 1873, were of

Dutiable drugs, etc.	12,202,344 dols.
Free ,, ,, ...	20,610,605 ,,
Total	32,812,949 ,,

The amount of duties paid on this was 4,441,853,853 dols., making a ratio of 36·4 per cent. on dutiable goods, or 13·5 per cent. on the total imports. Almost all crude drugs and articles from which manufactures are obtained are free of duty. As compared with other large imports it will be observed that the ratio of duty is favourable to the pharmaceutical vocation.

Statistics were furnished showing the drugs rejected at the Custom House in New York, and a large number of notes were read giving the supply, values, character, and fluctuations of the drug market of the year. The report of the committee upon sophistications and adulterations was then read on behalf of Charles Rice, chairman.

Professor Maisch read the report of the committee on legislation, of which he is chairman, and gave all the information which he had been able to collect during the year, relating to laws affecting pharmacy. He stated that in some of the southern States old laws affecting pharmacy had been exhumed, and attempts to enforce them had been made, to the discomfort of many in the business.

The committee on papers and queries now requested that replies to queries be called up. Of the fifty-two queries, twenty-five were responded to, seventeen were continued another year, and ten were dropped.

The treasurer's report gave the receipts and disbursements of the year, adding that quite a large number of persons had failed to meet their dues, and were likely to be dropped from the roll of membership. In all respects the financial affairs of the Association were satisfactory. The report was referred to an auditing committee, who subsequently reported that it corresponded with the vouchers, and warmly commended the treasurer for his care and neatness with his accounts.

Replies to queries and discussions occupied the balance of the sessions of this day.

The fourth and fifth sessions were held on Thursday. Mr. William Saunders offered a resolution, which was unanimously adopted, recognizing the great loss the Association had sustained in the loss of one of its founders, Professor William Procter, jun., of Philadelphia.

It was then decided that the next place of meeting should be Boston, and the time the 12th September, 1875.

Several propositions to amend the bye-laws were adopted; among them:—

To increase the salary of the permanent secretary to 600 dols. per annum;

To increase the salary of the treasurer to 400 dols. per annum;

To fix the salary of the reporter on the progress of pharmacy for the ensuing year at 500 dols.

The subject of a liquor dealer's licence for apothecaries was brought up by Mr. G. H. Schaffer, of Fort Madison, Iowa, who desired to have urgent and immediate steps taken to induce the Government to revoke the necessity of such a licence for the fraternity.

Some of the members present explained the difficulties with which the Government had to contend relating to the sale of liquors by druggists. Throughout the country there are so many who will use their business in drugs as a screen for the sale of liquors, that the Government is obliged to make the conscientious apothecary suffer with those who are guilty, and there appeared to be no way to lighten the burden. It was stated that the commissioner of internal revenue had said that, if druggists were allowed the privilege of selling liquors without a licence, wherever there was now a liquor-shop there would then be a drug-shop, and the Government would receive no revenue.

On Friday the final session was devoted mainly to the reading of papers in answer to queries and volunteer essays.

The committee on exhibition of specimens (J. T. King, chairman) presented a partial report, and a resolution was offered—"That in future all foreign patent or proprietary medicines and nostrums be treated the same as domestic articles of this class, and that they shall not be exhibited or considered at the meetings of this Association." On the vote being taken it was unanimously adopted.

Mr. J. F. Hancock, on behalf of the committee on unofficinal formulas, read some formulas which it was thought desirable to adopt for the sake of uniformity.

Mr. A. E. Ebert presented the formulas of elixirs as adopted by the Chicago College of Pharmacy, and after some discussion on the subject of elixirs, it was referred to a committee consisting of Messrs. William McIntyre, R. V. Mattison, and George W. Kennedy, who were instructed to collate and select formulas, and report at the next annual meeting.

The following is a list of queries reported on at the meeting, and a summary of the reports, taken from the New York *Druggists' Circular*:—

1. American extract of liquorice is regarded by a recent investigator as of superior quality, and is found to yield a large percentage to water. Does not such extract contain an admixture of gum or dextrine? Accepted by Adolph W. Miller, Philadelphia.

In reply to this, it was stated that careful experiments showed that one brand of liquorice had but a small portion of insoluble matter, and was evidently free from any intentional addition of foreign substances, but that some other brands examined contained dextrine.

4. Commercial sulphate of potassium, in the European markets, is stated to contain a large percentage of sulphate of sodium. Is this true of the sulphate found in the American markets? Accepted by P. W. Bedford.

In reply to this query, it was asserted that the sulphate of potassium sold in crystals was pure and entirely free from any sodium salts, but what is known in the market as "slurry," or impure sulphate of potassium, contains a considerable amount of the sulphate of sodium. This "slurry" is not used as a medicine direct, but is employed in the manufacture of glass and as an ingredient in some chemical processes.

5. What is cincho-quinine? Referred to Albert E. Ebert.

This paper detailed at length the commercial history of this much-vaunted article, and also the chemical experiments as to its composition. The name would indicate that quinia is at least a constituent, and the circulars accompanying the article state that it contains the various alkaloids of cinchona; but Mr. Ebert's careful experiments prove conclusively that it is nothing but *cinchonia*, there being *no other alkaloid* present in any of the samples examined, which were all of them obtained from the reputed manufacturer of this "valuable" delusion. Although it has an entirely different appearance from the cinchonia ordinarily found in commerce, this is caused by a modification of the drying process.

8. Powdered blue mass. What is an easy and convenient mode of preparing a mercurial powder to fully represent the officinal blue pill? Accepted by John F. Hancock, Baltimore.

Mr. Hancock gave the following formula as the result of his experience, and one which had proved entirely satisfactory:—

Mercury	284 grains.
Syrup	200 grains.
Sugar, a sufficient quantity.	

Mix the mercury with the syrup, and two hundred grains of sugar, and rub until the mercury is extinguished. Put it aside in a dry room for ten days, rub to powder, adding enough sugar to make the entire weight 1,152 grains, the whole to be thoroughly commingled. The paper stated that the mercury was partially oxidized, and that its action depended upon the oxide thus formed, and that the exposure for ten days was intended to accomplish this object.

The paper elicited considerable discussion, some contending that the intention in all the mercurial preparations in which the metal itself was present was to avoid any oxide, and that the introduction of honey and the trituration with this substance was as far as possible to prevent oxidation.

Professor Remington alluded to his experiments with mercurial powder (hydr. c. cretâ) some years ago, as detailed in a paper before the Association, in which he took the opposite view. It was also stated that no preparation in powder intended as a substitute for blue pill had proved satisfactory. After further discussion Mr. Hancock said that he would experiment further by preparing a powder made with oxide of mercury, and another made with mercury protected from oxidation, and he subsequently accepted a query having this for its subject.

11. How may oleic acid be readily and rapidly prepared, in a condition sufficiently pure for preparing oleate of mercury? Referred to Charles Rice.

Mr. Rice reviewed the various processes which have been published giving formulæ for purification of this acid, and stated that the simplest and best process was to take the crude oleic acid of the market, cool it to 45° F. Express, or better, express it at three different temperatures, the first one at 60° F., the second at 50° F., the third at 45° F.; then add some dilute sulphurous acid, agitate till decolorized, then wash with water until free from the sulphurous acid, and finally separate all water. In making the oleate of mercury, it is best to sift the oxide of mercury on the surface of the oleic acid, incorporating it slowly, and to use no heat. By this manipulation he had succeeded in obtaining a product which was free from any reduced mercury.

13. What is the relative quantity of extract of quassia prepared with water and prepared with dilute alcohol? Accepted by Joseph S. Whall.

The essayist stated that the yield from dilute alcohol was larger, the extract more satisfactory and of a better consistence than when made with water.

16. What is the most desirable solution of quinia for hypodermic injection? Accepted by A. P. Sharp.

Mr. Sharp stated that having found that all the acids usually employed were irritating, he resorted to the use of lactic acid, from which he obtained satisfactory results, both as to its chemical and physiological results. He gave two formulæ, in one of which a small proportion of alcohol was used, in the other bisulphite of sodium was used to preserve the solution from change. The latter formula was:—

Sulphate of quinia	15 grains.
Lactic acid	15 minims.
Water, to make	60 minims.
Bisulphite of sodium.	½ grain.

Rub the sulphate of quinia with a small portion of water to a fine paste, add the acid, then the remainder of the water, and lastly dissolve the bisulphite of sodium in the solution.

17. Why do some of the diluted phosphoric acids of the market form precipitates with tincture of chloride of iron, while others do not? Accepted by Louis Dohme.

Mr. Dohme stated that after he had finished his paper, on repeating some of his experiments with other specimens of phosphoric acid, he had obtained different results from those detailed in his paper, and he would continue his experiments. He attributes the precipitation alluded to in the query to the presence of pyrophosphoric acid. In the discussion which ensued it was stated that the heating of glacial phosphoric acid with water alone would produce the desired result, and be even better than the use of nitric acid, as in the officinal formula, the trouble being to free it from adhering traces of the nitric acid.

19. What are the advantages of making suppositories by moulding over the method of making them by hand? Accepted by George W. Kennedy.

Mr. Kennedy enumerated no less than nine cogent reasons for preferring *hand-made* to moulded suppositories. The principal reasons were, the better distribution of the medicinal ingredients through the mass, the readiness of making a small number, and the satisfactory results he had always obtained by this method. It seems evident that a skilful operator is necessary in order to rapidly make neat-looking suppositories by either method.

20. An examination of commercial carbonates of magnesium for carbonated alkalies. Accepted by P. W. Bedford. The writer stated that carbonate of magnesia, as found in the market, contained a small quantity of lime and soda, with traces of potassa and sulphuric acid. They were, however, minute in quantity, and could not probably be entirely freed from traces of these substances without increasing the cost too much for the large manufacturing processes.

22. Does water extract all the purgative principles of rhubarb, and is the alcoholic percolate of rhubarb, after its exhaustion with water, inert? Accepted by Charles A. Heinitsh.

Mr. Heinitsh states that water does not extract all the purgative principles in rhubarb. After carefully percolating rhubarb with water until no soluble matter was taken up, then drying, and again percolating it with alcohol, the latter liquid dissolved some soluble extractive matter, which, when evaporated to a pilular consistence, proved laxative in doses of six to ten grains, and purgative in doses of over twelve grains.

26. To what pharmaceutical uses can cosmoline be put? Accepted by Joseph L. Lemberger.

Mr. Lemberger stated that he had used cosmoline in a variety of forms as ointment, cerate, and fluid preparations, and found it to be a valuable substitute for lard and similar unctuous bodies. When combined in suitable proportions with yellow wax he deems it preferable to lard as ordinarily to be found, while as a healing agent he believes it to be far superior. He gave numerous instances in which he had seen its efficacy in severe burns, as also in other applications.

Considerable discussion ensued after the reading of this paper. The general opinion expressed was that cosmoline was no more or less than a purified paraffin oil, and that its various forms were only modifications effected by heat. The statements made by its proprietors were doubtless true, that they did not treat it with any chemicals; but as it was a process which they endeavoured to keep secret, and protected by a trade-mark or patent, it was the duty of pharmacists to seek some suitable substitute. That the article possesses merit seemed to be apparent to all, but the opinion prevailed that all this merit could be found in paraffin oil.

29. What preference is shown to graduates in pharmacy, as compared with non-graduates, and how do their salaries compare? Accepted by P. Balluff.

Mr. Balluff stated that graduates always procure positions more readily, and at better compensation, than can be commanded by non-graduates. This experience was not confined to New York, but his correspondence led him to believe it was almost universal.

30. How do the salaries of drug clerks compare with the salaries of clerks in other businesses, and with those of skilled mechanics? Accepted by H. N. Rittenhouse.

The reply of Mr. Rittenhouse was very voluminous, and embraced statistics showing the compensation paid to all classes of labour. Although the compensation of drug clerks seems liberal, yet when their hours of labour are compared with the hours of skilled mechanics, the ratio of time given by drug clerks is greater than any other class of labour for the same amount of money received as compensation. As only the most competent drug clerks can expect to receive liberal salaries, it depends upon the young man as to what he shall be valued at. It is, therefore, an incentive to all to attain the highest grade of competency, either considered as to ability to command a liberal salary, or the requisites to successfully conduct a business for himself.

33. What is the quality of the iron by hydrogen of the market? Accepted by J. L. A. Creuse.

The paper of Mr. Creuse was very exhaustive in its research. Selections were read showing the analysis of specimens of iron by hydrogen, the analysis proving that there was a vast difference in the samples examined.

35. What is the state of purity of commercial santonin obtained from various sources? Accepted by Frederick Hoffmann.

Dr. Hoffmann examined a number of samples obtained in various cities of the Union, and found all to be pure except one sample. There was, however, quite a difference in the appearance of the crystals, but this he attributed to the fact that they were obtained from different liquids.

Professor Remington stated that santonin had been seen of German origin, which contained a large percentage of ground mica.

39. An essay on granulated effervescent compounds. Accepted by R. V. Mattison.

The essayist read quite a lengthy paper, stating that most of the imported "granules" were unreliable; that, with the exception of a single foreign manufacturer and two American producers, those of citrate of magnesia were entirely free from this salt. The general process adopted in their manufacture was to combine equivalent weights of citric or tartaric acid with bicarbonate of soda by means of absolute alcohol; make them into a paste with the medicinal ingredient desired, and a small amount of sugar; then dry carefully, and afterwards sift them through suitable sieves, the fine powder which passed through the finer sieve to be worked over with the next lot of the same kind. The great difficulty was to produce them of a satisfactory white colour, which he asserted could not be done readily on a small scale. It was necessary that *absolute* alcohol be used, as a minute quantity of water would spoil the whole batch.

There was considerable criticism upon the paper, as the majority of those present thought it should have given more practical information, while others discountenanced the idea that for such preparations they should depend upon the wholesale manufacturer. It was the duty of the pharmacist to be competent in all branches, and the object of their meetings was not to encourage secret preparations, but to extend useful and practical information to all.

42. What merit has petroleum benzine as a solvent for the extraction of oleo-resinous drugs like chenopodium, etc.? Continued to Joseph P. Remington.

Professor Remington stated that his paper of last year on the solvent properties of petroleum benzine had proved the fact that it was not a good solvent for buchu, and since then other experiments had proved that it was not available for any of this class of oleo-resinous drugs, as after it failed to extract any more active soluble matter alcohol would still remove a large quantity. He therefore reported against its use as a solvent for these drugs.

43. Does not the acknowledged value of colchicum, and its liability to vary in activity, suggest the preparation of a working formula for medicinal colchicia as a new pharmaceutical? Continued to Ottmar Eberbach.

Mr. Eberbach's conclusions are that the alkaloid exists in small quantities, and is too expensive an extract to make a satisfactory pharmaceutical product from which to prepare any remedial agents. He exhibited specimens of the crude and crystallized colchicia in connection with his paper.

48. An essay on cleanliness as a pharmaceutical virtue, and especially on the means and methods of cleaning bottles, mortars, and vessels of all kinds in daily or occasional use. Continued to J. M. Ayers.

An amusing and interesting essay extolling the virtues of industry and soap, with sundry bits of good advice as well as sarcasm.

51. What are the degrees of strength and the purity of the so-called chemically pure mineral acids of the different manufacturers? Continued to P. W. Bedford.

The reply to this query gave the results of examinations of C. P. acid, obtained from various manufacturers. The acids examined were hydrochloric, sulphuric, and nitric. The sulphuric and nitric acids fall below the U. S. P. standard of specific gravity, while of the specimens of hydrochloric acid examined, two of them were above the standard. None of the acids contained any great amount of impurities, and, with the exception of the last two-named manufacturers, the others may be said to be very good articles, as the poorest of the others contain only traces of impurities, or sufficient to respond slightly to the tests employed.

Volunteer Papers.

A very exhaustive essay on "The Officinal Veratrums" was presented by C. L. Mitchell, and it was understood that it was a special competition for the Ebert Prize, which was founded last year.

The essay was divided into three portions, botanical, chemical, and physiological. The first portion reviewed all the characteristics of the veratrums; the second portion a lengthy chemical examination of each variety of veratrum, with their reactions, products, and characters; while the physiological examination detailed the action of the various substances isolated upon rabbits and other animals.

The deductions from the various experiments in connection with this paper are stated by Mr. Mitchell to be:—

1. There exists no such alkaloid as viridia.
2. Bullock's viridia is identical with, and probably was, jerira.
3. There is a distinct alkaloid in *Veratrum album*, differing from veratria and veratroidia.
4. The resin of *Veratrum album* is in itself nearly inactive, and owes whatever power it may possess to the presence of veratrolla.
5. The alkaloids do not exist in sufficient proportion to be profitably extracted.
6. Jerira does not exist in the seed of *Veratrum Sabadilla.*
7. Jerira and sabadilla are probably not identical.
8. Couërbe's "le vératrin" is a mixture of resin and veratria. Veratrolla acts as—(1st) Local irritant; (2nd) Irritant emetic and cathartic; (3rd) A direct depressant to the circulation; (4th) A powerful nerve and muscle poison, producing death by either paralysis or suspension of the action of the heart-muscle. Its action on the nervous system has not been studied. It is probably a spinal and motor depressant, like the other alkaloids of the group.

A volunteer paper, by James R. Mercein, on home-made chemicals, was very favourably received, as it urged the preparation of many of the chemicals now usually purchased. The paper was accompanied by some dozen specimens of chemicals prepared by Mr. Mercein.

Dr. W. H. Pile presented three volunteer papers. One on bromide of ammonia, gave a new and easy process for its manufacture. It may be briefly stated thus :—Into a five-gallon stone jar (which should be set in cold water) introduce—

Distilled water	4 pints.
Bromine	1 pound.

The bromine is poured down a funnel tube, long enough to touch the water, and afterwards add the water of ammonia, *in small quantities, avoiding much increase of temperature*, and the mouth of the jar covered with a glass plate. About two pounds of water of ammonia will be required. When the bromine has been entirely converted into bromide of ammonia, the solution may be evaporated with constant stirring as the process nears completion, in order that the salt may be obtained in a granular form.

The second paper was a brief one, on the preparation of phosphuretted resin.

The third paper was on a modification of hydrometers, by which a single hydrometer may be adapted for various uses in manufacturing. A glass hydrometer, having the upper extremity open and fitted with a cork, has a single mark made on the tube, and mercury is poured into it until it floats in distilled water at the level of the mark. The tube and its contents are now dried and weighed. To make this available for other liquids, it is only necessary to multiply the weight by the desired specific gravity of the liquid to be examined, and make the hydrometer correspond in weight by the addition or removal of a sufficient amount of mercury. If now placed in the liquid to be examined it gives an indication as to the density of the liquid. This instrument is not intended for delicate work, but rather that persons in manufacturing establishments may readily make hydrometers for special uses.

The only remaining paper read was by Clay W. Holmes, of Wilkesbarre, Pa., on castor-oil emulsion, for which he gave the following formula:—

Castor Oil.	6 fluid ounces.
Acacia	1 troy ounce.
Syrup	1 fluid ounce.
Glycerine	1 fluid ounce.
Water	3 fluid ounces.
Brandy	$\frac{1}{4}$ ounce.
Extract Vanilla	$\frac{1}{4}$ ounce.
Oil Cinnamon	5 drops.

Mix, and make emulsion.

Parliamentary and Law Proceedings.

Prosecution for Imitating Trade Marks.—Clarke's Blood-Mixture.

At the Middlesex Sessions, October 14, before Mr. Serjeant Cox, George Herbert Clarke, a chemist, of Shoreditch, was indicted, under the statute of the 25th and 26th Victoria, for that he did alter a trade-mark—to wit, one of "Clarke's World-famed Blood Mixture;" a second count charged him with causing such alteration to be made; a third count charged him with forging such trade-mark; a fourth count charged him with applying such forged trade-mark; and a fifth count charged him with applying a counterfeit trade-mark. There were other counts still further varying the offences.

Mr. Montagu Williams prosecuted; Mr. Besley appeared for the defendant.

The defendant having pleaded not guilty, Mr. Montagu Williams said the real question the jury would have to consider was whether the defendant had or had not copied the trade-mark of the prosecutor. The prosecutor was Mr. Francis Jonathan Clarke, of Bracebridge Hall, near Lincoln, a chemist, but although a chemist of Lincolnshire, he was well known throughout the kingdom. He registered a mixture called "Clarke's World-famed Blood Mixture," which was widely advertised and sold throughout the country. On the 18th of March, a person of the name of Crook, the London agent of Mr. Clarke, called upon the defendant, who is a chemist in Shoreditch, and inquired of him whether he would undertake the agency of Clarke's Blood Mixture for that neighbourhood. The defendant said he should like such an agency very much, and at his request he was supplied with a large quantity of "Clarke's World-famed Blood Mixture," all bearing a particular label, which was entered at Stationers' Hall, and it bore particular lines upon it. Subsequently Mr. Crook called upon the defendant, who said he liked the agency very well for the sale of this medicine, and upon that he was furnished with a thousand bills, and the defendant's name was printed at the bottom of them. It was subsequently found that the defendant was selling what he called "Clarke's Blood Renovator," a mixture of his own, instead of "Clarke's Blood Mixture," done up in similar bottles and with similar labels, and calculated to deceive, by substituting one for the other. Some conversation took place as to this substitution, and a prosecution was at once commenced. All the prosecutor wanted was to protect his own property, and make himself safe without having recourse to a criminal prosecution. If the defendant would give up the labels and apologize for what he had done, he would then be willing to give up the prosecution. The defendant, George Edward Clarke, had been mixed up with a Montague Clarke, under the name of "Dr. Clarke," for the sale of this medicine. Both had apologized, and having read the apology, he did not propose to offer any evidence. The apology was as follows :—"I, Charles Montague Clarke, do hereby acknowledge that I, under the spurious title of Doctor of Medicine, have illegally infringed and printed your trade mark 'Blood Mixture,' and copied your advertisements, labels, handbills, and caution, with intent to deceive the public. And I, George Herbert Clarke, do hereby acknowledge that I, under the title of pharmaceutical chemist, have prepared and sold for the said Charles Montague Clarke a certain compound called 'Blood Renovator.' Now, we, the said Charles Montague Clarke and George Herbert Clarke, do hereby, in consideration of your consenting to offer no evidence against the said George Herbert Clarke, on a true bill found against him by the grand jury of the Middlesex Sessions on the 8th day of October inst., undertake to agree to discontinue such practices, and to hand over to your solicitor forthwith all wrappers, handbills, advertisements, circulars, and bottles containing the stuff relating to the said spurious compound called 'Blood Renovator,' and we humbly apologize for having resorted to such practices.—Charles Montague Clarke, George Herbert Clarke. Signed in the presence of Henry Poull and J. Haseldine, clerks to Mr. J. Seymour Salaman, 12, King Street, Cheapside, solicitor to the Trade Mark Protection Society." Under these circumstances, on being consulted, he said this was a proper termination of the proceedings, and therefore he did not propose to offer any evidence in support of the prosecution.

The Jury then returned a verdict of "Not Guilty."

Mr. Besley said that, setting aside all technical objections as to the infringement of this trade-mark, as Mr. Clarke had spent a large sum of money in advertising this preparation, it was unfair on the part of the defendant to sell anything as a colourable imitation.

Mr. Serjeant Cox concurred in the course that had been taken, and ordered the defendant to pay the costs of the prosecution.—*The Daily Chronicle.*

Prosecutions under the Adulteration Act.

"Liebig's Liquid Extract of Beef."

At the Bradford Borough Court, on the 9th inst., John Knight, of 4, Nelson-square, Horton-road, was charged with selling an article called Liebig's Liquid Extract of Beef, which was alleged to be a different article from that which was actually sold under that name.

The Town Clerk said that he had nothing to say either against the extract or against those who sold it, his contention being that the defendant had sold an article which was not what it purported to be, and which was different from what it was described to be by the vendor. It was stated to be "the only beef extract that does not require cooking or warming, it being in the form of a liquor. It is composed chiefly of pure extract of beef, obtained from the best parts of the animal, wine, a small quantity of fine old brandy, and quinine." It was said to be highly nutritious and easily digested, was specially recommended to ladies in a delicate state, and the opinion of a Dr. Sewell was quoted : "I can recommend it as convenient, palatable, and easy of digestion." The Town Clerk urged that representations of this kind were mischievous, and calculated to mislead, as the so-called "Liquid Extract of Beef" contained a very minute portion of beef, no quinine, no Madeira wine, and no brandy, but something else to make it palatable. Directions were given on each bottle to the effect that "invalids may take a wine-glass full three times a day with great advantage. This quantity has been found to sustain life for months, when the patient could not retain any other kind of food on the stomach." He urged that all this was misleading, as the extract was stated to be "composed chiefly of pure extract of beef," while it was actually nothing of the sort. A couple of bottles of the extract were purchased of the defendant by Inspector Barker. The extract was analysed by Mr. F. M. Rimmington, borough analyst, and it was found to consist of a very small portion of beef, Tarragona wine, sweetened with sugar, flavoured with pimento or allspice, slightly aromatic in flavour, and containing 15 per cent. of pure alcohol. Evidence was given by Mr. Rimmington, who stated that he considered the extract was injurious to health when improperly recommended, as it was in the hand-bills given to purchasers. There might be no such man living as Dr. Sewell, and a false representation was made about the extract. It was not chiefly composed of beef, as there was only a trace of beef. There was no quinine, no brandy, no Madeira wine, and it appeared to him to be merely a sly method of drinking. Mr. H. Butterfield, the Medical Officer of Health, said that the extract would be injurious to pregnant women, and could not take the place of animal food, as it was injurious to give alcohol instead of beef. It could not be good as a food as it was described, and he considered that if the extract were taken instead of food, the person taking it would not live long. Mr. Terry, for the defendant, urged that his client was quite innocent of any intention to mislead. He had obtained the extract from Messrs. Digby, Gandy, and Co., of Liverpool. That firm had purchased the right to sell it from a Glasgow firm, and the extract that Mr. Knight received was part of the old stock which had been purchased along with a number of hand-bills. The Liverpool firm had since improved the extract, had patented it, and it was selling largely, so that they could hardly supply the demand. He went into a lengthy argument to prove that his client had done no wrong, but the magistrates (Messrs. J. Farrar and Ald. Mitchell) were of a different opinion, and the defendant was fined 40*s.*, with £2 10*s.* expenses, or one month in default. Mr. Terry then applied for a case, but the Bench refused. He then intimated his intention to appeal at the sessions, and later in the afternoon an undertaking to this effect was entered into by the defendant, John Knight, and Messrs. Edward Theodore Digby, and Chris. Gandy.—*Leeds Mercury.*

In reference to the foregoing case we have received a letter from Messrs. Digby, Gandy, and Co., of Liverpool, stating that the article alluded to is "Liebig's Liquid Extract of Beef and Tonic Invigorator," manufactured by Gerald Gordon and Co., of Glasgow, New York, and Montreal, received by Mr. Knight as samples, but that it is not now offered for sale in this country, and is not the "Liebig's Liquid Extract of Beef," manufactured and patented by them, and the quality of which they are in a position to guarantee.

Adulterated Mustard.

At the same sitting of the court, Charles Hill was charged with selling mustard that was adulterated. Inspector Booker applied at the defendant's place for some mustard from the bulk, but the defendant's man refused to sell from the bulk, and Booker bought a quarter-pound tin. The mustard was analysed by Mr. Rimmington. It was stated on the outside of the can that it consisted of pure mustard, farina, and *choice condiments*, but the analyst found that it consisted of mustard, wheat flour, and turmeric, but it was not injurious to health. The wheat flour was added to increase its bulk, and the turmeric to colour it. Booker stated that no declaration was made by the man from whom he bought it as to what the mustard contained, and he did not observe the specification on the exterior of the can. The mustard was Colman's. Mr. Berry, for the defendant, urged that his client was not responsible, as the can stated what the mustard consisted of, and he held that that was a sufficient declaration. The magistrates, however, thought otherwise, and a penalty of 10*s.* with 8*s.* costs, was inflicted, or fourteen days in default.

WHAT IS A SUFFICIENT DECLARATION OF ADMIXTURE?

At the Edmonton Petty Sessions, on the 28th ult., Mr. Robert Hockey, grocer, of Colney Hatch, appeared upon an adjourned summons charged with selling, as a pure article of food, mustard that was adulterated with 20 per cent. of flour and turmeric. The defence on the first hearing was that the label on the packet to which attention had been called, stated "This is an admixture in which no injurious ingredient had been used." The case had been adjourned for the production of a copy of a judgment in a superior court, to enable the bench to decide whether this was a sufficient declaration. The judgment quoted was that in the appeal of *Pope v. Tearle*, heard by Lord Chief Justice Coleridge, and Justices Brett and Grove, before reported in this Journal (vol. iv., p. 98); but as in its extended form, published in last month's Law Journal Report, Mr. Justice Groves gives another reading to the words *"and no other,"* which it has been asserted were inserted in the Act with special reference to drugs, we reproduce it here:—

"Lord Coleridge: I think the respondent is here entitled to our judgment. There are two sections of the Act (35 and 36 Vict., cap. 74) which bear upon this case, and it appears to me that the facts bring him within neither of them. [His Lordship here read the 3rd section.] Now, it appears to me that the true and reasonable construction of the Act interprets it thus—Whereas the phrase in the former section contemplated the case of the adulteration being by means of some noxious ingredient, the 3rd section went on to say, if an article of food or drink be mixed with a substance not noxious, but fraudulently added for the purpose of increasing the weight or bulk, and it be sold by a person knowing this who does not declare it, then such person shall be guilty under section 2. The respondent here is not within it. For though he sold an article so mixed, yet, by language and by label, he affected the purchaser with knowledge, and so did declare the admixture. He is not therefore within section 3. But supposing that he had not declared the admixture, and had sold, then he would have been brought within section 2. As it is, however, he is not within the latter section, for the simple reason that he has not here sold as unadulterated any article of food which was adulterated. Justice Brett: I am of the same opinion. Justice Grove: I read the Act in this way:—Sections 1 and 2 contemplate the mixing of noxious ingredients in articles of food and drink. The 3rd section, in order to avoid any doubt as to what adulteration is, says that the admixture of foreign substances, whether noxious or innocuous, is all the same adulteration. Is there anything in the section to make it necessary for the seller to declare what is the substance and quantity of the materials mixed? I think not. The words '*and no other*' in the 3rd section may well mean no noxious substance—nothing, that is to say, except for the purpose of increasing the weight. Judgment must, therefore, be given for the respondent (the grocer)."

After hearing the reading of this decision, the Bench unanimously dismissed the summons.

ALLEGED ADULTERATION OF PEPPER.

At Highgate, John Clevely, grocer, Colney Hatch, appeared in answer to an adjourned summons charging him with having sold adulterated pepper. Mr. Terry, solicitor, appeared for the defence. The inspector under the Adulteration of Food Act, deposed to purchasing two ounces of pepper at the defendant's shop, and Dr. Redwood, the county analyst, certified that it contained five per cent. of sand and inorganic matter, but that this adulteration would not be injurious to health. Henry King deposed that he represented the firm of Murray and Dean, formerly Sidney and Co., wholesale grocers, 41, Ludgate Hill, and sold the pepper to the defendant as pure. Witness bought the pepper of Messrs. Tomlin and Rendell, of Eastcheap, under a written guarantee that it was pure. Mr. Terry now produced a certificate from Dr. Hassall, the analyst, to whom a portion of the pepper bought by Mr. Faulkener, as well as samples from the bulk of Messrs. Murray and Dean's stock, had been sent. The certificate was as follows:—"The Analytical Sanitary Institute, 14, John Street, Adelphi.—Report of two samples of pepper received from Messrs. Murray and Dean, 41, Ludgate Hill: I have analysed with the greatest care two samples of black pepper sent to me to compare their composition with that of genuine black pepper. The first sample yielded on incineration 10·45 per cent. of mineral matter, containing 3·95 per cent. of silica or lead. The second sample, labelled 'Clevely,' contained 10·35 per cent. of mineral matter. Both samples contained small quantities of magnetic oxide of iron. Two samples of whole pepper berries obtained for the purpose of comparison gave only 4·60 and 4·00 per cent. of ash respectively, and contained but 0·12 and 0·10 per cent. of sand, while white decorticated pepper berries yielded as little as 1·56 per cent. of ash, which was non-magnetic. It is clear, therefore, from these results that both the samples sent for analysis contain a large excess of mineral matter, especially sand." Mr. Terry contended that this did not amount to adulteration. He argued that the sand was natural to the pepper, as it was not put in, but was from the stones by which it was ground. Moreover, the pepper berries when gathered fell to the ground, and the sand adhered to them. He called Mr. Cass, a spice grinder, of 5, Dockhead, who deposed that he ground about 100 tons of pepper a year for Messrs. Tomlin and Rendell. He fetched the whole pepper from the docks, and it was ground in stone mills, which certainly wasted a little. Mr. Nicholson said that "French burrs" (the stone used for millstones) gave off silica; but it was quite possible to grind pepper in a mill without stones. The Bench, after retiring to consult, decided that they must dismiss the summons, as they did not think there was any intention to adulterate the pepper; but Mr. Faulkener could have a case stated if he wished. Mr. Faulkener said he did not wish it. Mr. Nicholson said they also had considerable doubt about the meaning attached to the word "adulterate." Mr. King said that Messrs. Murray and Dean intended in future to manipulate the pepper themselves on their own premises.—*Grocer.*

ALLEGED ADULTERATION OF MUSTARD.

At the Mansion-house Police-court, on Thursday, Henry Parr, grocer, of the Trafalgar-road, Greenwich, was charged with selling adulterated mustard. Mr. Spencer prosecuted; Mr. J. B. Smith defended. It was proved that an ounce of mustard was purchased at defendant's shop, and placed in a bottle, which was corked and sealed in the presence of the manager. On hearing it was purchased for the purpose of analysis, the manager took out another ounce from a drawer in paper, and had the same sealed by the inspector. A portion of that purchased had been submitted to the public analyst, Mr. Wigner, whose certificate was produced to the effect that the mustard was adulterated with more than 30 per cent. of starch, which would not be prejudicial to health if taken as food. Mr. Smith said that the mustard in question was supplied in casks by Mr. Armistead, of Leeds, and the reason that a sealed packet of the mustard had been taken was that the mustard contained in the drawer might be analysed by a private analyst. This had been done by Dr. Tidy, who had certified that there was no adulteration whatever. He had, therefore, to ask for a third analysis, the decision in the case to rest upon the result; the portion to be analysed being that left from the part analysed by Mr. Wigner. Mr. Spencer said he had agreed to this further test, and that the analysis should be made by Dr. Heisch. Mr. Patteson accordingly adjourned the summons *sine die*.

SUPPOSED IMPROPER USE OF A MEDICINE.

The inquiry into the circumstances attending the death of Mr. William M'Kee, at Dundonald (see before, p. 275), was resumed on the 5th inst. Dr. Hodges, Professor of Medical Jurisprudence in Queen's College, Belfast, reported that he had examined the contents of the stomach and found traces of morphia. In one partly used bottle of medicine he had found ·306 grain of acetate of morphia, and in another ·665 grain: the former bottle when full would have contained 1 grain, and the latter about $2\frac{2}{3}$ grains of morphia. There was no label of any kind on either of these bottles. After some further evidence, the jury returned a verdict that the death was caused by an overdose of morphia, which resulted from the bottles containing the said poison being not properly labelled, and without any directions thereon as to how and what quantity should be taken, but that who supplied the said poison there was not sufficient evidence to show. They added a recommendation that the Crown should investigate the matter further, in order that the guilty party or parties may be prosecuted.

Reviews.

A TREATISE ON PHARMACY. By EDWARD PARRISH. Fourth Edition. By THOMAS WIEGAND. Philadelphia: Henry Lea; London: Baillière, Tindall, and Cox. 1874.

Perhaps one, if not the most important book upon pharmacy which has appeared in the English language has emanated from the Transatlantic press. 'Parrish's Pharmacy' is a well-known work on this side of the water, and the fact shows us that a really useful work never becomes merely local in its fame. It is impossible to look upon the fourth edition of this book without a double feeling of regret: Edward Parrish was unable to finish this edition, owing to his sudden death in the autumn of 1872, and now we find that the friend to whom this labour of love was dedicated is also no more.

In two short years the Americans lost two of their ablest men and worthiest citizens. The work, however, left by one of them, the writer of the book under review, was not allowed to be lost, and thanks to the judicious editing of Mr. Wiegand, the posthumous edition of 'Parrish' has been saved to the public with all the mature experience of its author, and perhaps none the worse for a dash of new blood.

'Parrish' is essentially a pharmacy book, or, in other words, it is the work for the man who wishes to study the *art* of pharmacy. It is not a book that we should recommend a student to study his pharmaceutical chemistry from; in fact, the chemistry is weak, and interlarded with a mass of extraneous details which are not suitable. In other words, 'Parrish' is more a book for the reference of the advanced student, or as the companion of the pharmacist's shop, than a work that would be of much use to the learner such as we understand the student to be, viz., a young man anxious to pass an examination. The author, however, had it in his plan to make it a text-book for professors of pharmacy. And the syllabi, as they are called are introduced very extensively for this purpose. The attempts to classify as much as possible in a tabular form all the materia medica and also the preparations, form useful compilations, and we know no work where this system has been more carefully and industriously carried out.

The matter, although somewhat re-arranged and transposed, is much of the same fashion as the last edition, with this exception, that it is much more full and extended. It is this fact that makes us object to the book for the use of students. Such works, in our opinion, are not suitable to teach, from their very fulness and complexity. The aspirant is obliged to take to cramming in self-defence, and he loses that method and perspicuity which are so essential to a sound foundation of learning in any science or art. Let him fill up the filigree work as he advances in his art, but a clear understanding of the skeleton upon which his superstructure is raised is absolutely essential.

To conclude our criticism so far as it may be at all called adverse, we must point out that the notation is rather loose. This is, no doubt, to be excused in a very large work like the one before us, because the conversion of the old notation into new must really be an Herculean undertaking; but as an example of what we mean, whilst barium is made a dyad in connection with oxygen on one page, we find it a monad when tied to iodine on the next.

Part I. is one of the divisions which stamp this book with usefulness; it is on the "furniture and implements" of the craft. It is true, as the author says, that no directions can be given to suit all conditions and circumstances for the arrangement of the pharmaceutical store, but no practising pharmacist will read this and not put by the book a wiser man.

The first chapter of the second part is devoted to the consideration of pharmacopœias. The author points out the necessity of an acquaintance amongst well-educated pharmacists with the standards of other countries. International communication is rendering this more imperative every day, and the example of consolidation set by the British Pharmacopœia is a move which, if extended, would benefit the three most interested parties vastly, if the initiative could be taken with regard to our own and the U.S. dispensatory.

After this we have a description of the necessary apparatus and their uses, and the chemical processes are explained. We still find the extraordinary jumble of ideas as regards old and new notation perpetuated through this part. We have already referred to this subject, but it is too important to pass over in silence. Thus we are told that "the formation of nitric acid in heating equal weights of nitrate of potassium and sulphuric acid is thus explained in accordance with the views of modern chemists"!

"$KNO_3+HSO_4=KSO_4+HNO_3$,"

and so on.

Now, as O is given as sixteen, and sulphur as thirty-two, there is evidently great confusion somewhere. The above equation means nothing, and it is calculated to mislead the student.

The work will be found invaluable to the practical man, from the numerous and varied formulæ for the compound mineral syrups which are now becoming as popular in our practice as on the other side of the Atlantic.

Part IV. is devoted to pharmacy in its relation to organic chemistry. The syllabi in this section are very full, and will be found very useful.

The chapter upon oils, particularly essential oils, is invaluable, and contains practical information in a concise form which we doubt can be found in any other work.

Part V. is the fullest and also one of the most important sections; it is headed "Pharmacy proper" (Galenical pharmacy). It contains many hints upon the subject of apparatus; amongst others we may mention Wiegand's improved clasp or ring for the retort stand, which is novel, and certainly possesses advantages over the old plan. The part containing the binding screw is open on one side, so that when the screw is loosened it can be slipped off laterally without moving it up the rod. The Galenical pharmacy is treated so fully, in fact is nearly half the work, both as regards the extent and importance, that we could not give it full justice without extending this review to much more than its legitimate space. It forms an encyclopædia of formulæ seldom met with, and at the same time is interspersed with manipulatory details which greatly enhance the value of what may be termed an important book. Parrish's 'Practical Pharmacy' is got up well, as all the better class of American books are, as regards their type, whilst the binding is exceptionally good, and forms a marked contrast to the usual boards, that certainly may temporarily cover, but assuredly do not bind—the books of publishers.

Nouveau Dictionnaire des Falsifications et des Altérations des Aliments, des Médicaments et de quelques Produits Employés dans les Arts, l'Industrie, et l'Économie Domestique; par J. L. Soubeiran, Professeur à l'École Supérieure de Pharmacie de Montpellier (J. Baillière et Fils, Paris).

M. Soubeiran opens his work with a preface, the commencement of which contains an excuse for adulteration in France, on the ground that the blockade established against France by the whole of Europe at the commencement of the present century, forced her to seek substitutes for her exhausted supplies; but he observes that the English, who have not the same excuse, practise adulteration to an equal extent. This certainly looks like making an excuse where none is wanted, particularly as a few lines farther on, after various reasons for the suppression of adulteration, he sums up in the following words:—"Adulteration, which is always the result of immoderate competition, ought to be severely punished, and commerce ought to be ashamed to lower itself to such work." The French definition of adulteration is also given—namely: "Purposely introducing into a product any other substance, whether inert or injurious; but accidental substitutions or admixtures, which may arise either from inadvertence or from defect in the manufacture, are not to be considered as adulterations." This definition is certainly rather lax, and does not in any way tend to elucidate the question which has for some time troubled the English legislature.

The work commences with a few pages descriptive of chemical apparatus and tests, which seem useless in a work like this, as any one attempting to carry out the analytical schemes described in the book should possess more knowledge than a few pages could convey. We are afraid, moreover, that this would give some confirmation to the already too popular, but false, notion that the requisite knowledge to enable any one to undertake analyses can be obtained by a short course of chemical study. The remainder of the book consists merely of a compilation of information respecting the various impurities in articles of food, medicines, etc., and the methods for detecting them, derived chiefly from Hassall's work on adulteration, and the various works on materia medica in general use; but it contains very little new or original work. Indeed, in some cases the methods given are out of date.

Some few errors have also escaped revision. Thus, acetic acid is said to boil at 120°, and solidify at 170°; hydrochloric acid, containing sulphurous acid, is said to give a precipitate of sulphite of barium with chloride of barium. On page 34 there is a substitution of the word citric for tartaric acid. Under hydrocyanic acid no mention is made of any process for estimating its strength; and under cyanide of potassium the volumetric process of Liebig is not mentioned. The statement, on the authority of Mr. P. L. Simmonds, that 250 tons of coculus indicus is consumed yearly by the English brewers is also open to doubt. Chamomile flower-heads are stated to have a flat receptacle, and no mention is made of the paleæ as the characteristic by which to distinguish them from the various flowers often substituted for them. Under bleaching powder no mention is made of the volumetric process by means of sodium hyposulphite, but the process given is that of Gay Lussac, depending on the quantity of arsenious acid capable of being converted into arsenic acid by the bleaching powder. Morphia is stated to be *soluble* in water, but the proportion is not stated. In testing for chloride in iodide of potassium, it is said that when nitrate of silver is added to the solution, and then ammonia to dissolve the precipitated chloride, the liquid will give a fresh precipitate with more nitrate of silver; nitric acid is doubtless intended.

Under milk, in order to extract the butter-fat, we are told "to filter milk through a triple filter, and when all the serum has run through, to exhaust the filter, etc., with ether, in order to dissolve the fat." No mention is made of first coagulating the milk to separate the curd from the serum.

A method of testing milk, precisely similar to that proposed by Mr. Horsley, of Cheltenham, is given, and a French chemist is named as the author; but no reference is given to the work in which it was originally published. We are unable to state, therefore, whether it would interfere with Mr. Horsley's claim to priority of discovery.

Under tannin the gelatine process is omitted; and in the method given of estimating tannic acid by means of tartar emetic, one of the most essential points—namely, the addition of chloride of ammonium—is altogether left out. The proportion of tannin in tea is also stated to be 30 to 40 per cent. in one part of the book, and from 12 to 20 per cent. in another.

On the whole, the book will doubtless be useful for the purpose for which, probably, it is intended, and will furnish to pharmacists or others who possess the knowledge requisite for discriminating between the good and the bad, a book of reference respecting methods of detecting adulterations. But it is scarcely the work which the high reputation its author justly bears would have led us to expect.

BOOKS RECEIVED.

Butter: its Analysis and Adulterations, specially treating on the Detection and Estimation of Foreign Fats. By Arthur Angell, F.R.M.S., and Otto Hehner. London: Wyman and Sons. 1874. From the Publishers.

Obituary.

Notice has been received of the death of the following:—

On the 21st September, 1874, Mr. Frederick Telfer, Pharmaceutical Chemist, who for many years carried on business in Corn Market Street, Oxford. Mr. Telfer had been a Member of the Pharmaceutical Society since 1842.

On the 1st October, 1874, Mr. Joshua Monkhouse, Pharmaceutical Chemist, of Liverpool. Mr. Monkhouse was a Member of the Pharmaceutical Society.

On the 5th September, 1874, Mr. Sutton Marshall Simpson, Chemist and Druggist, of Union Street, Bristol.

On the 30th September, Mr. Henry Fisher, Chemist and Druggist, of Lower Gornal, Staffordshire.

On the 6th September, Mr. John Scholfield, Chemist and Druggist, of Todmorden, Yorkshire.

On the 7th October, Mr. C. G. T. Williams, Chemist and Druggist, of Broad Street, Bath.

On the 8th October, 1874, Mr. Edward Schindler Griffiths, Chemist and Druggist, of Brighton, late of 47, Mortimer Street, Cavendish Square, London, W.

Notes and Queries.

[409.] DEPILATORY.—In reply to W. W., the best and safest depilatory is sulphide of barium made into a paste and applied to the part for five minutes, then scaled off with a bone knife.—Chemicus.

[414.] PREPARATIONS FOR THE TEETH.—Can any one give me a recipe for "Cherry Tooth Paste," also, "Soap Bark Tincture for the Teeth"?—Chemicus.

[415.] SYRUP OF HYPOPHOSPHITE OF IRON AND LIME.—"Syrupus" wishes to be supplied with a formula for Syrup of Hypophosphite of Iron and Lime.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Education.

Sir,—The eloquent and forcible address delivered on Wednesday last by Mr. Giles to the students of the Pharmaceutical Society ought not to be allowed to pass without comment, by way of enforcing the important principles which it enunciates.

And this all the more so since the speaker informed his audience that he was retiring from the practice of pharmacy.

I shall not venture now, and in this public fashion, to say all I feel impelled to say as to the ability and the attainments, crowned with fearless integrity, which have marked the career of this *facile princeps* of pharmacy. But this much, with propriety, I may say: we are thankful and proud to have had such men enrolled in our ranks—men capable of achieving distinction in any walk of life.

Bristol is pre-eminently wealthy in this respect. In what other town or city of the United Kingdom, the metropolis excepted, is such a trio of representative men to be found as hitherto have instructed and gladdened our meetings by their presence?

The influence of such leaders of thought is by no means confined to such meetings.

The *indirect* influences are greater than the *direct*, in the action of mind on mind, character on character. Principles introduced in living forms must ever be more potent as incentives to action than the most correct and faultless of systems continuing in the abstract only.

Mr. Giles retires from our ranks with the best wishes of all pharmacists that health and happiness may attend his days.

And now, Sir, let us for an instant pause and consider his valedictory address, the motto of which appropriately might be "*Prospiciens et respiciens.*" The retrospective portion of it will exercise an influence on our minds, determined by the age and position of his audience.

Many of us no longer young can endorse the accurate delineation of the state of pharmacy some thirty years ago or more. Keenly feeling the disadvantage at which we have been placed from the lack of early training, we are thankful that our sons start from a platform of 'vantage ground, which it will be their sin as well as their folly should they neglect.

The earnest and impassioned utterances of the address must prove a powerful stimulus to work on the part of the young men just entering the lists.

What, however, I am specially anxious to do in this communication is to support and enforce the views of Mr. Giles with regard to "*cram.*"

I admire the impartiality with which he dealt out his trenchant criticism. It matters not where and *by whom* the evil is perpetrated: that it is growing, that increased facilities for its growth are daily being proffered, that the result is wholly vicious, that if not promptly checked it must go a long way to stultify and neutralize our efforts steadily yet intrinsically to raise the educational status of the body with which we are identified, are truths that can be substantiated by an overwhelming array of facts.

Such a condition of mental dyspepsia as now threatens rising pharmacy never has the world seen before.

It was my good fortune, in common with my brethren of the Conference of 1872, at Brighton, to listen to the able and emphatic denouncement by Dr. Attfield of the evils of "cram."

For aught I know to the contrary, he may have fully anticipated how severe would be the criticism with which his opinions would be attacked; scarcely, however, could he have imagined how swiftly and abundantly his prophecy would be translated into fact. All honour to his outspokenness.

The question now arises, how shall we, each one in his own quiet provincial sphere of labour, exercise a healthful influence on the young men around us? Just thus, I take it. By deprecating and doing our best to prevent youths who have made no preliminary effort from going to London, "entering" for a three months' "*grind,*" and then presenting themselves to the Examiners.

Further, let us stick to the serious advice to do steady persistent work at home. "No day without a line," is an old-fashioned maxim, but if ever it needed to be enforced 'tis now.

As I have already intimated, we are grateful that our sons have Bloomsbury Square or other schools of pharmacy to which to repair; but what we need to impress on them is, that a certain amount of preparatory labour is absolutely essential to utilize the benefit of such schools.

It is a matter of common notoriety that young men are going up to town lamentably ignorant of the very alphabet of technical knowledge.

If this were regarded merely as a phase of the educational controversy of the present day, my fears would soon be allayed, being but an incident in what by all thoughtful men is admitted to be a period of transition. But, sir, if we transfer our reflections from the teacher to the taught, from the machine to the product, what do we see but a perpetuation of that very ignorance and incompetency in the future, to remove which we have been perfecting such elaborate methods?

May "cram" soon be dead and buried, its epitaph engraved, and its very ghost denied a resurrection!

Ere closing this letter, the length of which, were it not for the importance of its subject matter, should have my apology, I must express the great satisfaction I feel that the views I have so long entertained, and on different occasions fully expressed, concerning the Preliminary examination, has recently received the avowed support of the Editor of the *Pharmaceutical Journal*, the President of the Pharmaceutical Conference, and now of Mr. Giles.

With the valuable support which such men render me by endorsing my views I am content to wait, assured it cannot be many years before the Pharmaceutical Society will transfer that examination to other bodies more competent than itself to conduct it.

S. R. Atkins.

Salisbury, October 13, 1874.

Sir,—The address delivered to the students in the Society's School of Pharmacy on Wednesday last will have been read with profound interest by all who have the elevation of pharmacy truly at heart. Never, perhaps, was the cause of sound and honest study *versus* cram more eloquently and effectually pleaded than in Mr. Giles's admirable address. The blow against cram has been struck with great force, and it now rests with the leading pharmacists in the whole country, and with the councils of provincial associations, to take care that the effect produced should be lasting. This cannot be done, however, without the hearty co-operation of every one interested in the higher education of pharmacists; for, unless the gist of Mr. Giles's remarks be repeated again and again whenever there is a suitable opportunity, it is to be feared that many of our young men will remain blind to their own interests, and, yielding to the temptations of cram, will continue in their unscrupulous attempts to defraud the examiners, the public, and, above all, themselves.

I cordially agree with Mr. Giles as to the ultimate necessity of the establishment of a compulsory curriculum of education as a condition of examination; but instead of viewing such a measure as an ultimate resource after all other means have failed, I believe the time for its serious consideration, if not for its early adoption, has come already. Much good has been done by the untiring efforts of the examiners, but examinations, however well conducted, cannot successfully stamp out the evil now existing without their being aided by, and conditional upon, an enforced curriculum of education. The subject appears to me to be fully ripe for discussion, and I trust that it will not again be allowed to drop without a full expression of public pharmaceutical opinion upon its merits.

Louis Siebold.

Manchester, October 14*th*, 1874.

Emplastrum Plumbi.

Sir,—In the *Pharmaceutical Journal* of 29th August I read a very interesting paper on "The official plasters, and improved formulæ for their preparation," by Mr. A. W. Gerrard, upon which a discussion ensued, and Mr. Umney introduced the subject of Emplastrum plumbi. The speakers who followed acknowledged the difficulty of procuring a good and uniform article, and I can readily understand that if the formula of the B. P. is followed, such a thing is impossible.

In the laboratory attached to the establishment in which I served my apprenticeship there was an Irish porter, who could neither read nor write, but whose *spécialité* was making Emplastrum plumbi, and I invariably noticed that towards the conclusion of the manufacture of a batch he managed to get rid of us from the laboratory for a few minutes. Subsequently I taxed him with adding something to the plaster, and he informed me what the additions were. I may mention that my then employer invariably refused orders from wholesale houses for his plaster, although he could have secured large ones, but he preferred restricting the sale to his own retail customers.

The quantities of litharge and oil used were as follows:—

Litharge in very fine powder . 20 pounds.
Best olive oil . . . . 28 ,, by weight.

Great care was used in selecting the litharge, which we *invariably powdered.* A large copper pan was used over a naked fire, but the pan was raised on iron rings, so that it did not rest on the fuel.

Gentle boiling was continued for ten to twelve hours, and from time to time water sparingly added. Experience taught us when the plaster was nearly finished, and then the addition of water was discontinued, and as much as possible of that liquid was then evaporated.

When we considered the boiling should cease, twelve ounces of the best yellow resin and two pounds of liquor potassæ were added, and dissolved and mixed, and the plaster allowed to stand all night.

Next morning, any liquid floating on the top of the hard mass was carefully removed and the plaster heated, several boys were told off for plaster pulling, and sufficient was poured into water to supply us. With our hands oiled we took about one pound each, and kept pulling and kneading it until the required colour and shortness (I use the word for want of a better) were obtained. Each one piled up his mass on the slab, while the Irish porter before referred to weighed off and rolled the lumps to their required length.

I do not justify the use of the resin and liquor potassæ, and I have no doubt many of my professional brethren will condemn it. I simply state that the result of making Emplastrum plumbi by the process I have named was the production of a plaster I have never seen equalled. It was adhesive without being sticky, and in my opinion realized what a plaster ought to be.

P. WELLS.

East Brixton, S.W., August 31st, 1874.

THE PRACTICAL CHEMISTRY EXAMINATION.

Sir,—Will you allow me, through your correspondence columns, to ask Professor Attfield and others whom it may interest, to turn to P. J., [ii.] vol. xi., p. 268, where it will be found that Mr. John Ingham, Junior Bell Scholar, formed the precedent which has been so honourably followed by Mr. Luff, for "in the laboratory class he obtained the full number of marks possible." Remembering what Dr. Attfield said at the opening meeting of the session, when reporting on his class (the report appears in last week's Journal), I think it but just to my friend and fellow-student to draw atention to this fact.

300, Holborn, W.C. JOHN MOSS.

Erratum.—In the list of subscriptions to the Benevolent Fund, on p. 274, l. 3, for "Oldham, Rigley, William, 10*s.* 6*d.*," *read,* "Oldham, Wrigley, William, 10*s.* 6*d.*"

"*Inquirer.*"—You will find recipes for making lemonade and similar drinks in most receipt books.

"*Mac.*"—(1) Possibly from all traces of chlorine, used in bleaching the paper, not having been removed. (2) It would be correctly described as a mixture.

J. Jarvis.—Your suggestion is not in accord with the usual practice, but it shall have our consideration.

"*Erin.*"—(1) See a note in vol. iii. of this series of the Journal, p. 821. (2) A description of a method of preparing iodized cotton, by heating iodine and cotton wool together in stoppered bottles, will be found in vol. ii., p. 245.

J. W. Yates.—No.

Sal Aeratus.—A correspondent writes as follows respecting this substance:—"In the Journal dated Sept. 26th, you say sodium bicarbonate and ammonium carbonate are both sold for sal aeratus. If you refer to page 1206, 'Wood's Dispensatory of the United States,' you will, under the a l / Potassæ. Bicarbonas, read as follows:—'Distillers and brewers may prepare this salt with great facility by suspending the alkaline solution (potassium carbonate) in a fermenting tun. The salt in powder called sal aeratus, made principally in New England, is, we believe, prepared in this way. In composition it is between a carbonate and bicarbonate.' In confirmation of this, I know a party who has for years sent to one of the North American States Potas. bicarb. pulv."

W. J. S.—"No licence is required for the sale of quinine wine, if made according to the recipe in the British Pharmacopœia, and not sold as a proprietary or patent medicine." (See *Pharm. Journ.* [3] vol. iii., p. 327.)

J. W. W.—See an article entitled "Australian Jottings," at p. 161 of the present volume.

J. Barnet.—There would be nothing to prevent you passing both examinations, if you are competent, before the date mentioned, provided that you are twenty-one years of age when you present yourself for the Minor. For particulars respecting the examinations, see the official announcements on the first leaf of this Journal.

J. H. Talbot.—No.

G. Dowman.—We do not remember the proceedings referred to, and have been unable to find any report of them. You are recommended to search the back numbers of the Journal.

"*Justitia Fiat.*"—The subject of your letter is not of sufficiently general interest to admit of its publication in this Journal. If you have suffered a pecuniary wrong, the best plan would be to seek redress through the authorized channels.

L. E. Bore.—(1) *Peplis Portula.* (2) *Koniga maritima* (3) *Scleranthus annuus.* (4) *Amaranthus retroflexus.*

L. A. R.—"Associates who have paid the current year's subscription" are entitled to vote. The voting papers will be sent out within a few days.

J. Beach.—Warm the marble portion, and partly fill the cavity with melted marine glue, then insert the handle.

C. J. C.—(1) There is a polyglot list in Dorvault's '*L'Officine.*' (2) Apply to Messrs. Reeve, Publishers, Henrietta Street, Covent Garden. (3) No.

H. S D.—Fuse the amber and add to it the linseed oil hot; boil until it strings well; then let it cool a little and add the oil of turpentine. It is difficult to prepare of a very pale colour, but may easily be bleached with some fresh-slaked lime (Cooley).

A Young Pharmacist.—This is not the first time that vague charges like those in your letter have been made; but whenever it has been possible to inquire into them, it has been found that they were based upon grounds which were either imaginary or fictitious. If the alleged practice referred to by you be so well known as you state, there could be no difficulty in demonstrating the evil and putting an end to it. We shall have no objection to assist you in that direction.

Dundee Chemists and the Edinburgh Price List.—A correspondent writes under the name "*Cæsar*" to ask why the Dundee Chemists do not stick to the Edinburgh Price List. He states that one of the principal chemists there "cuts keen, and dispenses prescriptions and sells sponges or Holloway's pills at a reduced rate to the members of the Dundee Professional Supply Association." Nevertheless, he believes that if the rest of the chemists were to rise in a body and strike for higher prices, they would in the end not lose anything, but be great gainers.

"*Caution.*"—Your question raises several points which could not be decided offhand or without an exact knowledge of the circumstances. You are recommended to send your question to the Registrar, accompanied by full details.

W. R. F.—(1) The "quantitative composition" of gunpowder is variable, according to the kind. In most cases, however, it approaches 74·9 of nitre, 11·8 of sulphur, and 13·3 of charcoal. For a comparative list see Watts's Dictionary of Chemistry, vol. ii., p. 957. (2) The sale of opium or a preparation of opium by an unregistered person is illegal. You are recommended to communicate with the Registrar in reference to the case mentioned.

"*Nemo.*"—We regret that we are unable to supply the required information.

W. G. Piper.—They may be obtained of Mr. Cutter, Naturalist, Great Russell Street, London.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Roberts, Mr. A. Lister, Messrs. Lescher, Sons, and Co., Messrs. Curtis, Mr. Symons, Mr. M. J. Bentley, Cæsar, Excelsior, Observer, Hampton, Theta.

MONOBROMATED CAMPHOR.*

BY M. GAULT.

Monobromated camphor, discovered by Swarts about the year 1862,† has been recently applied to therapeutics in France, by Dr. Bourneville, at the Hospice de la Salpêtrière.

The author having been called upon to prepare some, the only information on the subject at his disposition was that in Wurtz's 'Dictionary,' under the head "camphor"; at the time he had no knowledge of the more complete research of Maisch.‡ Wurtz describes two processes, the first of which, due to Perkin, consists in distilling, at the temperature of 264° C., bibromated camphor, which is formed readily in the cold; the crystalline substance obtained being purified by re-crystallization from alcohol. This method is not very practicable, even if it always gave the product sought; for besides the difficulties it presents, it occasions a considerable loss of the product. M. Wurtz preferred to operate with sealed tubes; but his experiments were purely speculative, and the process would be insufficient for therapeutic exigencies. It was from observations made while experimenting with the second process that the author was led to adopt what he considers to be an easy and uniform method of preparing monobromated camphor.

First, the author was induced to believe that the temperature indicated by Perkin, and afterwards by Maisch, was too high, and, further, that operation under pressure in closed vessels might be avoided. He therefore constructed an apparatus, which he describes, and conducted the operation under other conditions, by which he obtained a product that had undergone no decomposition, and resembled in purity that obtained in the previous experiments.

The operation may be divided into four stages: (1) Formation of bibromated camphor; (2) Reaction, giving rise to monobromated camphor, at a temperature below 100° C.; (3) Purification by washings and crystallizations; (4) Utilization of a secondary product (Swarts's hydrobromate of camphor bromide).

The formation of bibromated camphor ($C_{10}H_{16}OBr_2$) presents no difficulty; it is effected by the simple addition of bromine to camphor. Maisch uses a small quantity of alcohol, but this the author thinks unnecessary. The camphor, previously powdered, is introduced into a retort about ten times the capacity of the volume of bibromated camphor to be formed, and upon this powder the bromine is poured in a thin stream, with constant stirring, until the camphor is all liquefied; under these conditions approximately two molecules of bromine to one of camphor will be employed. The clearness of the reaction, which is indicated by the liquefaction, dispenses with the necessity of weighing, whilst a slight excess of one or other of the ingredients has not been found to influence the final product. The conversion of the bibromated camphor into monobromated camphor is effected in the same retort, to which is adapted a long and large abductor tube dipping into an alkaline solution; this has for its object the absorption of all inconvenient vapours. The retort is placed in a water bath, which is heated to ebullition. The reaction quickly manifests itself, and is accompanied by the disengagement of torrents of hydrobromic acid gas, and some vapours of undecomposed camphor and bromine. The dark brown liquid acquires an amber colour, and the evolution of gas slackens suddenly. The reaction, due to a very simple substitution, is represented by the formula—

$$C_{10}H_{16}OBr_2 = C_{10}H_{15}BrO + HBr.$$

The arrangement of the apparatus and the tumultuous disengagement of gas did not permit the author to recognize the exact temperature of the reaction; but he is certain that it commenced between 80° and 90° C., and did not reach 132° C. That temperature, therefore, mentioned by Maisch, he considers to be exaggerated. He insists upon attention to this latter point, because he is convinced, by comparison with other processes, that the quantity of oily product is thus notably diminished, and that the purification of the monobromated camphor is rendered more easy. The amber liquid which remains in the retort solidifies on cooling, and forms a friable and slightly citrine mass. If the contents of the retort be thrown into a capsule, the disengagement of hydrobromic acid continues during several hours, and the mass presents an energetic reaction. But if the same liquid be thrown into boiling distilled water, and the ebullition be continued some time in the open air, the hydrobromic acid gas is nearly entirely removed from the mass, and the last traces of bromine vapour by which it might be contaminated are driven off. The product is then nearly white.

In connection with this point the author remarks that the volatilization of monobromated camphor by the intervention of vapour of water, alluded to by Maisch, is not so notable as to counteract the advantage of this first stage of purification. To obtain the product colourless and crystalline, decolorization by animal black or repeated crystallizations may be adopted. In either case the citrine mass of crude monobromated camphor is treated with boiling 90° to 95° alcohol, and the filtered liquor left to crystallize. The author prefers the method of repeated crystallizations. The crystals are dried in the open air upon unsized paper.

The monobromated camphor so obtained consists of tufts of crystalline acicular colourless prisms with a rectangular base, which attain a length of three centimetres. The crystals are hard, and crackle between the teeth. They have an odour both of camphor and turpentine, less penetrating than camphor, but also less fugitive. Their slightly bitter taste resembles that of camphor or Venice turpentine.

Monobromated camphor is insoluble in water, and soluble in alcohol, fixed and volatile oils, ether, carbon, bisulphide, chloroform, etc. Its melting point, according to Maisch, is at 67° C.; according to Wurtz, between 76° and 77° C. The author found it to range between 69° and 70° C., solidification commencing below 69°. It boils at 274° C., with partial decomposition. Heated to 100° C., it should not give a sublimate of camphor; calcined with potash, it leaves as a residue a mixture of bromide and carbonate of potassium.

In the mother liquors, and upon the crystals of the second and third formation, is found the oily substance that has been before spoken of as Swarts's hydrobromate of camphor bromide; the utilization of this product forms the fourth stage of the operation. It might be almost entirely removed by pressing the crystals between filtering paper; but this method, besides being imperfect, would cause considerable loss. With the same object the author tried the action of alkalies, in the hope of fixing the

* *L'Union Pharmaceutique*, vol. xv., p. 266.
† *Jahresbericht*, 1862, p. 462.
‡ *Pharmaceutical Journal* [3], vol. iii., pp. 201 and 221.

hydrobromic acid of the compound, but the result did not answer his expectations. He prefers to follow the indications of Swarts, who recommends to effect the dissociation of the hydrobromate by a temperature of 260° C., according to the following equation:—

$$C_{10}H_{15}BrOHBr = C_{10}H_{15}BrO + HBr.$$

In order to avoid, however, the carbonization of a considerable portion of the product, the author operates at a temperature below 260° C., for between 200° and 220° C. the disengagement of hydrobromic acid is abundant, and the decomposition according to the equation is nearly complete.

The high temperature of 200° C. to 260° C. is thus only used by the author for the utilization of a secondary product, whilst in Perkin's process all the bibromated product is submitted directly to a temperature which decomposes a considerable proportion, and to a succeeding distillation, more injurious than useful. The oily body, after being heated to between 200° C. and 220° C., forms a black viscous mass, which upon cooling becomes solid and brittle. Treated with boiling alcohol this mass yields, after filtration, fresh colourless crystals of monobromated camphor. The author reports that, operating thus, he obtained about 250 grains of perfectly pure monobromated camphor in a single operation.

Physiological Action.—Dr. Bourneville has communicated to the Sociéte de Biologie the result of experiments made upon guinea-pigs, rabbits, and cats with this new medicament. He attributes to monobromated camphor the following physiological properties:—

(1.) It diminishes the number of beats of the heart and determines a contraction of the auricular vessels.

(2.) It diminishes the number of inspirations.

(3.) It lowers the temperature in a regular manner. In mortal cases this abatement augments until the death; when recovery takes place the lowering of the temperature is followed by a return to the initial degree, but this recovery requires a longer time than that occupied in the diminution.

(4.) It possesses incontestible hypnotic properties, and appears to act principally upon the cerebral system.

(5.) The system does not appear to become tolerant of this medicine, and its prolonged use—at least with guinea-pigs—brings on a rapid emaciation.

Dr. Bourneville therefore considers the use of monobromated camphor is indicated when it is desired to produce an energetic sedative effect upon the circulatory system, and especially upon the cerebro-spinal nervous system. It is one of the most clearly-defined anti-spasmodics.

Administration.—According to Dr. Bourneville,* monobromated camphor may be administered under the form of pills, with conserve of roses as an excipient, or in a mixture with mucilage of gum arabic and syrup. The dose for adults varies from twelve to about thirty centigrams daily. Dr. Bourneville uses pills containing each ten centigrams of monobromide, and of these he gives as many as twelve a day. When administration by the mouth is impracticable he employs the following solution in subcutaneous injection:—

Monobromated Camphor . . .	3 grains.
Alcohol	35 "
Glycerine	22 "

* *Le Progrès Médicale*, 1874, No. 31.

EMULSIO CARNIS.*

BY JAMES KEMBLE.

It has long been a question with me whether or no fresh raw beef could not be utilized as a medicine, and administered in a concentrated fluid form, where a strong nourishing diet is more needed than medicine. Seeing an article in the *Medical Times* on the administration of raw beef, I resolved to institute a series of experiments, to determine the possibilities of preparing a solution of it that would keep long enough without change to be of practical use. My experiments and their result were as follows:

Fresh raw beef (lean)	℥ii
Sweet almonds	ʒiv
Bitter almonds	ʒiii
Sugar	ʒii
Water sufficient for emulsion . .	f℥viii

I rubbed the almonds, beef, and sugar to a fine pulp in a wedge-wood mortar, then added water gradually until a smooth paste was formed, added more of the water and strained through a sieve, returned the mass to the mortar, and manipulated with the balance of the water until f℥vii of emulsion was obtained, strained through a fine strainer and bottled; this in my experiment I designate as No. 1 emulsion. I then mixed of

(2) No. 1 Emulsion, f℥xiv with Brandy . .	fʒii
(3) No. 1 Emulsion, f℥xiv with Sherry wine .	fʒii
(4) No. 1 Emulsion, f℥xiv with Glycerin . .	fʒii

Experiment No. 2:—

A. Fresh raw beef (lean)	℥ii
Sweet almonds (roasted)	ʒv
Bitter almonds	ʒii
Sugar	ʒii
Water sufficient for emulsion	f℥viii

Manipulated the same as No. 1, until an emulsion was obtained; it was mixed as follows:—

B. Emulsion No. 2, f℥xiv with Brandy . .	fʒii
C. Emulsion No. 2, ℥xiv with Sherry wine .	fʒii
D. Emulsion No. 2, ℥xiv with Glycerin . .	fʒii

I made the above divisions for the purpose of testing the preservative properties of each agent employed, with the following results:—

After twenty-four hours, all sweet and good.

After forty-eight hours—

No. 1. Emulsion fermented; unfit for use.
No. 2. Perfectly sweet.
No. 3. Faint odour; least bit sour.
No. 4. Sweet and good.
A. Emulsion No. 2, fermentation commenced.
B. Sweet and good.
C. A little sour, but no odour.
D. Sweet and good.

After seventy-two hours—

No. 2. Slightly sour, but without odour.
No. 3. Fermentation commenced, putrescent odour.
No. 4. Fermentation commenced, putrescent odour.
B. Good, but a slight sour taste left on the tongue.
C. No odour, but sour.
D. Sweet, good and palatable.

After ninety-six hours—

B. was unfit for use; fermented.
C. was sour; unfit for use; fermented.
D. was very slightly changed, still palatable.

It will thus be seen that the brandy and glycerin possess about equal preservative properties, although, in the latter case, the glycerin seems to preserve the greater length of time. The preference would seem to be in favour of roasting or charring the sweet almonds, as it destroys, to a considerable extent, the tendency of the emulsin to induce fermentation.

I then made another lot of emulsion, and tried it with ʒii of brandy and glycerin respectively, to f℥i of emulsion;

* From the *American Journal of Pharmacy* for October.

also with three grains of sulphite of calcium, sulphite of sodium and chloride of sodium respectively, to f℥i of emulsion ; the result was like experiment No. 2, with the glycerin and the brandy. The chloride of sodium mixture began to change in thirty-six hours (perhaps would not have done so if the proportion of salt had been larger). Sulphite of calcium and sulphite of sodium acted very similarly ; the emulsions showed no change for sixty hours, were fit for use for seventy-six hours, although change had commenced, but were unsightly, unpleasant mixtures ; while glycerin and brandy, or both combined, possess greater preservative properties, and make a pleasant, palatable mixture.

I then made some more of the emulsion, to ascertain *how much* beef could be incorporated in a pint emulsion, and found that eight ounces may be incorporated into it ; but for practical and economical purposes, six ounces is all that can be thoroughly exhausted of all soluble matter.

It will be seen, by the experiments here made, that raw beef is applicable to every-day practice in hospitals, cities, and places where there is access to the markets for the beef. Physicians can prescribe the dose to suit their patients, and it will have to be made fresh every three or four days during warm weather. My experiments were made in July, with the thermometer ranging among the nineties. I judge that in cold weather this preparation could be made to keep good and sweet for a week or more.

I would suggest a formula for general use, as follows, viz.:—

Fresh raw beef (lean)	℥vi
Sweet almonds, deprived of their shells and roasted	℥i
Bitter almonds	ʒvi
Sugar	ʒvi
Glycerin	℥ii
Water sufficient for emulsion	℈i

Rub or beat the beef, almonds, and sugar to a fine pulp in a wedge-wood or wooden mortar ; then add water gradually until a smooth emulsion is formed, and strain through a sieve or coarse cloth ; return the residuary mass to the mortar, manipulate with the balance of the water until f℥xiv are obtained, strain all through a finer strainer, add the glycerin, and bottle ; the bottle is to be kept well corked. Dose :—f℥i, containing ʒiii of the beef.

The physician in prescribing can order the addition of brandy, pepsin, or any other medicine he wishes to administer at the same time. I tried combining ferric pyrophosphate with the mixture ; it combines well, but makes a dark, unsightly preparation, on account of the combination of the iron with the blood contained in the beef.

Philadelphia, August, 1874.

THE KOUMIS CURE.

The following interesting information respecting koumis, the method of its preparation, and the koumis establishments at Samara, is taken from a description written on the spot by a correspondent of the *Daily News*. Samara is the capital of a comparatively new government, carved out of the neighbouring governments of Simbirsk, Saratov, and Orenburg, and situated on the left bank of the Volga, on the borders of Orenburg, on the high road to Asia.

"It has long been known that the Tartar tribes inhabiting what is generally known as Independent Tartary (no longer, however, since General Kaufmann's visit particularly independent) and the nomad tribes scattered over its northern frontiers, the Turkomans and the Kirghis, as well as other tribes more or less akin to these, such as the half-nomad Bashkirs of Orenburg, all used fermented mare's milk, which they call koumis, not only as a beverage, but as a substantial portion of their daily food. It was reported to combine the nourishing properties of milk with the invigorating qualities of alcohol ; indeed, among its other virtues it was said to exhilarate and to intoxicate. It came into the heads of some Russian medical men, of whom, I believe, Dr. Portnikoff, of Samara, to have been one of the first, that this koumis might possibly possess medical properties as well. It was observed that consumption and its cognate disorders were unknown among the tribes who habitually drank koumis. Starting from this observation, experiments were made on the *vilia corpora* of consumptive patients, and with highly beneficial results. Upon this Dr. Portnikoff started a koumis establishment at Samara. Its situation offered him many advantages. In the first place, from its position on the Volga, it was at least approachable, whereas Orenburg, the nearest spot where koumis could be said to be indigenous, was the *ultima thule* of the civilized world. This new establishment on the Volga was the means, therefore, of pushing the koumis outposts 300 miles westwards. In the next place, it was observed that the pasturage at Samara was similar to that at Orenburg. It is supposed that the virtue of koumis consists in a great measure in the rich quality of the mare's milk, which again is dependent, not only on the race of mares, but on the pasturage on which they are fed. All these are propositions which are more or less vehemently affirmed and denied by the different camps into which koumis connoisseurs are divided. For my own part, without giving any opinion on so profound a subject, I would only venture in a very general way to observe that it is a very old idol of the human mind to mistake accidents for essentials, and to argue that, because things have been invariably seen in conjunction, they must necessarily be connected as cause and effect. However this may be, the *haute école* of koumis connoisseurs maintain that koumis, to be efficacious, must not only be composed of the milk of thorough-bred Tartar mares, but of thorough-bred Tartar mares fed on the rich covil of the steppes.

"For covil (*Stipa pennata*) is the technical name of the grass which grows on the steppes, and which is the favourite food of the mares. It flowers prettily in a kind of white silvery wave for about a month at the beginning of June, and makes a not ungraceful ornament for the hair, especially of blondes. It is only the tender grass, not the flower, of the covil which the mares graze on. In the midst of the covil the *Absinthum tartaricum* grows abundantly, emitting the sweetest smell. I could not help fancying that the two must form part of the vaunted pasturage of the steppes. It smelt so sweet that I thought if I had been a Tartar mare I should certainly have made it a *bonne bouche*. I was glad to hear that my error had been shared by a learned German doctor, who writing *à priori* in his study in Livonia on the medical properties of absinth, suggests that as it is found in large quantities on the steppes where the Tartar mares graze, part, at any rate, of the virtue of koumis may be attributable to his favourite herb. It is to be hoped that the learned doctor's theory does not depend on his illustration, for it is, unfortunately, not founded on fact. The mares do not touch the absinth. The grass of the covil is their sole diet. The absinth, with its perfume, is there because the Tartar mare is an epicure, and she loves to regale one sense with the sweet odour of the absinth while the young blade of the covil ministers to another.

"The Tartar horse about whom all this fuss is made is the most insignificant-looking brute dignified with the name of horse I ever saw. He exactly corresponds to the pictures one has seen, and the descriptions one has read, of the nondescript animals upon which the Cossacks were mounted during the invasion of France in 1812. Small, shaggy, and impoverished-looking, he hasn't the devilry in his eye which distinguishes the little Shetland pony. It is only when he is in action that he gives you a taste of his quality. He then bristles up, buckles to his work, and you begin to perceive, when you have already been half a day's journey, the enduring qualities of the little animal you have been contemning. Many days' continuous travelling at the rate of 150 versts (100 miles) a day will give you some idea of his powers. Those who deny the indispensableness of covil will for the most part maintain that there is no saving grace in koumis proceeding from aught but the milk of thoroughbred Tartar mares.

"There are koumis establishments in Russia elsewhere than at Samara. At Czarsko Selo, in the neighbourhood of St. Petersburg, as well as in the Sokslniki environ of Moscow, there are similar establishments. At both these places, although the precious covil does not flourish, the Tartar-bred mare is alone in vogue. I visited both these establishments, but fell in love with neither. In the first place the neighbourhood of a capital (and both St. Petersburg and Moscow are capitals) is an unfavourable situs for a 'cure.' The contrast of a medical establishment with the surrounding associations is fatal to it. All such establishments have a melancholy and depressing look about them. Phthisis, catarrh, and tubercles seem written on every brick, and labelled on every bottle. I felt that I should have an attack of 'nerves' if I stayed there ten minutes, and that all the Tartar mares in Russia could not restore me. If you are unlucky enough to require a 'cure,' go bury yourself alive as far from the habitations of men as you can; flee from the very neighbourhood of a city, far more a capital. Consider that situation the best which offers you the fewest resources, otherwise your labour is likely to be in vain, and your "cure" a mockery and a delusion, All these advantages, I may mention, are pre-eminently secured at Samara.

"Besides these establishments at St. Petersburg and Moscow, Dr. Stahlberg, formerly at the head of the Moscow establishment, has set up a similar one at Wiesbaden, maintaining that the covil is all humbug, and that it is 'the breed that does it.' The sceptical analysis is carried still farther; for in London there is a Russian (Polish) medical man, Dr. Yagielski, an authority in koumis, who goes so far counter to the received notions on the subject as to deny not only the indispensableness of Tartar mares for the production of koumis, but even of mares at all, actually giving the preference (tell it not in Gath and whisper it not in Samara) to the domestic cow. But I must leave the cow-produced koumis to its fate, and proceed with my description of the genuine covil-fed Tartar-bred mare's milk, koumis. The process of manufacture is the following. I may mention that it is Bashkir girls who are generally employed to make it. It is their national beverage, and they best understand it. Being less wild, too, than the nomad Khirgis, it is easier to 'catch' this particular Tartar specimen.

"Koumis is fermented mare's milk. An element of fermentation is consequently required for its manufacture. This is supplied by koumis itself. A certain proportion (one-third) of koumis is poured together with (two-thirds of) fresh mare's milk into a clean wooden vessel resembling an ordinary English churn, and there left for from six to eighteen hours, according to the degree of (alcoholic) strength that is required. During this period it is from time to time subjected to a churning process, with the object of keeping up and stimulating the process of fermentation. Herein consists the chief art, and whatever secret there may be in koumis-making is to know the exact amount of churning required; for, although a certain amount is requisite, it must be suspended at the point where curds or butter would be formed. Habit and practice alone teach this to the koumis-maker. After this fermenting process, stimulated by the occasional churning, has lasted a certain time, say six hours, a portion of the contents of the churn is drawn off, and this constitutes the weakest kind of koumis, say koumis of the first degree of strength. The remainder in the churn is subjected to a further period of similar fermentation and churning, say for another six hours, and then the churn is again tapped, and koumis of the second degree of strength is the result. Then another period of say six hours of a similar process for what still remains in the churn, and this, when drawn off, constitutes koumis of the third degree of strength. It will be observed that the difference in the degree of strength of the koumis consists in the different amount of fermentation to which it has been subjected. The strength of the koumis ought to be graduated according to the requirements of different patients, and this is a matter of some importance in the case of invalids. As soon as the koumis is drawn off it is poured into ordinary quart bottles, made with extra strong necks, corked down, and tightly strung; for, containing as it does large quantities of carbonic acid gas, it is subjected to the explosive accidents of all such liquors. Indeed, the inexperienced koumis drinker, on opening a bottle of koumis for the first time, if he is lucky enough not to lose his eye by the explosion of the cork, will most undoubtedly be soused all over by the frothing liquid.

"I have mentioned that the koumis itself is the fermenting element used in the composition of koumis—one-third koumis for two-thirds fresh mare's milk. It may be asked, when koumis is not obtainable (as at the beginning of the koumis season), what substitute is used? A couple of table-spoonfuls of yeast are put into an ordinary-sized quart bottle, filled with mare's milk which is allowed to ferment for twenty-four hours. The contents of this bottle are then poured into double the quantity of fresh mare's milk, and allowed to ferment for twenty-four hours more. Then twice the amount of fresh mare's milk is again added, the whole fermenting for twenty-four hours more. Thus a sufficient amount of the fermenting element is obtained to begin operations, the proportion 1 : 3 being always maintained between the fermenting element and the fresh milk. Some patients drink as much as six or eight bottles of koumis a day. Some subsist entirely on it; but, generally speaking, people eat their ordinary meals, and drink koumis between. It has a sharp and bitter taste, caused by the lactic acid, which it contains in large quantities; and the strongest sorts of all leave a kind of soft buttery after-taste, which, however, the carbonic acid gas helps to dissipate. Some people never can get over their dislike to the taste of koumis, and those it is never likely to benefit. The complaints for which koumis is considered beneficial are consumption and, it may be said generally, all affections of the mucous membrane. It is, of course, a mistake to suppose koumis a specific for consumption. It is nothing of the kind. People sometimes go to Samara in the last stages of that desease, when neither koumis nor anything else can be of avail. But in the early stages of consumption it often effects, by its strengthening properties, a beneficial change in the organism of the patient, and helps to arrest the ravages of the complaint. Where, however, it is of sovereign efficacy is in cases of recovery from a long and wasting illness where no organic detriment exists. Often, in such cases, after a couple of months of koumis-drinking the system is braced up, the blood streams more quickly through the veins, the pulsation increases, and a general feeling of *bien-etre* pervades the whole man. Not that I feel inclined to attribute the whole benefit which is derived from a cure at Samara to the properties of koumis. The fine, dry, rarefied air of the steppes has undoubtedly something to do with it. The lungs are called into active play, and lend their assistance to the general recuperative process.

"You *feel* the dryness of the air at Samara. In the higher parts of the steppes there is no dew. The most delicate and consumptive patient can admire, with impunity, the beauties of the setting sun—and the sunsets are very beautiful at Samara. He is not obliged, as in Italy, to flee that treacherous hour: he can sit out of doors without risk, and watch that setting sun reflected on the Jigoulee hills which here skirt the Volga, fringing with gold the clouds that crown the summits of those glowing hills, and lighting up the whole expanse of the river with liquid glittering fire. There is no fixed duration for a "cure" at Samara. The average stay of patients is two months, but as koumis is rather a diet than a medicine, their stay is often prolonged beyond this period. The weather is the chief regulator in this respect. Fine hot weather is considered essential for a 'cure.' June, July, and August are the finest months. The koumis establishments, of which there are three principal and several smaller ones at Samara, are situated at distances varying from six to twelve versts (four to eight miles) from the town, and are composed not of single blocks of buildings, but of little detached houses, mostly built of wood, containing from two to six, and rarely as many as eight rooms each, the whole connected with, that is, surrounding, a larger building which is the kursaal of the little colony, or, where a kursaal does not exist, a central kitchen which ministers to the culinary requirements of the whole. When there is a kursaal, the patients can either dine there at a *table-d'hôte*, or separately in their own apartments.

"I have used the term 'colony' to describe these koumis establishments. It best depicts the effect which they produce on one at first sight. There, in the midst of the desert steppe, with few signs of human habitation around, you suddenly come upon a little wooden oasis, surrounded by a paling, and dotted about with a number of little single-storied wooden houses, resembling overgrown mushrooms, with zigzag walks or terraces cut in every direction, and queer-looking people, men and women, walking about—all drinkers at all watering-places are peripatetics—with a quart bottle in one hand and a large mug in the other, and you know that you are at a koumis establishment."

PECULIAR TOXIC ACTION EXERCISED BY THE COLCHICUM AUTUMNALE AT THE TIME OF FLOWERING.

BY I. PIERRE.

The author, in a letter recently communicated to the French Academy,* states, that having plucked some fully-expanded flowers of *Colchicum autumnale* in order to examine them more closely, he was surprised to notice that after a few seconds his fingers had changed colour, and taken the livid greenish yellow tint characteristic of a corpse in a state of incipient decomposition. After about ten seconds the skin regained its usual colour. As the discolouration extended throughout the length of the fingers, and even beyond, the question arose whether or not it was caused by absorption by contact at the extremity of the fingers. M. Pierre therefore extended his hand over a large clump of flowers, having anthers two or three centimetres in length, and carefully avoided all contact. The same phenomenon was produced with the same rapidity, and disappeared as quickly when the hand was removed. The experiment was repeated several times, and by different persons, but always with the same result.

In order to investigate the matter more conveniently, M. Pierre had two large clumps of the colchicum flowers placed in pots and removed to his laboratory; but on repeating the experiment twenty-four hours afterwards the effect was not so obvious. Upon comparing the flowers capable of producing the phenomenon with those which appeared to have lost the power, it was noticed that the inactive flowers had commenced to fade, and that the pistils and filaments of the stamens were much paler in colour than on the preceding day, or than those of less advanced flowers. He therefore thinks it presumable that it is principally during or approaching the act of fecundation that the colchicum flower possesses in the highest degree the property above described.

What, then, is the substance in the flower capable of producing this effect, which disappears so rapidly? The author thinks it can scarcely be a solid or a pulverulent pollinic matter, or the colour produced would be more persistent, but that it is probably an extremely volatile substance which has not yet been studied. In this view he is supported by the fact that after a number of experiments, without contact, and without raising his hand to his mouth, M. Pierre experienced in the organs of taste a peculiar sensation [*sensation vireuse*]; whilst his assistant, using the same finger many times, experienced a numbness in it which was persistent during several hours.

The author proposes to investigate the nature of this singular substance, which probably plays an important part in the accidents attributed to fresh colchicum compared with the innocuousness of the stale or dried flowers.

In connection with this action of certain principles of the colchicum flower, the author remarks that in the Gâtinais, where saffron is cultivated on a large scale, some persons, especially among women and children, cannot work at plucking the flowers without suffering from the symptoms of a peculiar poisoning, which manifests itself externally in a swollen and bloated appearance.

* *Comptes Rendus*, vol. lxxix., p. 633.

NOTES ON A NEW METHOD FOR THE ELECTRO-CHEMICAL MANIPULATION OF OILS AND OTHER NON-CONDUCTING LIQUIDS.*

BY W. SYMONS, F.C.S.

In following out some experiments, it occurred to me that the solutions of metallic salts in alcohol and ether may be made the medium of subjecting to the electric current various oils and other liquids which cannot be otherwise acted upon by the galvanic battery.

A solution of zinc chloride in alcohol, and ether shaken with liquor ferri perchlor. fort., P.B., suggested themselves. For the sake of brevity I will call the latter ferric ether, and this appears the best adapted for the purpose. In both these media oils, carbon disulphide, and other bodies may be brought under the influence of a weak galvanic current, and chemical changes in their constitution be thus produced. Carbon disulphide may also be mixed with oils in solution in ferric ether without destroying the conductibility of the liquid, and currents can be transmitted through such mixtures continuously for several days. Sometimes a body similar to camphor or spermaceti in appearance is formed at the cathode. Frequently the appearance of the liquid while in the circuit undergoes various changes during the course of the experiment, and sometimes, after a considerable time has passed, small bubbles of gas will be evolved on the one or the other electrode.

Convenient receptacles are small wide-mouthed bottles with corks, through which are passed, for electrodes, silver wires, sometimes with strips of platinum soldered to them. Iron wire has also been used for the anode and mercury for the cathode, but when mercury is used V tubes are more convenient than bottles. In other experiments with V tubes a solution of salt or lime has been used for the cathode. When lime water, or rather lime pulp, is used with carbon disulphide dissolved in ferric ether, the mixture seems to be gradually changed into carbo-sulphuret of calcium and the iron is precipitated, the denser liquid, which I take to be the carbo-sulphuret, gradually growing up into the ether, but with a well-defined separation between the two liquids.

Gas does not so frequently appear with ferric ether as when zinc-chloride and alcohol are used, and the zinc is much more readily deposited than the iron from the ether.

As far as tested by experiment, all oils soluble in alcohol are completely soluble in ferric ether, and all such solutions are conductors. Oils of cloves, pennyroyal, lavender, and cajeput have thus been tried, but not for any lengthened period. Castor oil has been kept longer under notice. When an iron wire is put into a mixture of castor oil and ferric ether, bubbles of hydrogen are generated even before it is brought into the circuit, and an iron and silver wire in this mixture will cause a deviation of the galvanometer, without the intervention of the battery. When carbon disulphide is added the gas no longer issues from the iron, but from the silver wire.

* Paper read before the British Association at Belfast, September, 1874.

Oils insoluble in alcohol, so far as tried, are only partially soluble in ferric ether. If five parts of lard oil, or cod liver oil, be shaken with seven parts of ferric ether, about three parts of the mixture is thrown down as a red liquid, which conducts the current, but the light portion of the liquid does not. If a current be kept up for some hours through the mixture by an iron anode and silver cathode, reaching to the bottom of the vessel, the red liquid will be gradually absorbed, losing its colour, and the iron wire will be enlarged by an accretion which I have not examined. Olive oil and colza oil throw down similar liquids, but of a light brown colour; and sperm oil agrees in colour with these vegetable oils rather than the animal oils before noticed. After being set aside for several weeks, the denser liquid in the olive and colza oil mixture was dissolved, the whole forming a brown, clear, homogeneous, conducting liquid.

From the cod liver oil mixture about two-thirds of the lighter liquid was removed and shaken with liquor ferri perchlor., without adding any more ether; it became a darker red than the precipitated portion. When not exposed to the air this red liquid remains unaltered, and as it contains iron in solution with cod liver oil, possibly the subject may have a significance and utility from a medical point of view.* This has led me to dwell more in detail on this experiment, but it will be obvious that a great number of combinations can thus be made the subject of investigation. I have, however, neither the time nor the appliances for fully carrying out the subject, and must be content with merely offering these hints, leaving it to more fortunate students of nature to follow it up. It is perhaps a bold assertion from one whose homespun apparatus and investigations are necessarily so imperfect and incomplete, but the behaviour of the ferric ether sometimes has led me to think that it acts the part of a conducting liquid diaphragm. Thus, when it holds in solution carbon disulphide alone, drops of a dense liquid gradually grow on a platinum cathode and drop off, which probably is carbon disulphide, thus transferred electro-mechanically, somewhat similar to the experiments recorded by Davy and A. Crosse.

In one experiment with lard oil and ferric ether carbon disulphide was added, which dissolved in the lighter liquid, thus bringing the specific gravity of the two layers of liquid nearly equal. On passing a current through wires reaching into the lower conducting liquid, small globules were observed to ascend by the side of the cathode and then to fall, thus keeping up a continuous circulation. Carbon monochloride has also been used, but only sparingly, as it is an expensive plaything, and its behaviour appears to be similar to carbon disulphide. It was attempted, without success, to dissolve some metallic chlorides in carbon monochloride. Platinum dichloride, left in this liquid for some weeks, softens into a liquid condition, but does not then conduct the current, which, however, was rather weak.

I have generally used forty pairs of the small battery which I will describe in another paper, but fifty or sixty pairs would have been better for some of the experiments, as, without using an iron anode, the deviation of the galvanometer was small, although quite distinct.

The galvanometer was also home-made, with twenty-four coils of fine copper wire. To the binding screws were soldered two short, stout, copper wires, amalgamated, and dipping into two mercury cups. A short, stout V of copper wire connected the cups. By removing this wire the current could be readily sent round the galvanometer.

The appearance in more than one experiment of a black powder on the surface of a mercurial cathode when carbon disulphide was in the mixture was at first an object of great interest. Might it not be an electric deposit of carbon? But as this powder dissolved in nitro-hydrochloric acid, it was probably mercuric sulphide. Although it may appear somewhat contradictory to some of Faraday's assertions in 'Experimental Researches,' series 7, etc., yet still there can be no doubt of the fact that in several of these experiments carbon disulphide was decomposed by the electric current; and seeing that A. Crosse, in his experiments, formed crystals of such bodies as silica and sulphur, is the thought necessarily a De Morgan paradox, to opine that even yet a way may be ultimately found to constrain coy carbon to congeal into concrete crystals?

Barnstaple, July 27, 1874.

* There was an allusion in a discussion in the recent Pharmaceutical Conference to the desirableness of having a solution of iron in cod liver oil.

OIL FROM NUX VOMICA.*

BY CHARLES BULLOCK.

In the preparation of extract of nux vomica, with the intention of having the extract sufficiently hard to permit of pulverization, the hardening process was conducted in a porcelain vessel heated by a steam jacket. As the extract solidified each night on cooling the oily matter rose to the surface, and was removed before reheating. From 150 pounds of nux vomica five pints of oil were obtained.

To ascertain whether this oil contained any notable portion of the alkaloids of nux vomica, four fluid ounces of the oil was agitated with water acidulated with sulphuric acid; the water was allowed to separate by long standing, and then removed. The process of washing was repeated as long as the washings were disturbed by a solution of caustic soda.

On the addition of the soda solution to a slight excess immediate precipitation occurred, the precipitate on stirring aggregated into a waxlike mass; at the end of twenty-fours hours the solution was filled with a copious gelatinous deposit. Both precipitates were collected on a filter, washed to remove the excess of alkali, and treated with water acidulated with sulphuric acid until exhausted. The acid solution was neutralized with soda, the alkaloids collected on a filter, dried and dissolved in hot dilute alcohol. The alcoholic solution yielded 10·6 grains of alkaloids.

The presence of strychnia was shown by the characteristic violet colour, when treated with sulphuric acid and chromate of potassium; but as the alkaloids dissolved *almost* completely in warm absolute alcohol, strychnia could only be present in small quantity, the major part being brucia.

The gelatinous matter when dry weighed 14 grains. Heated on platinum foil it remained unchanged, and was sparingly soluble in hydrochloric acid. When boiled with a solution of pure carbonate of potassium, and the filtered solution neutralized with nitric acid, the addition of nitrate of barium produced no change (absence of sulphuric and phosphoric acids). The insoluble portion remained insoluble in dilute hydrochloric acid; the precipitate was, therefore, not a salt of the alkaline earths.

A *second* portion was fused with pure caustic soda, the fused mass dissolved completely in water. To a part solution of chloride of ammonium was added, producing a copious flocculent precipitate, showing the base to be alumina. To the remaining portion of the soda solution, after super-saturation with nitric acid, solution of molybdate of ammonium was added, no reaction took place, even after long standing, showing the entire absence of phosphoric acid.

Prof. J. M. Maisch has noticed the presence of earthy phosphates in nux vomica [*Amer. Journ. Pharm.*, vol. 32, p. 524]. In this instance the phosphoric acid may have been removed by long digestion with dilute sulphuric acid and subsequent precipitation by soda.

The presence of alkaloids in the oil rendered apparent the suggestion of Prof. Procter, that, when the oil is removed, it should be agitated with a little dilute alcohol, which takes from it any adhering extractive matter.

* From the *American Journal of Pharmacy* for September.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 24, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

RECENT FAILURES IN THE MINOR EXAMINATION.

THE subject of pharmaceutical examinations still continues to occupy the thoughts and fears of many who are in some way or other affected by the influence they exercise at the present time. We have recently received several letters in reference to this subject, and to the means of preparation for passing the examinations, which we have not published, since they appeared to have been written without due appreciation of the facts of the case. However, there are some points in these letters which it is desirable to refer to for the sake of correcting erroneous impressions which seem to be prevalent.

In the first place we select a letter written by Mr. SHILLCOCK, of Bromley, in which he expresses an opinion that some notice should be taken of the results of the present year's examinations, as contrasted with those of 1873. He points out that, according to statements he has obtained, the number of candidates for the Minor examination in 1873 was 745, of which number 410, or about 52 per cent., passed the examination; while in 1874 the number of candidates has been 894, of which only 278, or about 29 per cent., have passed. We do not stay to question the accuracy of these figures, nor do we entertain any doubt that they may be correct in the main, and, so far as the drift of our correspondent's letter is concerned, it may be admitted that the proportion of rejections in the Minor examination has been very much larger in the present year than it was last year.

Of course there must be, as our correspondent assumes, some particular reason for such a marked difference, and to this extent we may agree with him. But when he goes on to remark that this requires explanation because the Syllabus of 1874 was the same as that of 1873, we are unable to share his opinion. Still less are we able to concur with him in the extraordinary inference which he regards as being very clearly deducible from the facts he puts forward, viz., that in 1873 either a very great number of pupils were allowed to pass who were not competent, or a great number who were examined in 1874 were very unfairly dealt with. While giving Mr. SHILLCOCK all credit for the sincerity of his opinion, we cannot refrain from expressing our conviction that he has fallen into serious error, and the possible mischievous effects of such an erroneous opinion are sufficient to justify a more detailed refutation of it than some might think it to be deserving of.

Mr. SHILLCOCK declares that he cannot believe that in 1873 the standard of ability in the candidates was so much higher than in 1874, and adds that he does not hesitate to declare his conviction that the contrary was the case. In putting forward this view Mr. SHILLCOCK appears to have entirely forgotten the changes that have just come into force as regards the Minor examination. He strangely overlooks the fact that those changes—intended to give the examiners greater facilities for testing the practical qualifications of candidates—have been too commonly regarded as constituting an increased stringency in the Minor examination, and he omits to take into account that the natural consequence of such an apprehension—whether on real or imaginary grounds—would be to stimulate many towards endeavouring to pass the examination before the alterations came into force. So far back as the early part of this year such a tendency was recognizable, and in reviewing the general result of the examinations we took occasion to suggest the probability that, as the time approached for the new regulations to come into operation, a large number of candidates would enter the examination room prematurely.

The facts adduced by Mr. SHILLCOCK in regard to the proportion of rejections in the Minor Examination are to our apprehension ample proof of the justice of the anticipation we then ventured. The result of the fear that the examination would be in itself more severe has been manifest in the unusually large number of candidates presenting themselves. The equally unusual proportion of rejections has proved that very many of those candidates had not acquired such a knowledge of the subjects in which they were to undergo examination as to enable them to pass through this ordeal, or to qualify them for conducting the business of a chemist and druggist.

It is almost inconceivable that such a result as this should be to any considerable extent considered as a misfortune in regard to the general interests of the trade; but with regret we must recognize the fact that such an opinion does prevail. Even Mr. SHILLCOCK apologizes for bringing this subject forward by referring to the sentiments he has heard expressed, and by stating his belief that the great majority of chemists in the country would endorse the opinions he holds.

While we fully sympathize with those who have experienced the trouble, anxiety, and difficulty arising in many instances from the necessity to give proof of qualification, and from the inadequacy of the means by which such qualification can be obtained, we cannot allow regard for individual hardship to interfere with the consideration of what is imperatively demanded of chemists and druggists, not only in the interests of the public, but also for the attainment of the object for which the Pharmaceutical Society was founded and any attempt to obtain a Pharmacy Act was undertaken.

We intend noticing another phase of the subject next week.

LARCH BARK.

It appears possible that the introduction of Larch Bark into the British Pharmacopœia may be synchronous with the commencement of the disappearance of the Larch tree from Great Britain. Not, however, from an "ugly rush" of the public to try the new official remedy, similar to that which denuded the earliest eucalyptus plants in the South of France, but through a disease which is stated to be extending its ravages and increasing in malignity. Indeed, so convinced is a recent writer in the *Garden* that in this country the Larch and Spruce Fir are doomed, that he thinks the time has come for discussing the question by what trees they are to be replaced. It appears that this disease did not at first show itself in young trees, which were not attacked until they had reached the age of twenty, or even thirty, years. Now, however, trees still in the nursery are suffering from its ravages, and plantations of trees four and five years old are said to be dying off "wholesale." The present year would seem to have been particularly favourable to the propagation of this disease. The fact that it has been an unusually dry year, viewed in conjunction with various other circumstances, suggests the idea that drought has much to do with its origin. Both the Spruce Fir and the Larch, as well as the *Pinus excelsus*, all of which suffer from its attacks, come from more rainy countries than ours, and it is thought possible that, "owing to the system of excessive drainage which has, during the last sixty years, been carried to such an extent in this country (and more especially in Scotland, the focus of the disease), our climate has undergone such a change that those trees are unable to thrive in it."

"DISPENSING ALLIANCES."

The refining effects of the Chicago fire having been insufficient to purge the city of one bad practice, unfortunately too well known in this country, the scorching heat of newspaper criticism has been applied with somewhat better effect. On several recent occasions the medical profession of Chicago has been roundly charged by the *Chicago Times* with "collusion with pharmacists for the purpose of extorting money from their patients." This collusion was alleged to be evidenced by the use of prescription papers bearing the business "cards" of pharmacists; the occupation of offices, free or at a nominal rent, adjacent to, or belonging to, pharmacists; the writing of private formulæ, understood by certain pharmacists exclusively; and the acceptance of commissions upon prescriptions from pharmacists.

The effect of the attack, according to the *Pharmacist*, has been equal to a "ten strike," whatever that may mean. The Society of Physicians and Surgeons has held a meeting, and drawn up resolutions, in the preamble to which it was acknowledged that the practices above designated, although deprecated by many, always have been maintained by others, "innocently and in good faith, unsuspicious of their abusive application." The resolutions recognized, however, that such practices tend to the degradation and demoralization of the medical profession, and pledged the members to discontinue and discourage them. It was further agreed that the acceptance of commissions upon prescriptions by physicians from pharmacists is positively disreputable and dishonest, and should be deemed sufficient cause for the expulsion of a member from the Society. A committee was appointed also to consider, with a similar committee from the College of Pharmacy, what measures should be taken to check the growing evil of prescribing proprietary medicines, and the accepting of samples of such medicines from the agents of the wholesale drug houses.

A few days later the Chicago College of Pharmacy held a meeting, and passed resolutions recognizing the existence of the evil, condemning a system "that substitutes a money consideration for just claims of merit and education," and inviting the medical profession to aid the College in its endeavours to "emancipate the business from evils and abuses which prevent and hinder progress." A committee was appointed to co-operate with the committee from the medical society.

It was truly remarked in the Report to the Council from the Delegates to the International Conference that the effect of decisions in questions affecting pharmacy cannot be limited to localities, but that their influence for good or evil must be more widely felt. We therefore welcome this fresh blow at pharmaceutical palmistry and philippian prescriptions.

AN ADVANTAGE OF STATE EDUCATION.

According to the *Revue Internationale*, a decree of the Superior Tribunal of Jalisco, the capital of the province of Guadalaxara, in Mexico, enjoins all physicians and surgeons to give, without fee, their professional services to the tribunals whenever required. The Procureur Fiscal bases this demand upon the fact that, as the State gives medical instruction gratuitously, it has a right to the free services of those taught whenever it requires them. The reply on the part of the medical men is, that since education is given without charge in all the schools, it would follow that all the citizens should render their services upon the same patriotic terms.

POISONING OF CATTLE.

It is reported that twenty-three head of cattle have recently been poisoned in the district of Ballinrobe, co. Mayo, through grazing in pastures where an abundance of Meadow Saffron (*Colchicum autumnale*) was growing. When the mortality began to assume serious dimensions it was feared by the people living in the locality that it was due to some form of epizootic disease; but an investigation by an officer attached to the department charged with carrying out the provisions of the Contagious Cattle Disease Act revealed the true cause.

The Jalap plant (*Exogonium purga*) has flowered freely this season on a south wall at Kew. The *Garden* thinks that the beautiful appearance of its "rich purple salver-shaped flowers," independently of any other properties the plant may possess, render it well worthy of attention as a tender or half-hardy climber.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

The following is the result of the Preliminary Examination held on the 5th inst. :—

ENGLAND AND WALES.

Two hundred and twenty-two candidates presented themselves for examination, of whom *one hundred and thirty-two* failed. The following *ninety* passed, and have been duly registered as Apprentices or Students :—

- *Adams, Charles .... Birmingham.
- *Opie, Edward Augustus .... Plymouth.
- *Hart, Arthur .... London.
- *Mould, Arthur Howe .... London.
- *Walkley, James Byron .... Bollington.
- *Reade, Joseph George Edward London.
- Equal.
  - *Frost, George Percy H. .... Derby.
  - *Maddox, John Thomas Rowland Carmarthen.
- Morris, Thomas .... Denbigh.
- Equal.
  - Greener, Michael Hindmarsh ... Alnwick.
  - Hudson, George Mawdsley .... Southport.
- Watson, Henry Gervase .... Sheffield.
- Prosser, Francis .... Milford Haven.
- Williams, Egbert .... Coventry.
- Wheeley, John Thomas Martin London.
- Equal.
  - Cox, Ernest .... Bristol.
  - Harries, William .... Llandovery.
  - Pollitt, Joseph Moore .... Radcliffe.
- Equal.
  - Laing, Richard William .... Capetown, S. Africa.
  - Patterson, Thomas .... Preston.
  - Smith, Alexander Newsome ... Radford.
- Chambers, William Rubery ... Birmingham.
- Equal.
  - Baker, Charles Frederick .... Hitchin.
  - Fowler, George .... Tewkesbury.
- Equal.
  - Ground, Thomas .... Birmingham.
  - Groves, Arthur .... Cambridge.
  - Knott, Henry Archer .... Walthamstow.
- Davenport, George Harry .... Wolverhampton.
- Equal.
  - Evans, William Willoughby ... Cilsane.
  - Procter, John .... Pocklington.
- Holland, Henry .... Leftwich.
- Alcock, Henry .... Coventry.
- Equal.
  - Cass, Isaac .... Mirfield.
  - Gregory, Edward Thomas .... London.
- Equal.
  - Goodall, William Antony .... Bristol.
  - Richards, Thomas .... St. Clears.
  - Rossiter, Thomas Edward .... Tiverton.
- Dodd, William Ralph .... Market Drayton.
- Equal.
  - Armstrong, Benjamin, jun. ... Newcastle-on-Tyne.
  - Rogers, James Isaac .... North Shields.
- Equal.
  - Bevan, Edward .... Swansea.
  - Dixon, James Simpson .... Kendal.
- Crow, William .... Berwick-on-Tweed.
- Equal.
  - Coates, Frederick Charles .... Sudbury.
  - Hepworth, Arthur .... Newcastle-on-Tyne.
  - Morgan, William Henry .... Llanelly.
- Equal.
  - Hall, Thomas Wright .... Bristol.
  - Ward, William Wright .... Whitby.
- Jones, Richard Edward .... London.
- Equal.
  - Jackson, David .... Manchester.
  - Jones, Richard .... Swansea.
  - Metcalfe, John .... Bedale.
  - Middleton, Ernest Denny .... Marske-by-the-Sea.
  - Morris, Walter .... Farnworth.
  - Short, George William .... Swindon.
  - Wright, Edward Goddard .... Doncaster.
- Brown, Thomas Land .... Ripon.
- Equal.
  - Hebblethwaite, George Arthur Hull.
  - Robinson, Frederick Gardner ... Pendleton.
- Bridge, George Edward .... Maidstone.
- Equal.
  - Minnitt, Walter .... London.
  - Baker, George Henry .... Southsea.
  - Snell, Charles Henry .... York.
  - Williams, John Henry .... London.
- Woodman, John Dover .... Upper Norwood.
- Equal.
  - Beattey, William Crump .... London.
  - Burford, Samuel Francis .... Leicester.
  - Cattell, Charles .... Ely.
  - Clark, John .... Colne.
  - Cocks, Walter James .... Southsea.
  - Gravill, Edward Day .... Gainsborough.
  - Horrell, Alfred Charles Julian ... Dartford.
  - Jones, Thomas Slater .... Port Penrhyn.
  - Kelly, John George .... Leicester.
  - Loam, James Gilbert .... Kirkdale.
  - Manners, John .... Shildon.
  - Middlebrook, Joseph .... Sheffield Moor.
  - Newton, Henry .... Doncaster.
  - Nicholls, Samuel John .... Plymouth.
  - Parsons, Vincett James .... Icklesham.
  - Phillips, James Patt .... Bideford.
  - Roberts, Morgan .... Cardiff.
  - Rook, Barnard .... Sittingbourne.
  - Rundle, George .... London.
  - Shrivell, Frederick Wm. Edwd ... Hadlow.
  - Thompson, Hamilton .... York.
  - Vickerman, Thomas .... Nottingham.
  - Williamson, Edward Field .... Grimsby.
  - Windmill, William Henry .... Barking.
  - Woodrow, Walter .... Salisbury.

SCOTLAND.

Twenty-one candidates presented themselves for examination ; of these *twelve* failed. The following *nine* passed, and have been duly registered :—

- *Dick, George Walter .... Edinburgh.
- *Mackill, Robert Alexander .... Hamilton.
- *Eunson, John .... Kirkwall.
- *Glass, William .... Friockheim.
- *Duncan, William .... Leith.
- Ainslie, William Wood .... Edinburgh.
- Equal.
  - Donaldson, David .... Edinburgh.
  - Laing, Alexander .... Aberdeen.
- Kay, William .... Edinburgh.

The following is a list of the Centres at which the Examinations were held, showing the number of Candidates examined at each Centre, and the result.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Barnstaple	1	1	0	London	49	19	30
Berwick	1	1	0	Lynn	1	0	1
Birmingham	9	3	6	Macclesfield	1	1	0
Boston	2	0	2	Manchester	21	5	16
Brighton	4	0	4	Newcastle-on-Tyne	4	4	0
Bristol	6	4	2	Norwich	1	0	1
Cambridge	5	3	2	Northampton	2	0	2
Canterbury	2	1	1	Nottingham	6	2	4
Cardiff	1	1	0	Oxford	1	0	1
Carmarthen	8	5	3	Peterborough	1	0	1
Carnarvon	3	1	2	Plymouth	3	2	1
Cheltenham	3	0	3	Portsmouth	5	2	3
Chester	4	1	3	Preston	4	2	2
Darlington	7	2	5	Salisbury	2	1	1
Doncaster	2	2	0	Scarborough	1	1	0
Exeter	2	1	1	Sheffield	2	2	0
Guernsey	1	0	1	Shrewsbury	3	1	2
Hull	8	3	5	Stafford	3	0	3
Leamington	4	3	1	Swansea	4	3	1
Leeds	8	2	6	Worcester	4	2	2
Leicester	6	2	4	York	4	4	0
Lincoln	3	1	2				
Liverpool	10	2	8				
SCOTLAND.							
Aberdeen	5	2	3	Edinburgh	7	5	2
Dundee	7	1	6	Glasgow	2	1	1

* Passed in the First Division.

The questions for examination were as follows :—

Time allowed: Three hours.

LATIN.

N.B.—Candidates are not required to translate more than two paragraphs, and are recommended to select either Nos. 1 and 2 or Nos. 3 and 4.

1. Eo autem frumento, quod flumine Arare navibus subvexerat, propterea uti minus poterat, quod iter ab Arare Helvetii averterant, a quibus discedere nolebat. Diem ex die ducere Ædui, conferri, comportari, adesse dicere.

2. Multo denique die per exploratores Cæsar cognovit, et montem a suis teneri, et Helvetios castra movisse, et Considium timore perterritum, quod non vidisset, pro viso sibi renuntiâsse.

3. Necesse est, quæcunque in pulverem redigi præcepimus, ita per cribrum tenue demitti, ut separentur sordes et partes crassiores. Plerosque Pulveres oportet recens præparari, non diu servari.

4. Capiat æger haustum catharticum proximâ luce navem conscendens; et si post navigationem vomitus supervenerit, bibat æger spiritûs alicujus paululum aquâ commixtum.

5. Decline the pronouns Idem and Qui.

6. State the infinitive, perfect, and supine of the following verbs :—Juvo, edo, cubo, venio, doceo, coquo, mordeo, and spargo.

7. Parse "Ne multa discas, sed multum."

ARITHMETIC.

8. A gentleman's income is £896 13*s.* 4*d.* per annum; he gives to the poor £13 10*s.* quarterly, and lays up 200 guineas at the year's end; how much does he spend in six days?

9. If $\frac{3}{4}$ of a yard of cloth that is $2\frac{1}{4}$ yards wide will make a garment, how much cloth that is $\frac{7}{8}$ of a yard wide will make the same?

10. What is the value of a beam of timber whose length is 24 ft. 8 in., breadth 3 ft. 9 in., and thickness 2 ft., at 3*s.* $8\frac{3}{4}$*d.* per cubic foot?

11. State the equivalent in avoirdupois weights of a kilogramme and a litre respectively, and how many cubic centimetres are contained in a litre.

ENGLISH.

12. State the plurals of the following words :—Pony, grotto, valley, hero, scarf, genius, die, sheaf, index, and crisis.

13. Parse the following :—

Thou, whose almighty word
Chaos and darkness heard,
And took their flight,
Hear us.—

14. Write from fifteen to twenty-five lines on one only of the following subjects :—

Economy.
Painting.
Republicanism.

Provincial Transactions.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The sixth annual meeting was held at 37, Blackfriars Street, on Thursday evening, October 1, Mr. W. S. Brown, President, in the chair. The following report of the Council was read by Mr. F. Baden Benger, Hon. Secretary, and the Treasurer, Mr. Geo. S. Woolley, presented his statement of accounts, as follows :—

ANNUAL REPORT.

"The past year has been a somewhat uneventful one in pharmaceutical circles, but there is reason to hope that during this period the Manchester Chemists' Association has been more firmly established, and that its usefulness has not been less evident than in former years.

"The session was inaugurated on November 7 by a soirée and exhibition at the Memorial Hall. Upwards of thirty firms sent contributions, forming a collection of much interest. Several short lectures on scientific subjects were given during the evening. There was a large attendance, including some eminent members of the medical profession, and the meeting was a very pleasant one.

"In December Mr. Louis Siebold delivered an able lecture before the Association on the methods of detecting hydrocyanic acid and cyanide of potassium in cases of poisoning, and in January Mr. John Plant, F.G.S., very kindly contributed a lecture on Coal—its history and chemistry.

"During the session two evenings were devoted to conversation and discussion of a less formal character than usual. The experiment appeared satisfactory. There was a fair attendance, and several members brought forward subjects of interest to the Association.

"The reading-room and library have been open five evenings a week, except during the summer months; and, as before, students have been able to gain admission at any other hour by applying for the keys.

"Your Association is indebted to the Pharmaceutical Society for again contributing copies of the *Pharmaceutical Journal* weekly, and to the Pharmaceutical Conference for the annual 'Year Book.' A set of dried official indigenous plants has also been presented by Messrs. Butler and McCulloch.

"The numerical strength of the Association remains about the same as at the end of the last session. A large number of the chemists of the district are still unconnected with it, and as repeated applications have been made to all whose names appear in the Manchester Directory, the only inference to be drawn is, that they are unable to recognize the claims which we believe the Association has on their support. It should be borne in mind that, through the exertions of your Association, Manchester has become a centre of pharmaceutical education; thoughtful assistants, desirous of improving themselves, are anxious to settle in the neighbourhood, and parents are beginning to see the importance of apprenticing their sons in a locality where a means of acquiring professional as well as trading experience is afforded. It should be unnecessary to point out the substantial gain thus accruing to the whole body of the trade in this district, or to urge on business men so very evident a reason for maintaining the educational character of the Association.

"The income is at present insufficient to cover the charges for rent and taxes, water, gas, attendance, postage, etc., though every possible economy has been practised in conducting the business of the Association. Since its formation no paid assistance has been obtained, even for directing circulars, etc., as is usual in other large associations; and, though your council are most reluctant to curtail any of the advantages now offered to members and associates, or to propose a larger annual subscription, one of these courses seems likely to be forced upon them unless a larger number of members join our ranks.

"Your Council cannot refrain from an expression of regret that so few take an active part in promoting the success of the monthly and other meetings. Acceptable as are the subscriptions only of those who do not attend, it would be a great encouragement to gentlemen who devote much time and trouble to the preparation of lectures and addresses if these gatherings were more truly representative of the trade of the district. It is satisfactory, however, to notice the large number of associates always present, and your Council are aware that in many cases principals are compelled to stay at home in order to give their *employés* the opportunity of attending.

"The School of Pharmacy in connection with your Association is now recognized as one of the legitimate pharmaceutical schools of the kingdom, and judged either by the quality of the teaching or by the number of students, will bear favourable comparison with most others. A detailed report of the School for the last session has been already published. The entries for the chemistry course were 21, for the materia medica course 19, and for the botany course 23. In these subjects no fewer than eighty lectures were delivered by Mr. Siebold. The fees formed that gentleman's very inadequate remuneration. These courses will be repeated during the ensuing session. Mr. Siebold will again undertake the chemistry and materia medica courses, whilst the services of Mr. Leo H. Grindon, well known as a lecturer on botany, have been secured in that department. A course of practical laboratory instruction is also arranged, under the direction of Mr. Siebold.

"Your Council have much pleasure in announcing that Mr. Siebold has undertaken to deliver, gratuitously, a short course of lectures during the winter, on 'The Analysis of Common Articles of Food,' to which members and associates will be admitted free.

"During the six years since its formation no extraneous assistance has been asked by the Association. It is for the incoming Council to decide whether, considering that the sum of upwards of £550, including lecture fees, has been expended, and a further sum of £60 devoted to the formation of a library, the time has not arrived when the Pharmaceutical Council should be asked for some aid in carrying on future work.

"Your Council would, in conclusion, again most earnestly urge on all members of the trade the duty of assisting in securing the permanent establishment and extension of our educational arrangements, fully believing that it is the interest of all to co-operate in so important an undertaking."

THE TREASURER IN ACCOUNT WITH THE MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION, OCTOBER 1, 1874.

October, 1873. *Dr.*	£	s.	d.
To Balance in hand ...	20	16	11
,, Cash from 80 Members ...	40	0	0
,, ,, ,, 77 Associates ...	9	12	6
,, ,, for 7 Soirée Tickets ...	0	7	0
,, ,, ,, 2 Lecture Tickets (Non-Members) ...	0	2	0
,, Lecture Fees ...	54	8	6
,, Bank Interest up to Dec. 31, 1873 ...	1	3	2
,, Balance due to Treasurer ...	14	0	2
	£140	10	3

1873-4. *Cr.*	£	s.	d.
By Cash Rent ...	39	10	0
,, Expenses of Conversazione ...	13	7	6
,, Printing, Stationery, and Advertising ...	8	13	6
,, Porter's Wages ...	12	15	0
,, Meeting at Memorial Hall ...	2	4	6
,, Postage ...	4	16	7
,, Sundries ...	1	3	10
,, Cash for Prizes ...	3	10	10
,, Mr. Siebold for Lectures ...	54	8	6
	£140	10	3

LIBRARY FUND.

1873.	£	s.	d.
To Balance in hand ...	15	11	5
	£15	11	5

1873-4.	£	s.	d.
By Cash for Books, etc. ...	8	0	0
,, ,, in hand ...	7	11	5
	£7	11	5

Examined and found correct,

C. A. JOHNSTONE.
STANDEN PAINE.

The Report and Treasurer's Statement were adopted, and the usual votes of thanks to the returning officers having been passed, the following gentlemen were re-elected office bearers for the ensuing year:—President, Mr. W. Scott Brown; Vice-Presidents, Mr. J. T. Slugg, F.R.A.S., and Mr. W. Wilkinson; Treasurer, Mr. Geo. S. Woolley; Hon. Secretary, Mr. F. Baden Benger. Council: Messrs. Barnaby, Blain, Bostock, Botham, Hargraves, Hughes, Kay, Mumbray, Payne, Robinson, Hermann Woolley, and J. Waterhouse. Messrs. C. A. Johnstone and Standen Paine were re-appointed Auditors.

The members afterwards dined together at the Blackfriars Hotel. Amongst the visitors were Mr. John Plant, F.G.S., Curator of the Peel Park Museum; Mr. Estcourt, F.C.S., City Analyst; Dr. Edwards, and others.

Some excellent speeches were delivered, and a most agreeable evening was spent.

LEEDS CHEMISTS' ASSOCIATION.

The 12th annual meeting was held in the library on Wednesday afternoon, October 14, 1874, the President, Mr. F. Reynolds, in the chair. The minutes of the last meeting having been read and confirmed, the Secretary (Mr. J. W. Longley) read the

REPORT.

"Numerically, the last session has been a successful one. The increase in the number of members is four over last year, and the increase of associates is nine over last year, making an increase in the annual subscriptions of £3 2*s*. 6*d*. Your Committee have pleasure in stating that there is at present a balance in favour of the Society of £9 1*s*. 6*d*. The expenses during the past year have been somewhat heavy. A room in the Philosophical Hall has been engaged for two of our monthly meetings, and many minor expenses have tended to lessen the balance in hand. Your Committee have pleasure in drawing attention to the new library, and trust that the comfort of the room, the additional books, and various advantages that are now offered will materially increase the attendance at all lectures and meetings. The first monthly meeting was occupied by a social gathering at the Trevelyan Hotel, on November 12, 1873, when the members and associates, together with the chemists and druggists of the town, assembled to the number of nearly 100. Tea and coffee were provided at 8 o'clock in the evening, the president, Mr. Reynolds, in the chair. After a very excellent address from the president, a paper was read by Mr. R. H. Davis, of Harrogate, on 'The Monthly Analytical Examinations of the Harrogate Spas, 1872.' During the past session papers have been read as follows:—'Fermentation,' by Mr. Louis Siebold, Manchester; 'Water,' by Mr. E. Brown, Leeds; 'The Roots and Stems of the British Pharmacopœia,' by Mr. James Abbott; 'The Adulteration Act,' by Mr. E. Yewdall. Your committee take this opportunity of thanking those members of the Association who have assisted them in this work.

"Two members of the Association attended the British Pharmaceutical Conference, held in London during the month of August last, as delegates from our Society.

"The following books have been added to the library:—'Thorpe's Quantitative Analysis,' 'Armstrong on Organic Chemistry,' and 'The Year Book of Pharmacy,' a donation from the Committee of the Pharmaceutical Conference.

"A class has been conducted by Mr. J. Abbott during the past session, on Materia Medica, and has been attended by 17 students from our Society. Two prizes were offered, the first a book value 15*s*., the second a book value 7*s*. 6*d*. Mr. Hanbury was asked to adjudicate on the papers, and kindly consented. Only four candidates presented themselves for examination. None of the candidates having arrived at Mr. Hanbury's standard of merit, your committee regret that they could not conscientiously award a prize to any of the students.

"A class has been conducted by Mr. George Ward during the past session, on Inorganic and Organic Chemistry, and has been well attended by the chemists' assistants and apprentices in the town. The following is the result of the examination held at the conclusion of the course, under the Science and Art Department, so far as our associates are concerned:—

"*Inorganic Chemistry.*—Mr. E. O. Brown, elementary grade, first class, and laboratory practice; Mr. J. Fisher, elementary grade, second class.

"*Organic Chemistry.*—Mr. A. A. Pearson, advanced grade, second class, and laboratory practice.

"Two prizes were offered by the committee, value the same amount as those for the materia medica students; Dr. Attfield adjudicated. Only two candidates presented themselves; the first prize was given to Mr. E. O. Brown, and the second to Mr. C. A. Smith.

"The following is the treasurer's account for the past year:—

Dr.

		£	s.	d.
1873.				
Oct. 1.	To cash in Treasurer's hands	14	0	0
	To cash in Secretary's hands	1	0	10½
Dec.	To 39 Members' Subscriptions	19	10	0
	To 56 Associates' Subscriptions	7	0	0
1874.				
May	To Balance from Botany Class	2	5	0
		£43	15	10½

Cr.

	£	s.	d.
Stationery	0	16	4
Advertising	1	14	10
Books, Periodicals, Printing, Bookbinding, etc.	12	3	0½
Lecture Expenses	3	4	6
Collecting Subscriptions	1	1	0
Rent of Library	9	4	0
'Chemist and Druggist' for 1874	0	7	6
Refurnishing Library	5	0	0
Joiner's Account	0	9	2
Balance in Hand	9	1	6
Porter's Attendance at Rooms	0	14	0
	£43	15	10½

We have examined the above accounts, and find them correct.

JOHN BOWMAN, } Auditors.
T. B. STEAD, }

"Your Committee have pleasure in stating that the Chemistry Class, conducted by Mr. Ward, and the Botany Class, conducted by Mr. Abbott, will be carried on during the coming session, particulars of which have been forwarded to each member and associate. Your Committee cannot but feel that the numerical strength of the Society is weak, compared to the number of chemists' assistants and apprentices in the town, and also regret that the attendance at meetings and lectures is of so limited a nature; they would therefore suggest that each member and associate should do his utmost to point out to his friends the desirability of upholding the society by attending lectures, &c., so that not only is their own knowledge increased, but the interests of the trade are better promoted, and the feeling of good fellowship more firmly established."

On the motion of Mr. Brown, seconded by Mr. Taylor, the Report was adopted.

The election of officers for the coming session was then proceeded with, and resulted as follows:—President, Mr. Freshfield Reynolds; Vice-President, Mr. Edwin Yewdall; Honorary Secretary, Mr. Samuel Taylor; Librarian, Mr. E. O. Brown; Curator, Mr. Payne; Committee, Messrs. E. Brown, George Ward, William Smeeton, John William Longley, R. Simpson, and P. Jefferson.

Mr. F. Reynolds then moved that a vote of thanks be given to the retiring officers, and spoke in praise of the manner in which Mr. Longley had fulfilled his duties as honorary secretary. Mr. E. Brown said he could fully endorse the remarks of the president. The motion was seconded by Mr. Yewdall, and carried.

It was then resolved that two prize books should be given at the end of the course to the two students from the Association who have attended Mr. Ward's class, and attained the most proficiency, the first to be a book, value not exceeding 14*s.*, and the second not exceeding 7*s.*

Mr. Brown offered to give a book, value 6*s.*, for the second best student in the Materia Medica Class, Mr. Richard Reynolds having offered to give a book as first prize at the last meeting.

GLASGOW CHEMISTS' ASSOCIATION.

ASSISTANTS' SECTION.

The opening meeting of session 1874-5 was held in the West Hall, Anderson's University, on Wednesday, October 14, at nine p.m., the president, Mr. John C. Hunter, in the chair. There was a good attendance of members. The meeting being constituted, twelve new members were elected. The president then delivered an opening address, in which, after recounting the principal events in the history of the Association during the past year, he turned his attention to the History of the Microscope. The following is the substance:—

Mr. Hunter commenced with a short epitome of the papers read by the members of the junior section of the Association last session. Mr. Foster had read a very interesting and instructive paper on the Animal Substances used in Medicine, more especially dwelling upon those contained in the B.P., and referred the various substances to their natural orders and classes. A very good paper on the Manufacture of Iodine had been read by Mr. Currie, who exhibited a series of well-executed drawings of the various apparatus used in its manufacture, and concluded his paper by showing the various tests for the recognition of iodine. The third paper was read by Mr. Murdoch, the late secretary, and entitled "Drugs and Druggists," in which he described some of the disadvantages of chemists and druggists, more especially regretting the late hours they were subjected to in discharging their duties to the public, and adverting to the small modicum of thanks they sometimes got in return. A paper was read by Mr. Bray, on Mercury and Its Preparations. He described the extraction of mercury from its ores, and its combinations with oxygen, chlorine, the red oxide, and the two chlorides. He also referred to the preparation of the ointment, blue pill, and mercury with chalk. Mr. Hunter himself had read a paper on the modern relations between Organic and Inorganic Chemistry, in which he endeavoured to show that the barrier that once did separate them no longer exists, and that some substances can be produced by artificial means which formerly were supposed to require the vital action of plants and animals.

After this summary, Mr. Hunter read his paper on the History of the Microscope:—

"In ancient records some mention occurs of lenses being used for the purpose of making bodies appear larger than they seemed to be to the naked eye. Seneca, who lived about the beginning of the Christian era, alludes to them, and Pliny also mentions the magnifying and burning power of lenses. From the time of Pliny up to the fifteenth century, however, there has been no record found of any instrument similar to that now called the microscope.

"The Italians and Dutch have disputed as to the priority of the invention of the microscope, but the names of the rival claimants have been lost to us, so that it is very difficult to say to which of those countries the honour belongs. The first mention of its construction is about the year 1590, when an ingenious Dutchman, Zacharias Jansen, and his son, were among the first to make them. A short time afterwards we find one named Cornelius Drebbel made and brought over to England a microscope. Drebbel's microscope was a good deal larger than those now employed; it was more like what is now called a telescope, being about six feet long and one inch in diameter.

"Fontana, in a work published in the year 1646, says that he had constructed a microscope in the year 1618, or about 28 years after the Jansens are said to have made one. In the year 1685, Stelluti published a description of the various parts of a bee, which he had examined with a microscope. These microscopes were what are now called simple microscopes, because composed of one lens only, and they were similar in structure to those that are sometimes vended in the streets by peripatetic merchants for a few pence. Yet, by means of the simple microscope, very many great discoveries were made by acute and enthusiastic observers. About 1665 two names began to appear which will be handed down to posterity connected with discoveries made with the microscope, namely, Leeuwenhoek and Hartsoeker. It is to Leeuwenhoek, however, that we are most indebted for some of the most wonderful discoveries ever made by the instrument. He used to live a very solitary life, shutting himself up in his study to watch the various phenomena connected with the inhabitants of a world not visible to the eye alone, and after observing their motion, etc., he wrote descriptions of them that quite astonished the world at that time. Leeuwenhoek made all his own lenses, and at his death he left some of them to the Royal Society of London.

"Hartsoeker, together with Dr. Hooke, was the first to introduce glass globes for magnifying instead of a convex lens. On account of their sphericity they magnified bodies enormously, and by their means it became possible to see the animalcules in water impregnated with vegetable remains.

"In the year 1740, Dr. Lieberkuhn greatly improved the simple microscope, and, like Leuwenhoc, he made his own, using one microscope for examining one or two objects only. On that account he was continually making new ones, twelve of which he left at his death to the Royal College of Surgeons of London. Lieberkuhn was also the inventor of the solar microscope.

"The first three compound microscopes were invented by Dr. Hooke, Eustachio Divini, and Philip Bonnani. Dr. Hooke, in a preface to his 'Micrographica,' published in the year 1767, gives an account of his compound microscope; its length was about 7 inches, and it was composed of one object glass, one mid-glass, and one eyepiece. Eustachio Divini published an account of his in the year 1768. It was composed of one object-glass, one mid-glass, and two eyepieces; its length was about three feet when drawn out and sixteen inches when shut up, and its greatest magnifying power was about 143 diameters. Philip Bonnani's microscope was closely allied to Dr. Hooke's, being composed, like his, of one object-glass, one mid-glass, and one eyepiece. Sir Isaac Newton, after his famous discovery of the composition of white light, made experiments with various kinds of lenses, to obviate the chromatism or coloured fringe that surrounded the image of any body viewed through a refracting lens. But it is not to Sir Isaac Newton that we are indebted for the invention of the true achromatic microscope, although he was confident that it would be ultimately accomplished. Euler, in the year 1776, was the first to invent a near approach to the achromatic microscope, and in the year 1816, Fraeunhofer, the celebrated optician of Munich, well known for his discovery of what are called 'Fraeunhofer's lines' in the Solar Spectrum, improved upon the microscope of Euler; but still it was not truly achromatic. In the years 1823-4-5, the Academy of Sciences, Paris, and the Royal Society of London were presented with microscopes truly achromatic, and from that time till now there has been a gradual progression in their manufacture, both as regards lenses, stands, condensers, etc. Microscopes may now be purchased for from a few shillings to over one hundred pounds, and the magnifying power varies from 20 diameters to the enlargement of surface 56,000,000 times."

Mr. Hunter then gave an interesting sketch of some of the various ways in which the microscope is utilized in scientific investigation.

At the conclusion of the reading of the paper the President was awarded a hearty vote of thanks for his excellent address, and his kindness in again accepting the presidentship.

The Secretary (Mr. John Foster) intimated that a tutorial class would be formed, to assist young men in preparing for the preliminary examination, should a sufficient number come forward. At the close of the meeting 15 gentlemen enrolled themselves for the same.

A letter was read from a gentleman, complaining that some neighbouring chemists had failed to persevere in the early closing movement. Messrs. Murdoch and Hunter were elected a deputation to investigate the matter.

The following donations were made to the library:—From Mr. R. S. Neilson, 'Green's Botanical Dictionary,' 2 vols., and 'Spon's Workshop Receipts;' from Mr. John C. Hunter, President, a second donation of microscopic objects.

It was intimated that the next meeting would be held on Wednesday, the 11th of November, when Mr. William Currie would read a paper on 'Bleaching.'

BRISTOL PHARMACEUTICAL ASSOCIATION.

The first general meeting of the present session was held at the Bristol Institution, on Friday, October 16.

The president, Mr. G. F. Schacht, in introducing the proceedings, said his first duty that evening was an extremely agreeable one; it was to announce to the members that the President of the Pharmaceutical Society of Great Britain honoured them with his presence that evening. Mr. Hill's interest in the work they were engaged in promoting had been, as they would well remember, most substantially shown. It was only on the occasion of their last gathering that he had had the pleasure of making known to them the nature of that manifestation; and he was sure they would agree with him that his presence there that evening was another proof of the sincere interest he felt in their work. In their name, therefore, as well as his own, he rejoiced to offer him a hearty welcome, and thank him very much for having come amongst them. He had also to announce, on behalf of the Council, that they had succeeded in getting an excellent programme of monthly evening lectures, lacking in no respect the interest they had possessed on former occasions. Some old friends, and a few new ones, had been good enough to promise their help; and really, in making that announcement, he could not help congratulating the Society on the many kind friends they had, who assisted them in the most generous manner in the work they had undertaken. He was sure they were very grateful to them, and fully appreciated the value and importance of their co-operation. He would also remind them, though probably they had all seen the notices, of the courses of lectures which had been arranged on chemistry and botany, and which would be under the direction, as heretofore, of their kind friends, Mr. Coomber and Mr. Leipner. In connection with these classes, the Council had determined to offer again something like the same system of prizes as had been offered last year to those young men who would enter into the matter of their own education cordially, and show their appreciation of the efforts made to supply the means by presenting themselves at the examinations. There would be also some prizes given for an examination on the chemistry, botany, materia medica, and pharmacy of the Pharmacopœia. That was a somewhat alarming title to give it, but, on reflection, it would be found not so formidable after all. The examination would take place some time after the conclusion of the session, and the prizes would be provided out of the fund which Mr. Hills had given. The object of the Council in offering these special prizes was to induce and encourage a practical study of pharmacy, and the sciences surrounding it, in their everyday work. That really would be what the examination would test, and he hoped a large number of his young friends would compete when the time came. The details were not yet quite settled, but they would be announced in due course. Another subject to which he must allude was, that in the autumn of next year the British Association would probably meet in that city, and they would remember that the Pharmaceutical Conference held its gathering simultaneously with the greater gathering. On previous occasions very interesting papers had been read by gentle men residing in the towns in which the meetings had been held. He might say that some of the most important communications he had heard read before the Conference had been from members residing in the special locality in which the gathering had been held; and he took that opportunity of most urgently drawing their attention to the fact, in the hope that the Bristol Association would be really well represented on that occasion, and that they would, one and all, endeavour to uphold, to the utmost of their ability, the dignity and reputation of the pharmacy of the West. There was only one hint he would give, and that was, that any gentleman intending to prepare a paper for the occasion should begin as early as he possibly could, so that he might not suffer the grief and annoyance of finding he had not perfectly completed his work when the time arrived. It was right that he should now thank them for having called him once more to the duty of being their president. As one of them, he was only anxious to take his turn in such matters, and, of course, he willingly acceded to the request made to him. It was in accordance with their usual habit to elect to the office the same individual two years in succession. The plan had its recommendations, but it had also its disadvantages, one of them being that the same person was expected to prepare two consecutive addresses, which should possess some degree of interest. But one must accept the duties as well as the honours of a position. On the last occasion he was anxious to direct his observations more particularly to their younger members, and that was one reason, perhaps, why he should not do so a second time. Another and a more important reason was, that from a much larger platform — namely, the Lecture Hall of the Pharmaceutical Society of Great Britain—the great bulk of pharmaceutical students had been recently addressed most ably and most thoughtfully by their fellow-member, Mr. Giles; and it would be simple tautology if he were to attempt to go over the same ground again. He sincerely hoped they had all read that address, but if any had not he recommended them to do so on the first opportunity. These circumstances had constrained him to endeavour that his remarks on the present occasion should possess a somewhat more general interest; and he would now, with their kind permission, proceed to read them.

The President's Address.

"There is a word familiar to us all which has somewhat recently received a legal definition. The law defines a "chemist and druggist" to be a person entitled to keep open shop for the sale and dispensing of poisons. From this point of view the occupation of a chemist and druggist is emphatically a trade; but his duties neither begin nor end with, though they may include, the keeping a shop and the selling of poisons, for he has also to practise pharmacy.

"Pharmacy is an art—a branch of the great and blessed art of healing—and for its proper practice there are two requirements, over and above all that concern simple trading, namely, a scientific training and a knowledge of scientific matter.

"I have thought that these relations of the several portions of our duties are not quite always sufficiently kept in view, and that perhaps it might be useful to-night to speak of pharmacy in its relation to the art of medicine —its ultimate dependence, in common with all the other branches of that art, upon scientific knowledge —and the position of the chemist and druggist to the whole matter. Grant me leave, however, to indulge in a few abstract considerations first.

"Science may perhaps be broadly defined as man's intellectual effort to apprehend the phenomena of the universe. As nature is probably one, so science may be assumed to be one likewise; but, from the contracted and limited nature of man's time and powers, it has, during the processes of his work, and in the expression of that work, become divided into many sections.

"An art is (or perhaps I should rather say ought to be) a practical application of scientific principles to some useful purpose, and were the knowledge of those principles complete the art might be perfect. But no department of knowledge since the world began has ever been so exhausted of its treasures that man has been able to close the account and say—this is complete. On the contrary, that which was so grandly true when first uttered is equally true now, and probably will ever be true as long as we continue man; what we know is but as the pebble compared with the illimitable ocean of truth; and as the pebbles of our own material shores are cast about hither and thither by every tide and wave of the giant sea, causing sandbanks to shift, beaches to rise, and the whole face of the coast to change, so, with each fresh tide of discovery the face of science may become absolutely changed, and the old landmarks of knowledge valueless and waste. Everything outside and inside of man is apprehended by him simply as his nature enables him to apprehend—that is, partially and incompletely; and hence his most elaborate summings-up and views of knowledge are of necessity transitional, and change (ever, let us hope, to something larger and truer) becomes the very first condition of mental activity.

"The period of our own times appears to be crowded with illustrations of this truth; and were I able, even in a very loose manner, to epitomize the masses of work and of thought that have enriched the fields of science during recent years, you would be willing to join in almost any expression I might suggest of wonder and delight. But the slightest of all glances will suffice to show, not only the immense activity and energy that have been enlisted in the work, but also the many diverse aspects some of these sections of science have been made to assume under the differing intellectual atmospheres through which they have been viewed. Let us try and take that glance together.

"If it be directed to the region of physical science, the first point to arrest our attention will probably be the grand generalization known by the expression—the conservation of force, through which all phenomena attended with disturbance of force are regarded as correlated with each other—every single manifestation being in essence the transmutation of one form of force into another—each being the precise measure of the other—all being capable of exact expression in one common language—nothing being lost. Thanks to the secure method of modern inquiry, this generalization is the result not of conjecture, but of close reasoning upon evidence, that evidence being laborious experiment.

"There must be many among you able as I am to remember when this idea was but dimly shadowed forth; and when, on the contrary, we were more commonly taught to regard light as an "emission," heat as a substance called "caloric," electricity as a "subtle fluid," and chemical action as the result of an "affinity." Moreover, a peculiar severance was insisted upon between all these and mechanical motion, which was deemed to have neither resemblance nor relation to any amongst them.

"But what a chasm between these two sets of ideas! It is sometimes said time should not be measured by days and minutes, but by the tides of emotion that sweep through us. By such a record what ages seem here to intervene. The steps seem almost infinite in number, and as one's thought endeavours to rest for a moment upon some that appear more marked than others—such, for instance, as are suggested by the words Electrolysis, Vapour-densities, Specific heats—we find it difficult to realize that so vast a region could have been explored within the short period of one's own day.

"Side by side with this struggle to apprehend the nature and attributes of *force*, there has been an equally anxious effort to attain to a knowledge of the ultimate condition of matter.

"It is not to be wondered at that those familiar to some extent with the properties of masses of matter should set themselves to inquire of what those masses consisted, nor is it surprising that when all proximate and tangible processes of analysis had been appealed to in vain, imagination and speculation should have sought to intrude the answer; but when we find that at this dangerous point of the inquiry modern science is true to her first principles, and seeks to supply the missing evidence by processes that spring from the most exact of all the sciences—viz., mathematics—we feel that the half conclusions already arrived at may be at least so far trusted that we may indulge in the hope of at last finding a secure basis upon which to rear a true theory of nature. I here allude to the labours that have led some of our highest mathematicians and physicists to the conviction not only that atoms exist, but even to an approximative measurement of their size.

"The influence of physical investigations such as these upon our own special department of work—chemistry—has been indeed great, involving many changes of doctrine amongst its professors, and most bewildering modifications of language and even of character. In opposition to this march of modernism a voice has sometimes been heard protesting that the experimental work of the laboratory should be kept distinct from all hypotheses and systems; but though the warning may not have been without its value, nor altogether wrongly urged in some quarters, there can be little doubt that the alliance of the two streams of thought has served in a wonderful degree to strengthen the force of both, and to open and illumine many of the paths that led out into the unknown. Dalton's grand hypothesis subserves the great process of discovery with apparently more and more certainty, and has, since its enunciation, constituted the only practical starting point for all we possess entitled to be called a theory of chemistry. That great section of the subject, the chemistry of the Carbon compounds, which has developed so amazingly and so rapidly, could scarcely have passed beyond its first steps but for the suggestive aid afforded by the method of grouping hypothetical atoms; nor could such doctrines as those of "compound radicles," of "types," and of "substitution," which have assisted so largely in this wonderful progress, have been conceived but for the fundamental union of the physical and chemical ideas.

"As illustrating the tendency of modern chemical thought, I quote a sentence lately uttered by a master of the science.

"He says, 'Looking back, we see a logical sequence in the history of chemical speculation, and no doubt the next step will appear, after it has been taken, to follow as naturally from the present position. One thing we can distinctly see—we are struggling towards a theory of chemistry. Such a theory we do not possess. What we are sometimes pleased to dignify with that name is a collection of generalizations of various degrees of imperfection. We cannot attain to a real theory of chemistry until we are able to connect the science by some hypothesis with the general theory of dynamics. No attempt of this kind has hitherto been made, and it is difficult to see how any such attempt can be made until we know something in reference to the absolute size, mass, and shape of molecules and of atoms, the position of the atoms in the molecule, and the nature of the forces acting upon them. Whence can we look for such knowledge? The phenomena of gaseous diffusion, of gaseous friction, and of the propagation of heat through gases have already given us an approximation to the size and mass of the molecules of gases. It is not unreasonable to suppose that a comparative study of the specific heat of gases and vapours may lead to some approximate knowledge as to the shapes of their molecules, and a comparison of such approximate results with the chemical constitution of the substances may lead to a hypothesis which will lay the foundation of a real theory of chemistry. We do not know when the change will take place, or whether it will be gradual or sudden, but no one who believes in the progress of human knowledge, and in the consistency of nature, can doubt that ultimately the theory of chemistry, and of all other physical sciences, will be absorbed into the one theory of dynamics.'

"So speaks Professor Crum Brown.

"It must be admitted that these views may, in their turn, have to yield to others of broader significance and deeper grasp of truth, but, for the present, they contain that great element of comfort to which I have alluded, the prospect of a veritable theory of all the material sciences.

"Turning our glance to those sciences apparently more closely connected with the phenomena of life, I fear we have not yet reached quite so hopeful a period, the explanation of which, no doubt, lies in the vastly greater difficulties that attend the inquiry. Naturalists, histologists, functionists, therapeutists, biologists in every department of inquiry have examined, and questioned, and experimented with equal sagacity and enthusiasm; but a living organism is so unlike a test tube, the chance of conducting two experiments under identical circumstances is so remote, and the uncertainty of the answer to the question put in the experiment is so great, that a rapidity of progress in any way commensurate with that of the more tangible sciences is clearly impossible. There also exists another hindrance to the progress of biological knowledge, to which I must just make reference, the idea that the subject of life is sacred, and must not be touched by mortal. I would speak upon such a topic with all the reverence and humility that should accompany great ignorance, but I cannot at present see other than that the laws with which the Giver of Life has been pleased to surround that gift are as properly open to man's investigation as are those which surround His gift of light or heat; and I feel persuaded that until a much higher knowledge of these laws than we now possess is attained, it is hopeless to expect a rational and scientific application of those agents which we know will affect life. Whether life be a force *sui generis*, a controller of force, or some grand concurrence of force—whether the secret will for ever elude the grasp of man's search or whether some future biologist will be able to include *his* science also as a branch of dynamics, I, of course, cannot pretend to say; but I reverently claim it as a legitimate subject of scientific investigation, and one in which every practitioner in the art of medicine is profoundly interested. At present, however, I believe I may say we have no glimpse of a true theory of life at all parallel to that given us of the other forces of nature by Professor Crum Brown.

"Nevertheless, pray believe that biological science advances, and in none of its branches appears to lack earnest and enthusiastic workers.

"Now, I have spoken of an art as the practical application of scientific principles to some useful purposes. As an illustration let me adduce the art of telegraphy, which was commenced with a fair knowledge of the principles involved, and matured by rational processes into one of the wonders of the age. But I am aware that many an art has been discovered and practised long before the principles upon which it depended were ever perceived. Shall I mention the smelting of iron and the manufacture of glass, as ready illustrations of this fact? But all such practices bear the relation to general knowledge that isolated experiment bears to science; they are not rational but empirical, and progress in such arts is laboured and slow, and is attended with many mistakes and much disappointment.

"If in these few considerations I have been so fortunate as to enlist your acquiescence, we shall probably be of one mind in our general estimate of the art of medicine, of which we have said that our own occupation, pharmacy, is a branch.

"The blessed instinct to attempt the alleviation of pain and sickness appears to have impelled mankind very early in his social history into something of a practice of medicine. It would be foreign to our purpose now to trace the story of the development of that practice into an art, but I wish to point out that, as science and the scientific method itself are but the things of the last few centuries, medicine must have been, in past times at any rate, pure empiricism.

"One feels no pain in making this statement—it needs but a very slight effort of virtue to pity one's ancestors; but if we have to say that for the most part empiricism still rules in the practice of medicine, some of us may feel a little shock.

"The assertion, however, should be interpreted as disparaging to neither physician nor pharmacist. It is the duty of each to do the best he can under the circumstances that surround him. If it be the general expereince, gathered goodness knows how, that bark cures ague, the physician will wisely continue to administer bark, even though he be unable to detect the process by which the remedy acts. If the combination of a certain base with one chemical produces an insoluble inert mass, and with another a soluble and active remedy, the pharmacist will most properly suggest the latter, even though unable to explain the cause of the difference. The sciences which should tell them of these mysteries have been to the present moment dumb, and until more light appears the practitioners must do their best with the glimmers of their respective experiences.

"Were they ever so anxious to escape the trammels of empiricism, and adopt the purely scientific method in their respective arts, would it be possible to do so? What is an intermittent? What is solubility? Can science answer these first questions? Possibly she may some day, but most certainly she cannot now.

"I do not mean to assert that the scientific method finds no place in the practice of modern medicine. It could not, for instance, be affirmed that the introduction of such remedies as chloroform and chloral hydrate was entirely empirical, or that the attempt to substitute the alkaloids for the crude drugs yielding them was other than a step towards rational therapeutics; but, all credit being frankly given for these and many other most worthy efforts to apply our fragments of knowledge to the art of medicine, the bulk of its practice rests upon sheer experience. Hence those curious compound formulæ that figure in our pharmacopœias, and the still more curious prescriptions we sometimes see in which these *compounds* are again directed to be mingled with two or three other *compounds*, until the complexity of the remedy is such as to appear calculated to puzzle not only the disorder but even Nature herself. Still these Mithridatic remedies have been found to 'do good,' and the issues (in all opportunities for experiment) are so important that one cannot wonder conservatism rules, and that these fine old formulæ survive the many perils of many editions.

"In the meantime, notwithstanding the great advance science has made all round the subject of medicine, it is still powerless to raise it out of its empiricism; and of our own art, pharmacy, I am compelled to say that its practice at the present moment is singularly like what it was in the days of my pupilage. A few new remedies, a few improved processes, and all is told; and for this the pharmacist is sometimes taunted and his art contemned. But could it possibly have been otherwise? The part is not greater than the whole; and until the great art of medicine has entered upon some new and higher development, the branch, pharmacy, must attend her in her more lowly course.

"It may appear but a poor conclusion this—to contend in the first place that an art rests upon certain sciences; to go on to show how wonderfully those sciences have developed; and, finally, to be driven to admit that the art has nevertheless remained stationary. But after all here is no real contradiction. Those discoveries which are to bridge over the space between the vital and the physical forces have yet to be made; and hence the application of physical knowledge, how great soever it may be, to the influencing of vital phenomena is in great part delayed.

"But this is only delay, and need not diminish our faith, that one day the physician may practise his art, by the light of pure science, with a confidence and certainty in no degree less than that of the physicist. On the contrary, the wonderful progress in material science that I have just dimly sketched is our justification for the hope that such will be the issue.

"And the process? Well, the process must be the same as that which to the present time has been attended with such rich reward—work, laborious and patient work, in which we pharmacists must take our share, for we, as well as practitioners in medicine, are daily groping amidst the hidden things of truth, and each one must struggle to bring something to the light.

"At this point let me hazard one reflection:

"Those that work side by side might surely, with some advantage to the result, work hand in hand; and when whole realms of work appear to be destined for the *joint* labour of the physician and the pharmacist, may it not be hoped that they will one day occupy them with a fellowship a little more cordial than, let me admit, is quite possible at the present moment.

"In therapeutical chemistry alone is scope for such united work as might help in a wonderful degree to the attainment of the hoped-for light, and in no direction amidst the many that must still be explored would it seem that physician and pharmacist might more usefully work—the one to the help of the other—than this, *provided each brought to the task the requisite qualifications.*

"At the outset of my observations I declared my intention not to direct them especially to our students; and yet what I happen to have said should appeal more to the young amongst us than to the mature. The training and the knowledge that were spoken of as necessary for the proper fulfilment of our high duties can only be acquired in youth, and hence in this, as in all discourses that involve an aspiration for progress, the speaker is compelled to appeal to the younger portion of his audience. I do so now most earnestly, and beg you, young gentlemen, for the honour of our calling, to use your present opportunities well. You have adopted a definite line of life; some of its duties are mechanical, some, as we have seen, are intellectual; equip yourselves thoroughly for both; glory in doing your trade honestly and well, glory in doing your best to advance knowledge.

"In the actual practice of the healing art the pharmacist is content to regard his place as a humble one; but in the sphere of those labours that are slowly, perhaps, but surely forging out the principles upon which that art must ultimately rest, he may claim what place he chooses; and in this labour he will find himself the ally and comrade, not of this professional man nor of that, but of the whole glorious band of beings whose bright aim and purpose has ever been to fulfil their utmost duty and to leave mankind wiser and more noble than they found him."

Mr. Hills, who was received most cordially, said—

Ladies and Gentlemen,—I rise to express my great admiration of the address of the President of this Pharmaceutical Association, and to move a vote of thanks to him upon this occasion. I esteem it a great privilege to meet you here this evening. It is a pleasure which I have promised to myself to pay a visit to my friends in Bristol, and at the same time to see what they were doing. For I read the reports of the proceedings of all the local associations in the *Journal*, and I have read so much of your work in Bristol, and have observed that you were doing it so wonderfully well, that I became very curious to attend one of your meetings and to see for myself. I have long been wishing to do so, and at last I have succeeded, and I assure you that I am delighted to have been present this evening. Your President announced me as the President of the Pharmaceutical Society of Great Britain, and I have the honour to hold that position; but I am here now more in my private capacity, as representative of a house in London which held a high position long before my time, which position it has fallen to my duty to maintain; and upon this point I will say a few words for the encouragement of my young friends now present. I came to London years ago quite a stranger, not knowing anyone connected with pharmacy, and with no other friend than my own perseverance. I walked from street to street in search of a situation, and after some ten or twelve days I succeeded in getting one, and I have remained in it all my life. I was fortunate in falling among excellent friends—Jacob and Frederic Bell—names which I know you honour as those of men who have done all in their power (especially Jacob Bell) to uphold the dignity of pharmacy. I hope my experience will encourage you young men to rely upon your own efforts. Sometimes we hear young men say, "We cannot do this or that;" but you may do anything you like if only you make up your minds to succeed. It gives me great pleasure to see so many of you here to-night, and I wish to encourage the younger members to come to these evening meetings, for I know there is much to be learnt by attending them. We have had evening meetings in London for thirty-two or thirty-three years, and I do not think I have missed being present at more than four during that time. I used to say to myself, "There are eight meetings in the year, viz., the first Wednesdays of the appointed months; for all those evenings I am *engaged*, and nothing shall interfere with my going to the Society;" and I wish my young friends to think of this, and never to miss an opportunity of coming here, where they may obtain much scientific knowledge and valuable information. The object of these meetings is to receive and also to give information, and it is for that purpose that we come to them, both to give and take, and I would again urge my young friends to miss no occasion which tends to their elevation in pharmacy. The Pharmaceutical Society has done a great work for advancing pharmaceutical science and pharmaceutical education; it has pretty nearly accomplished all that it can do as a central organization, and now we look to you to carry out this work and to extend these influences in the provinces. We are looking to you, all England is looking, to see what the Bristol men are doing; we expect you to set an example to the provinces, for it is necessary that these local associations should be multiplied throughout the country in order to prepare young men to take advantage of the Pharmaceutical Society, and to extend its operations. And if you do not carry out what is expected from you—well, I really do not know what punishment is not in store for you. But I have no fear for you—I believe you to be good men and true, desirous of doing all in your power to elevate your calling, and to do your duty towards mankind, particularly when you are encouraged by the presence of so many charming ladies as I now see before me. It is more particularly the duty of the younger members to uphold the position which pharmacy has attained. Since my first coming on the boards many good men have passed away—my time is coming—and therefore we look to you. Consequently, let me implore you to think seriously; not only to think seriously, but to act resolutely, and to do all you possibly can for the elevation of your calling. It has been a great pleasure to me to listen to your President's address, as well as to meet in their own homes friends whom I have known for so many years, and with whom I have been for a long time associated in the Pharmaceutical Society. I have also to thank you for your kind reception of my name when it was announced to you early in the evening. Although President of the Society, I am really down here as a friend, to be amongst you socially, and, if I can, to be of some use in carrying on the good work which you have hitherto done so wonderfully well. In conclusion, I beg to move a cordial vote of thanks to the President of the Bristol Pharmaceutical Association for his most excellent and elaborate address this evening. (Prolonged applause.)

Mr. Schacht briefly acknowledged the compliment, and the proceedings terminated.

Parliamentary and Law Proceedings.

Conviction under the Pharmacy Act.

At the Woburn Petty Sessions, held on Friday, October 16, Richard Chapman was summoned, charged with "having sold poison—to wit, prussic acid—without affixing the name of the article and the name and address of the seller to it."

Mr. Flux, solicitor, attended on behalf of the Pharmaceutical Society, and conducted the prosecution.

Mr. Ward, clerk to Messrs. Flux and Co., proved having, on the 12th of October, applied at the shop of the accused to have a prescription compounded; that he saw the accused, who undertook to prepare the medicine in accordance with the prescription, and he afterwards called and received back the prescription, together with a compound in a bottle which the witnessed produced; that he paid the accused one shilling as the price of the article, and was informed by him that the shop was his own; that witness afterwards removed the outer wrapper, and finding that the bottle was not labelled with the name and address of the seller, applied for a summons, and caused it to be served; that he afterwards returned to London, and handed the bottle to Dr. Redwood in the condition in which it had been received.

Dr. Redwood proved having analysed the contents of the bottle, and ascertained that it contained prussic acid. He produced the bottle, which was labelled only with the words, "the mixture as prescribed."

The accused called as his witness Mr. Vesey, of Woburn, surgeon, who proved that for thirty years the accused had been dispenser in his surgery, and deposed to his competency to compound medicines; that he had been examined at Apothecaries Hall, and obtained a certificate, which the witness produced. He had always borne an excellent character. That accused did not hold himself out as a chemist and druggist, but only as a dispenser of medicines.

Cross-examined by Mr. Flux, the witness would not pledge his oath that the accused did not display in his window a sign bearing the words "Dispensing Chemist." The accused had no certificate other than the one produced, which was to the purport that he was competent to act as assistant to an apothecary. That the accused was not a duly qualified medical practitioner nor a registered chemist and druggist. He believed the accused to be competent to act as a surgeon or apothecary, or to be admitted to the register if he chose to submit to the examination.

Mr. Flux submitted that a case was established for a conviction, and that it had not been met by the defence. He was not instructed to press hard upon the accused, but he did press for a conviction, which should operate as a warning to the accused and others, and vindicate the law.

After consultation the Bench decided that the accused must be convicted, and accordingly fined him five shillings, and ordered him to pay the costs.

Apollinaris Water.—Important Case under the Trade Marks Act.

Eugene Fisher, mineral water manufacturer, of Park Road, Camberwell, appeared at the Lambeth Police Court, on Saturday, the 17th inst., in answer to a summons taken out against him by Mr. Stavely Power Wilkinson, secretary of the Apollinaris Company (Limited), for having, on the 8th day of September, with intend to defraud, unlawfully enclosed a certain article—to wit, mineral water—in certain bottles having thereon the trade mark of the Apollinaris Company. Mr. George Lewis appeared for the complainants, and Mr. Fullagar defended.

Mr. Lewis opened the case at some length, and observed that it was one of great importance, particularly to the public. The company had obtained a concession, at great expense, to import a water from Prussia, which was largely drunk, and strongly recommended by medical men. The defendant was now charged with enclosing a water he himself had manufactured, in bottles bearing the label and trade mark of the company. It was therefore highly necessary for proceedings to be taken, in order to protect the public and warn them against imposition. He should ask at the close of the evidence that the defendant should be sent for trial.

Henry Dorresugh said he was in the employ of defendant, up to a few weeks back, in washing bottles bearing the labels of the Apollinaris Company. When cleaned the bottles were filled from a tap of a machine on the premises, corked up, and wired. When the labels came off in the washing they were dried, but he did not know what was done with them. He had washed two or three hampers of such bottles.

Mr. James Alfred Wanklyn, analytical chemist, of Fitzroy Square, said he had examined six bottles labelled "Apollinaris Water" brought to him. The water was found to contain the rate of 84 grains of chloride of sodium in one gallon, 6 grains of sulphate of lime, 12 grains of carbonate of lime, and 12 grains of sulphate of magnesia. There was a perceptible quantity of lead. The water was not clean, and there was a perceptible quantity of organic matter. He had also analysed a bottle of water from the springs as supplied by the company. It was devoid of lead, and contained hardly a trace of organic matter. It contained a quantity of phosphates. The real water contained about 270 grains of solids per gallon, and the spurious water 114 grains. They were utterly distinct, and no chemist could mistake them. The spurious water, habitually drunk, would be injurious to health, but otherwise not.

After some further evidence Mr. Lewis asked for a remand, in order to enable him to complete the case.—Mr. Fullager said he had several witnesses to call.—Mr. Lushington directed a remand, and agreed to accept the defendant's own bail to appear on the next occasion.—*Standard.*

Review.

An Introduction to Pharmaceutical and Medical Chemistry (Theoretical and Practical). Arranged on the Principle of the Course of Lectures on Chemistry as delivered at the South London School of Pharmacy. By Dr. John Muter, M.A., F.C.S. London: William Baxter, South London School of Pharmacy.

We are glad to welcome an addition to existing means for enabling the student of pharmacy to make intelligent acquaintance with one of his most important subjects. After a careful examination of Dr. Muter's manual, we have little doubt that it will be found useful, not to the student merely, but to the practising pharmacist, and it is probable that the latter will be better able to appreciate its contents than the former; for though, as a rule, the style is clear and terse, certain parts of the volume, more especially those which are devoted to what is fundamental in chemical science, are written with a condensation so condensed that we fear the student's inability to see the fulness of meaning which lies behind. From the moment the author commences to treat of the physical and chemical characters of the elements and their compounds, he proceeds with a diction which is gratefully free from encumbrance, and glides along with a smoothness which begets confidence. In this part of his subject the author is evidently at home. Would we could say as much for Chapter I., in which the modern theories of chemistry are discussed! We hope, for the sake of the embryo pharmacist, that he will not depend on any one book for an explanation of chemical theories, but least of all on this. Here, where liberal filling up would meet with ample and immediate results of most profitable kind, there is little besides the dry bones of theory. Some of the most important physical relations of atoms are dismissed with not much more than a good dictionary definition of the terms with which these relations are identified. The section on "salts and their mode of formulation, as based on a knowledge of atomicity," must be excepted from this general condemnation. Yet even here, where there is most to praise, we find much to blame. It is stated, for example, that "hydrochloric acid (HCl) is proved to be an acid because, by presenting a metal to it we can displace the H, and form a metallic chloride, such as potassium chloride (KCl)." Would the author have his student reader to conclude that water (H_2O) is proved to be an acid, because by presenting a metal to it, we can displace H, and form a metallic hydrate, such as potassium hydrate (KHO)? There is nothing here contrary to such a conclusion. In the same section we read:—"The radical SO_4 being a dyad, the formulæ of its compounds, first with a monad radical, such as potassium, secondly with a dyad radical like calcium, and thirdly with a hexad, say ferric iron, will be as follows:—

Potassium sulphate . . .	$K'_2 SO''_4$.
Calcium sulphate	$Ca'' SO''_4$.
Ferric sulphate	$Fe^{vi}_2 3SO''_4$."

In the ferric sulphate we have a balance of value similar to that produced by two threepenny pieces on the one hand, and six pennies on the other. One more example will suffice. The radical of phosphates is PO'''_4. Phosphoric acid (the radical combined with hydrogen) will therefore be $H'_3 PO'''_4$. Just as three pennies are equal in value to one threepenny piece." No exception can be taken to the admirable illustration which concludes this extract, but we do object to the statement that the formula for ferric sulphate shows a balance of value similar to that of two threepenny pieces on the one hand, and six pennies on the other; we should rather say, as a matter of fact, the balance is similar to that of two threepenny pieces with three sets of twopence, a simile subsequently employed in considering the formula of calcium phosphate, $Ca''_3 2PO'''_4$. The formula given for ferric sulphate, however, does not agree with either of these statements. It more readily suggests the unequal comparison of two sixpences with three twopences. Dr. Muter would seem to have been led into error in this instance, by a desire to reconcile the statement (repeated at p. 111) that iron in the ferric condition is hexad, with the formula of ferric sulphate. The fact is, iron is hexad in the ferrates, *e.g.*, $H_2 Fe O_4$, or not at all. Atomicity is a property of the atom, or we do not understand the meaning of the word. But Dr. Muter, finding that the two atoms of Fe in a molecule of ferric sulphate have an aggregate atom-fixing power of six, speaks of them together, and calls the double atom *hexad.* Why not say that carbon, which is tetrad in methyl hydride CH_4, is hexad in ethyl hydride C_2H_6, and octad in propyl hydride C_3H_8? The same reasoning would make carbon hexad again in benzol C_6H_6. Even if it be allowed that the above is a proper treatment of the iron atoms, the formula is not correctly written. It should be $(Fe_2)^{vi} 3 (SO_4)''$. What must be the mental obfuscation of the student, who, after being told that oxygen is a dyad, finds it occasionally represented as a triad? It is undoubtedly so represented in the formula for calcium phosphate $Ca''_3 2 PO'''_4$, which, if numerals and dashes are to be used, should be $Ca''_3 2 (PO_4)'''$.

The second chapter is an excellent digest of the practical operations employed by the chemist, such as solution, precipitation, filtration, etc. Here also will be found directions for taking specific gravities, which we commend to the careful attention of the student, as well as short notices of qualitative, quantitative, and spectrum analysis. With regard to the section on Circular Polarization with which this chapter closes, we may say that Nicol's prism is formed of *one* crystal of calx spar divided in the plane which passes through the obtuse angles, and the halves united in the same position with Canada balsam; and that for the explanation of "right and left-handed" to be of any value, it requires to be supplemented by a statement of the order of the colours assumed by the transmitted ray, according as the prism is turned to the right or left. This order is from red to violet; and if, to produce it, the prism must be turned to the right, the body under examination possesses right-handed polarization; if to the left, left-handed.

The classification employed in treating of the elements and their compounds is somewhat unusual, and we are disposed to think may be found almost as useful as those more commonly met with, for enabling the student to grasp and retain the facts. There is no distinction between the so-called Organic and Inorganic Chemistries. The simple basylous radicals first receive attention in the order of their atomicity, hydrogen heading the list. A general description of the sources, isolation, and characters of each metallic radical is supplemented, except in the case of hydrogen (*hydrium*), by a tabular arrangement of the relative and distinctive reactions of its salts. The more common compound basylous radicals, methyl, ethyl, etc., are then introduced, to give way presently to the acidulous radicals and their compounds. Under chlorine will be found all compounds generally met with in pharmacy containing this element, viz: chlorides, hypochlorites, chlorates, chloroform, chloral, etc., with information on detection, separation, and estimation. Under oxygen we make acquaintance with oxides and hydrates, then with alcohols and their derivatives as being closely connected with oxygen. Sulphur, nitrogen, phosphorus, etc., receive similar treatment. The chapter on ammonia and its derivatives affords an opportunity for describing the alkaloids, while an appendix to carbon comprises the hydrocarbons, amylaceous and saccharine bodies, glucosides and aloins, albuminous, and lastly, pigmentary substances. This classification, though useful in the aspect suggested above, will not, we think, be found to adapt itself with facility to analytical methods.

We think it a pity that the British Pharmacopœia processes should have been copied to swell a book of sufficient bulk without them. If the steps of each process were explained there would be some excuse for it, but in that case one process might be chosen as typical of a class.

Under hydrogen it is stated that *nascent* (an adjective) is a point of time, in these words—"by the term *nascent* is meant the instant of its liberation." The statement that iodide of ammonium is not used in pharmacy (p. 217) is one which most readers will be able to correct for themselves. "The oxidation of an alcohol first results in the formation of a body called an *aldehyd*" (p. 300). This is not a general truth,—only primary alcohols yield aldehyds. Why should the acid sulphate of quinine be called quinine *hydrosulphate* (p. 596) rather than the neutral official salt? The term used to be employed to indicate a compound of a totally different acid radical, and being likely to cause confusion, should not, we think, be applied to either of these salts. The name *Asagræa officinalis* was given out of compliment to Dr. Asa Gray; to spell it thus—Assagræa (p. 622)—robs the term of its significance. On p. 635 it is stated that hypophosphites were originally introduced as constituents in *Parrish's Chemical Food*. We presume *Churchill's syrup of the hypophosphites* is here intended. On p. 606 it is stated "*Injectio morphiæ hypodermica*, B.P., is thus prepared":—the ingredients follow, but the *modus operandi* is not given. We have looked carefully, but in vain, for any mention of the metrical system. The above errors we have discovered in our very careful perusal of Dr. Muter's book, and we note them now with no other intention than that they may be corrected in a future edition. The book is capitally printed on toned paper, and different kinds of type are used in such a way that the eye is instantly arrested in its passage over the page by some word, in which the meaning of a sentence or paragraph is focussed as it were. That the author found himself unable to amplify the introductory chapter is cause for regret; in its present form it detracts from the general usefulness of the work.

BOOKS RECEIVED.

Pharmacographia.—A History of the Principal Drugs of Vegetable Origin met with in Great Britain and British India. By Friedrich A. Flückiger, Ph.D., etc., and Daniel Hanbury, F.R.S., etc. London: Macmillan and Co. 1874. From the Publisher.

Notes and Queries.

AMMONIATED TINCTURE OF QUININE.—A much more elegant preparation of quinine in combination with ammonia, can be prepared by dissolving freshly precipitated quina in aromatic spirits of ammonia, containing in one fluid drachm either 1 gr. or 2 gr. of quinine.—Curtis and Co.

COD LIVER OIL EMULSION AND PHOSPHORIC ACID.—The following formula for an emulsion of cod liver oil and phosphoric acid is said by the *Druggists' Circular* to be used by Dr. Andrews, of the Utica Insane Institution. It is stated that although the fishy odour is not entirely neutralized, neither the odour nor taste of the emulsion suggests the presence of the oil to persons not familiar with cod liver oil:—

Cod Liver Oil	4 ounces.
Glyconin (see below)	9 drachms.
Aromatic Spirits of Ammonia . .	1 ,,
Sherry Wine	16 ,,
Diluted Phosphoric Acid	4 ,,
Essence of Bitter Almonds . . .	2 ,,

Add the oil to the glyconin *very slowly*, stirring briskly all the while, and then the other ingredients in the same order as they are written. The essence of bitter almonds mentioned is made by dissolving one drachm of the essential oil in eight ounces of alcohol. The *pyrophosphate of iron cannot* be used in the mixture, on account of the free phosphoric acid, which causes its immediate gelatinization. The same decomposition has been remarked in other similar instances. The ammonia-citrate of iron, which is used sometimes, has not the same disadvantage, but offers another, that of turning the mixture unpleasantly dark unless the sherry wine be replaced by Jamaica rum, or some distilled liquor free from tannin.

GLYCONIN.—Glyconin, the preparation quoted in the above formula, is made by mixing five parts of concentrated glycerine with four parts of yolks of eggs, previously well beaten. It is said to keep almost indefinitely.

LEAD IN CITRIC ACID.—Mr. Reichardt, of New York, states that having met with a residue of 14 grains of lead from two pounds of citric acid dissolved in water, he was induced to obtain five specimens of acid from various sources, and found them all contaminated with the metal in similar proportions. The same impurity was found to exist in specimens of citrate of magnesia. It probably would have its origin in the leaden vessels used in the preparation of citric acid.

MERCURIAL OINTMENT PREPARED WITH GLYCERINE.—M. Melsens states (*Répertoire de Pharmacie*, ii. 483), that the addition of a small quantity of glycerine to the ingredient used in the preparation of mercurial ointment causes the more rapid extinction of the mercury. He uses 125 grams of mercury, 108 grams of lard, 12 grams of almond oil, and 5 grams of glycerine. The oil, glycerine, and mercury are first mixed together in a glass mortar. After triturating for ten minutes, the mercury becomes divided into small globules; the lard is then added a little at a time, and the ointment is finished.

MUCILAGE OF GUM ARABIC.—Messrs. Archer and Co., of Norfolk, Va., state (*Amer. Journ. Pharm.*, Oct., p. 468.) that the inconvenience arising from the instability of mucilage of gum arabic during the summer months may be overcome by substituting "tolu water" for water. The "tolu water" is prepared as follows:—

Tinct. Tolu (saturated)	f℥ij.
Carb. Magnes.	℥iv.
Water	Oij.

Rub the tincture first with the carbonate of magnesia, then with the water gradually added, and filter. The mucilage thus prepared has a faint odour and flavour of tolu, which has not been found objectionable. It is suggested that tolu prevents change in liquids in the same manner as benzoin obviates rancidity in unctuous substances, and that this property might be utilized in the preparation of many syrups and mixtures which are particularly unstable.

SULPHATE OF QUININE PILLS.—Mr. H. P. Reynolds has published the following formula for quinine pills (*Amer. Journ. Pharm.*, Sept., p. 404):—

Take of Sulphate of Quinia . . .	600 grs.
Tartaric Acid	100 grs.
Glycerin, pure	75 minims.

Rub the quinia and acid together in a mortar to a fine powder, till no appearance of crystals remains; add the glycerin—just 75 minims, no more nor less—and continue the trituration till the powder becomes adherent, when it should be beaten into proper form for handling and divided into the required number of pills. He states that the mass is firm, solid, rolls well, and does not set for some hours, and that the pills will be found small for their weight, very white if rolled in starch powder, and, however old or dry, perfectly and entirely soluble. He repeats the caution that the quantity of glycerin is just right, though it seems at first insufficient for such a bulk of quinia; in connection with the tartaric acid it does the work, though requiring patient trituration. Even a very few drops of glycerin more than the proportion given will render the mass inconveniently sticky.

Correspondence.

*** ***No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.***

Pharmaceutical Education.

Sir,—In the *Pharmaceutical Journal* of October 17, I read a letter from Mr. Siebold, beginning with a eulogy on the opening address delivered by Mr. Giles to the students in the Society's School of Pharmacy, and ending with a proposed plan for putting down the strongholds of cram.

I also read Mr. Giles's address with great interest and pleasure, and possibly I think as highly of it as Mr. Siebold can do. I most cordially agree with him in all that he has said on it.

No one more heartily hates the abominable system of cram than I do, which he (Mr. Siebold) rightly describes as an "unscrupulous attempt to defraud the examiners, the public, and, above all, themselves."

His plan, however, appears to me, if not altogether *impossible*, at least *impracticable*. Every chemist's assistant cannot go to London to undergo a "compulsory curriculum of education." And another and more powerful reason why his plan must fail is, that many a student finds it hard work indeed to find the requisite supply of the "needful" to pay his examination fees, and would consequently find it altogether impossible to provide a sum sufficient to enable him to go through a "ten months' course of training," however much he might wish to do so.

No one will deny that many students who never saw Bloomsbury Square have passed the Society's examinations as honourably and as creditably as any who went through a lengthened and expensive "curriculum of education" there.

Perhaps Mr. Siebold can show us an outlet from these difficulties. By so doing he will greatly oblige

A Country Student.

C. Roberts.—(1) Nitrate of bismuth is directed to be pressed with the hands, because that is the usual and most convenient way of applying such pressure as is required. (2) Oil is employed because it is found to be an ingredient which assists in producing the effects sought for by the use of the compound.

"*Lapis.*"—By Sal Sodæ is no doubt intended crystalline Carbonate of Sodium. In the 'Pharmacopœia Germanica,' Sal Sodæ Crudus is described as the rough Carbonate of Sodium (washing soda), and Sal Sodæ Depuratus as the purified Carbonate of Sodium used in medicine. As you live at Runcorn, surely you cannot require a description of this manufacture?

"*A Correspondent.*"—The foreign liquorice root may be distinguished by its taste, being not so purely sweet as that of the English root, but having a slightly bitter after-taste. A transverse section of the root shows the medullary rays wider apart and the cortical portion more distinct than in the English root. The underground stem is often mixed with the root, but may be recognized by its evident pith, and by the absence of the transverse striæ so conspicuous in the root. It is also less sweet.

"*Neston.*"—(1) The use of the title of "chemist and druggist" is limited by the Pharmacy Act, 1868, to persons on the Register of Chemists and Druggists. (2) Probably the decisions were based on the fact that the plaintiffs were not registered medical practitioners. (3) Yes.

W. R.—(1) We have been unable to find any authority for the statement in the dictionary mentioned. (2) Pereira states, that the term calomel (from Gr. *kalos*, 'good,' and *melas*, 'black,') was first used by Sir T. Mayenne (who died in 1655), in consequence, according to some, of his having had a favourite black servant who prepared it; according to others, because it was a *good* remedy for *black* bile. (3) In the 'Pharmacopœia Londoniensis,' 1721, under "Mercurius Dulcis Sublimatus," it is said, "quod si quater aut pluries sublimetur, Calomelas nominatur." In the 'Pharm. Lond.,' 1788, the subchloride of mercury is indexed as "Calomelas—*olim* Mercurius dulcis sublimatus." (4) Calomel acquires a yellowish tinge upon being triturated in a mortar.

W. Pitchford.—"Cinnabar of antimony" is a synonym for mercuric sulphide, or vermilion.

T. D. V.—The liquefaction is due to the physical properties of the two substances, but we have seen no satisfactory explanation of any other change which takes place.

R. H. Rowell.—The exemption appears to extend only to quinine wine prepared and sold as a preparation of the British Pharmacopœia.

Sligo.—As far as we know, there is nothing to prevent a licentiate apothecary using the title "Dr.," or practising as a doctor in England (subject to the question of the recovery of fees under the Medical Act, 1858).

Messrs. J. Lescher, Son, & Co.—We cannot insert your letter in its present form, but should be glad to receive a contribution relative to the subject, with any facts appended, showing that at the present time the article you manufacture is the only pure one in the English market.

Communications, Letters, etc., have been received from Mr. Upton, Mr. Balkwill, Mr. Brown, Mr. Rimmington, Mr. Hughes, Mr. J. Wyld, Mr. Priestley, Mr. Harper, "A Young Pharmacist," "Cram," "Extortion," W.W.

CROTON CHLORAL.*

BY DR. R. ENGEL.

Notwithstanding that since Dr. Liebreich first brought croton chloral under the notice of the medical profession it has been the subject of numerous physiological experiments, very little is generally known of it especially in a chemical point of view. The object of the author in this paper, therefore, has been to describe the preparation, and the chemical, physiological, and therapeutic properties of this substance, which is now prepared on a large scale in Berlin.

Constitution.—Ordinary chloral is an aldehyd; it is the hydride of trichloracetyl, $C_2Cl_3O.H$. Croton chloral is the hydride of trichlorocrotonyl, $C_4H_2C_3O.H$, or the aldehyd of crotonic acid, $C_4H_5O.OH$, in the radical of which three atoms of hydrogen have been replaced by three atoms of chlorine.

Preparation.—Krämer and Pinner † were the first to obtain croton chloral by passing a current of chlorine into aldehyd during twenty-four hours. The action is very energetic at the commencement of the operation, so that it is necessary to surround the vessel containing the aldehyd with a refrigerating mixture, and it is only towards the end that the temperature is raised to 100° C. During all the time of the action of the chlorine upon the aldehyd large quantities of hydrochloric acid are disengaged. The product obtained is submitted to fractitional distillation, and a liquid is thus isolated passing over between 163° C. and 165° C., which is croton chloral.

Wurtz had previously studied the action of chlorine upon aldehyd ‡, and had indicated among other products of the reaction, chloride of acetyl, and had shown that ordinary chloral is not produced; but the formation of croton chloral escaped him. The reason was that Wurtz caused chlorine in excess to act upon aldehyd, whilst Krämer and Pinner passed a current of chlorine into the aldehyd until it was no longer absorbed.

The production of croton chloral under these conditions is easily understood, since Kekulé has shown that acetic aldehyd, under the influence of various saline solutions, and more easily still under that of hydrochloric acid, is condensed, with the elimination of water, into croton aldehyd:—

$$2\,\underbrace{C_2H_3O.H}_{\text{Aldehyd.}} = \underbrace{C_4H_5O.H}_{\text{Croton aldehyd.}} + \underbrace{H_2O}_{\text{Water.}}$$

Further, aldehyd, under the combined action of heat and a little hydrochloric acid, may even be combined with other aldehydes, with the elimination of water, and new compounds be thus engendered, which are themselves aldehyds.

In the action of chlorine upon acetic aldehyd a substitution is commenced in the latter, which results in the formation of hydrochloric acid. This acid determines, as has just been seen, the formation of croton aldehyd; upon which the substitutive action of the chlorine then goes on. The formation of croton chloral is thus readily explained.

Physical and Chemical Properties.—Anhydrous croton chloral is a colourless oleaginous liquid, having a peculiar odour, recalling that of ordinary chloral. It is insoluble in water, but, like ordinary chloral, it combines with water to form a crystallized hydrate. The hydrate of croton-chloral crystallizes in white nacreous spangles. It is slightly soluble in cold water, more freely soluble in warm water, and extremely soluble in alcohol (Krämer and Pinner). It dissolves more readily in glycerine than in water (J. Worms).

It is known that ordinary chloral is decomposed under the influence of caustic potash into chloroform and formiate of potassium:—

$$\underbrace{C_2Cl_3O.H}_{\text{Chloral.}} + KOH = \underbrace{CHO.OK}_{\text{Formiate of Potassium.}} + \underbrace{CHCl_2.Cl}_{\text{Chloroform.}}$$

Under the same influence croton chloral breaks up into allyl-chloroform and formiate of potassium:—

$$\underbrace{C_4H_2Cl_3O.H}_{\text{Croton chloral.}} + KOH = \underbrace{CHO.OK}_{\text{Formiate of potassium.}} + \underbrace{C_3H_3Cl_2.Cl}_{\text{Allyl-chloroform.}}$$

But allyl-chloroform is excessively unstable, and decomposes rapidly into hydrochloric acid and bichlorallylene:—

$$\underbrace{C_3H_3Cl_2.Cl}_{\text{Allyl chloroform.}} = HCl + \underbrace{C_3H_2Cl_2}_{\text{Bichlorallylene.}}$$

Physiological and Therapeutic Properties.—According to Liebreich,* croton chloral, administered internally, rapidly produces slumber similarly to ordinary chloral, but without its use being followed, as in the case of the latter, by lowering of the pulse and respiration. Even after the administration of very high doses of croton chloral the pulse is not reduced.

The author thinks that it is not to the first product of decomposition (allyl-chloroform) that hypnotism is due. Allyl chloroform, being very unstable, breaks up immediately, and he thinks therefore the action of croton chloral should be attributed to bichlorallylene. Moreover, Liebreich has found that bichlorallylene, when administered to animals, does not reduce the circulation or respiration. Comparing the effects of chloroform and chloral on the one hand, and bichloride of ethylene and bichlorallylene on the other, he considers himself justified in asserting that whilst the trichlorinated substances act upon the brain, spinal cord, and heart, the bichlorinated substances act only upon the brain and spinal cord. In none of his experiments has Liebreich recognized any hurtful effects on the stomach or any other organs; and he reports that he has employed it very successfully in cases of facial neuralgia, the pain ceasing frequently before sleep is produced. Jules Worms, however, asserts that croton chloral is not so generally tolerated as chloral, and Georges Gay says that its narcotic action is more uncertain.

Croton chloral is hypnotic in doses of from half to one gram. It may be administered in solution in water, or in glycerine. The following is the formula employed by Jules Worms:—

Croton Chloral	1 gram.
Glycerine	60 grams.
Water	60 „
Oil of Peppermint	3 drops.
Simple Syrup	25 grams.

In a paper contributed to the *American Practitioner* by Mr. Louis Diehl, of Louisville, he remarks that croton chloral hydrate differs from the ordinary

* *Journal de Pharmacie et de Chimie* [4], vol. xx., p. 278.
† *Annalen d. Chemie und Pharmacie*, vol. clviii., p. 37.
‡ *Ann. de Chim. et de Phys.* [3], vol. xlix. p. 48.

* See *Pharm. Journ.* [3], vol. iv., p. 510.

chloral hydrate by its sparing solubility in cold water, and in the exceedingly irritant character of its vapour. Chloral hydrate, on the contrary, is freely soluble in water, and its odour when pure is not irritating. Nevertheless, nearly all commercial chloral hydrate has a more or less irritating odour, and it is inferred by Mr. Diehl that this is owing to the presence of croton chloral, formed either from aldehyd, contained as impurity in the alcohol, or from aldehyd generated by the action of chlorine. No experiments have, however, been made by him to prove the correctness of the inference.

Reporting upon a sample of croton chloral hydrate purchased in New York, the original source of which was unknown, he says, "It is a white, powdery substance, of a pearly lustre, apparently crystalline, and when triturated in a mortar has the appearance and feels to the touch like pulverized valerianate of zinc. Its odour reminds of ordinary chloral hydrate and iodoform; does not seem to be more pungent than that of ordinary commercial chloral hydrate, and not as much so as that of some samples I have noticed. Its taste is bitter and aromatic, recalling the odour of iodoform. It is more soluble in cold water than I should have expected from the characteristic, sparingly soluble, given it by its discoverers. Thirty minims of distilled water dissolve one grain readily. If another grain be added to this solution heat is required to dissolve it, and upon cooling and standing a short time a copious crop of well-defined crystals is obtained. Subsequent experiments proved it to be soluble in between twenty-two and a half and twenty-five parts of water, at a temperature of 60° F. In alcohol it was found to be freely soluble."

From these experiments it follows that croton chloral hydrate (commercial) may be dispensed in aqueous solution of a strength corresponding to two grains in the fl. drachm, and Mr. Diehl gives the following formula:—

℞.	Croton-chloral Hydrate	g. viij.
	Warm Water	fl. ℥ i.
	Simple Elixir	fl. ℥ vij.
Ft. solut.		

Owing to the alcohol contained in the simple elixir,* a larger quantity than two grains to the fl. drachm could, if desirable, be incorporated and held in solution by the above mixture.

* See *Pharm. Journ.* [3], vol. iv., p. 682.

CHEMICAL STUDIES OF THE PEPPERS OF COMMERCE.†

BY A. WYNTER BLYTH, M.R.C.S., L.S.A., A.K.C.,

Analyst to the County of Devon.

It will be indispensable for some time to come to accumulate facts on the properties of articles of food in the *pure* state. The exact amount of ash, the solubility of substances in different liquids, the specific gravity of the aqueous infusion, etc., many of them, when applied to foods, wholly uninteresting to the ordinary chemist, become of great value in the technical examination of articles suspected of adulteration. However unimportant some slight variation in solubility, for example, may be in a purely chemical sense, yet if that variation be, within certain limits, constant, it is of the greatest utility to the public analyst.

The peppers I have examined were obtained from the importers in the berry, and ground by myself; they are, I believe, specimens of pure pepper. The following are the methods adopted in the examination:—

The ash was burnt at a very low temperature in a platinum dish, supporting a chimney to increase the draught; the soluble ash was obtained by boiling the ash with water, filtering, evaporating the soluble ash down in a platinum dish, heating to dull redness, and weighing; the aqueous extract by putting 4 grammes of pepper in a large flask with 500 c.c. of water, distilling over 200 c.c., returning these into the flask, when cool, filtering, weighing and evaporating $\frac{1}{10}$th; the ammonia, by taking 5 c.c. of the last liquid and distilling it with 50 c.c. of alkaline permanganate by Wanklyn's method; and the alcoholic extract, by treating about 1 grm. of the dry pepper with repeated quantities of alcohol, and boiling for some time in a flask connected with a reversed Liebig's condenser. I have not yet estimated the piperine in the peppers; indeed, although it can be extracted with comparative ease, the crystallization of the alkaloid and the separation of the resin takes up so much time that the process, however satisfactory, cannot be very attractive to analysts, who have to examine a great number of samples in a short time.

Ash.

	Soluble Ash.	Total Ash.	
		Pepper in the Dry State.	Pepper in its Ordinary Condition.
	Per cent.	Per cent.	Per cent.
Penang	2·2120	4·189	3·8480
Tellicherry . . .	3·3800	5·770	5·3460
Sumatra	2·6260	4·316	3·3340
Malabar	3·4530	5·195	4·6740
Trang	2·5380	4·775	4·2110
A white pepper, ground by myself, bought at a retail shop	0·5584	1·120	0·7889
Long pepper . . .	4·4720	8·308	7·1543

The first five peppers give, as the mean of the soluble ash, 2·84 per cent. of the dried substance, the two extremes being respectively 3·453 and 2·212. The mean of the total ash of the five peppers is 4·845 per cent., the two extremes being 4·189 and 5·770.

Hygroscopic Moisture.

	Per cent.
Penang	9·531
Tellicherry	12·908
Sumatra	10·103
Malabar	10·548
Trang	11·664
Long pepper	10·778

It is worthy of note that, as the peppers were finely powdered and kept on the water-bath for many hours, besides water, the volatile oil would to a considerable degree be dissipated.

The total loss of weight may be stated generally at 11 per cent.

Alcoholic Extract.

	Grms. per cent. of Dry Pepper.
Penang	7·650
Tellicherry	7·836
Sumatra	6·450
Malabar	6·375
Trang.	6·300
The white pepper before mentioned.	7·650
Long pepper	2·600

The extract was thoroughly dried before weighing; it may be said to be never less than 6 per cent. in black and white peppers. The small extract yielded by long pepper is noteworthy.

† From the *Chemical News*, October 9, 1874.

Aqueous Extract.

	The Dry Substance yields to Water. Per cent.
Penang	18·335
Tellicherry	16·500
Sumatra	17·500
Malabar	20·375
Trang	18·175
Long pepper	16·825

The total ammonia yielded in the manner before mentioned, expressed in percentage:—

100 grms. of—

			NH_3.		Nitrogen.
Penang pepper	yield	to water	0·450	=	0·370
Tellicherry	"	"	0·450	=	0·370
Sumatra	"	"	0·375	=	0·310
Malabar	"	"	0·295	=	0·243
Trang	"	"	0·325	=	0·300
Long	"	"	0·175	=	0·144

As 100 parts of piperine contain 4·9 of nitrogen, if the nitrogen be considered as dissolved piperine, the mean of the piperine boiling-water takes up, and when cold retains, of the first five peppers = 0·017. The small yield from long pepper is a great distinguishing mark.

Barnstaple, September 23, 1874.

THE MANUFACTURE OF BORACIC ACID IN TUSCANY.*

BY P. LE NEVE FOSTER, JUN., C.E.

The production of boracic acid in Tuscany from the hot boiling springs and jets of vapour called *soffioni* is certainly one of the most important branches of chemical industry in Italy. The curious phenomenon of jets of vapour issuing naturally from the ground is met with over an area of comparatively limited extent, situated between Massa Marittima and Volterra. The hill-sides in many of the valleys of the tributaries of the River Cecina are studded with such *soffioni*, and numerous *lagoni*, or ponds of muddy blue water boiling vehemently, have been formed by the natural springs, acted on by these vents of vapour.

Towards the close of the last century (between 1770 and 1780) boracic acid was discovered in the springs of Monte Rotondo and Castelnuovo, by Hœffer, the chemist to the Grand Duke of Tuscany, and by Professor Mascagin, but no steps of any importance for utilising these springs for making boracic acid appear to have been taken until 1818, when Mr. François Lardarel, a Frenchman, established works on a small scale for the collection and extraction of this substance from the waters of the *lagoni* in the neighbourhood of Castelnuovo. At first his efforts were unattended with success, and, in a commercial point of view, may be said to have proved a failure, owing to the great expense of obtaining fuel for evaporating the water. At length the brilliant idea struck M. Lardarel of employing the heat of the natural steam jets to evaporate the weak solution from the *lagoni*, and this was the turning point in his fortunes. This method, which was first applied in 1827, had the effect of converting an unprofitable branch of industry into one of the most successful in Italy. At the present time there are no less than seven separate establishments belonging to Count Lardarel, all situated within a few miles of the little town of Castelnuovo, which may be said to be the centre of the boracic acid industry in Italy. These establishments are as follows:—

1. Lardarello, or Lagoni, of Monte Cerboli.
2. Castelnuovo, Val di Cecina.
3. Serrazeano, or the "Lagoni Solforei."
4. Lustignano, or the "Lagoni Rossi."
5. Sasso, or the "Lagoni di Acquavita."
6. Monte Rotondo, or the "Lagoni della Pianacce."
7. "Il Lago," where the works of San Federigo, San Eduardo, and La Collacchia are situated.

The works at Lardarello are the most important of all, and it is there that all the products of the other establishments are sent. The processes by which the acid is extracted being precisely the same at each, it will only be necessary to describe in detail those carried out at Lardarello. This little colony, which was founded by the late Count, is situated at a short distance from the village of Monte Cerboli, on the torrent Possera, and shows what might be done in other parts of Italy for improving the social condition of the working classes. There is a neat square, "La Piazza dell' Industria," surrounded by blocks of buildings, which on one side include the offices, church, museum of mineralogy, and schools, and on the other, the model lodging-houses for the workmen, stores, workshops for various tradesmen, such as tailors, shoemakers, etc., and a weaving establishment for giving employment to the wives and daughters of the workmen.

The *lagoni* are situated to the south of this little village, and consist of artificial basins constructed of coarse masonry, large enough to contain several *soffioni*. At the present time most of these *soffioni* are obtained artificially by boring, and are lined with sheet iron tubes from 25 to 30 centimetres (10 to 12 inches) in diameter. These borings are found more manageable, besides giving out more vapour than those formed naturally. The basins, or *lagoni*, are situated at different levels on the hill-side, and the uppermost is supplied with water conducted by a canal from near the Bagno del Norbo. After remaining in this basin for twenty-four hours, during which time it has been kept in constant agitation by the subterranean vapours, and has become of a slate blue colour, the water passes into a canal, and is conducted to another basin at a lower level, where it remains another twenty-four hours, and in consequence takes up an additional quantity of boracic acid.

The water, after passing through a chain of *lagoni*, where it is brought up to a strength of about 0·50 per cent. of boracic acid, is then conducted to a large tank, about 20 metres (66 feet) square and ½ a metre (1 foot 6 inches) deep, covered by a tiled roof supported on brick columns. Here it is allowed to settle, the impurities held in suspension are precipitated to the bottom, and the water leaves the tank in a perfectly clean state.

The next operation is to concentrate this weak solution of acid. This is effected by evaporating it in long lead pans, ingeniously heated with steam from the dry *soffioni*. These pans are about 60 metres (200 feet) in length by 2·50 to 3 metres (8 feet 4 inches to 10 feet) in breadth, arranged usually in three parallel lines under one roof, supported on columns, the sides being open so as not to impede the evaporation. The pans are supported on beams over low steam passages, into which the vapour is conducted by pipes from the *soffioni*. Formerly a masonry arch was built over one of the natural springs, and the steam collected in this manner; but these buildings were liable to be undermined, and attacked by the corroding influence of the vapours, and it is now found far more convenient to connect the pipes to the tube of an artificial boring, to say nothing of making a neater job and the arrangement being more under control. The pans have a number of divisions placed transversely across them, usually from 80 cent. to 1 metre (2 feet 7 inches to 3 feet 4 inches) apart. These divisions are 0·05 metres (2 inches) in height, and the pans are arranged so as to have a slight inclination from the end where the water is admitted towards the other, where there is a large and deep reservoir. The water is allowed to enter in a regulated quantity from the precipitating tank, and following from one division to another, it gradually evaporates, and after having passed over 50 to 60 divisions, it assumes a bright yellow hue, increasing in intensity as it approaches the end, where it runs into the tank or boiler. Every 24 hours this boiler is emptied, and its contents pumped up to

* From the *Journal of the Society of Arts*, October 9, 1874.

the crystallizing house, in which a series of vats about a metre (3 feet 4 inches) in diameter are placed. These vats being filled, the liquor is allowed to remain four days, during which time the boracic acid is deposited in crystals at the bottom and sides to a depth of a few inches, and the liquid that then remains is drawn off by removing a plug at the bottom, and conducted away by a drain to the evaporating house. Fresh liquid is then introduced into the water, and the same process is repeated until they are completely filled with crystals of boracic acid. As these crystals retain a large amount of water, they are, when removed from the vats, placed in large wicker baskets to drain, and are afterwards taken to the drying-house, where the contents are spread in thin layers on the floor, and stirred constantly with a wooden rake. It is then packed in barrels containing about 600 kilos. each (12 cwt.), and sent to Leghorn, where it is shipped chiefly for England.

The boracic acid manufactured in this manner contains about 13 per cent. of impurities, chiefly sulphate of lime, ammonia, alumina, and magnesia.

At the Lardarello Works there are 12 evaporating sheds, containing 35 evaporators. The average daily production is about 3,000 kilos. (3 tons), though some days as much as 4,200 kilos. (4 tons) have been made. The Castelnuovo establishment averages 26,700 kilos. (27 tons) per month, and the production of the other works is still less. The total annual production of the whole of the establishments belonging to Count Lardarel is estimated at 3,000 tons.

Notwithstanding the extreme simplicity of the whole process, it is a matter of surprise to many who have visited these works, and it is much to be regretted in the interests of science, that Count Lardarel (whose motto is evidently "rest and be thankful," instead of "progress") has not thought fit to employ a chemist at his establishment, and up to the present no progress has been made in this manufacture since the first application of steam by the late Count in 1827, although it is highly probable that, under the management of a scientific man, considerable improvements might be introduced.

M. Durval has an establishment for the manufacture of boracic acid at the Lake of Monte Rotondo, called also "Il Lago Solforei di Vecchiena," which has an area of about 18 acres. The water contains about 0·002 of acid. The produce of these works is sent chiefly to France.

At Travale, an Italian company, called the Società Anomonia Borica Travalese, have an establishment for extracting the boracic acid which is found there, though in a far more diluted state than at the *lagoni* of Count Lardarel, and although the process by which it is extracted does not differ in principle from that previously described, certain very important modifications and improvements have been introduced. These springs, which are called "I Lagoni delle Galleraje," are situated at a short distance from the village of Travale, in the valley of the Sajo, a little stream flowing into the Feccia and Merse tributaries of the Ombrone. Here the boracic acid is associated with sulphate of ammonia, which is extracted from the waters of a series of *lagoni* by evaporating apparatus, heated by the natural vapours of the *soffioni*, but as the sulphate of ammonia is worth only 35 francs per quintal, whilst the boracic acid is worth 50 francs, and the cost of production is almost equal, there is very little profit attendant upon its manufacture. The water of these *lagoni* contain about 500 milligrammes (about 7 grains) per litre (1¾ pint) of sulphate of ammonia. All the *soffioni* at this place have been obtained by boring, and this company are possessed of excellent tools for this purpose, by means of which they are enabled to bore to a diameter of 40 centimetres (16 inches). These borings usually meet water at a depth of from 15 to 20 metres (50 to 70 feet), though in one place a depth of 168 metres (560 feet) was reached before tapping these subterraneous sources of heat, viz: in a boring called "Il foro Pietro."

Another boring ("Il foro Carlo"), 73 metres (240 feet) deep, furnishes a supply of water holding boracic acid in solution, which rises to the level of the ground, as in an artesian well, its supply being equal to 600,000 litres (132,144 gallons) per 24 hours, of which only one-sixth part is at present utilized. This solution contains only 260 milligrammes (about four grains) per litre (1¾ pint) of boracic acid, which is given off at a temperature of 96° Cent. (205° Fah.). Here there is no basin, as at Lardarello, the water being led away direct by cast-iron pipes from the bore-hole to the precipitating tank, which is 18·50 metres (60 feet) in length, by 13·50 metres (45 feet in width), and 0·50 metre (1 foot 8 inches) in depth. The improvement that has been introduced here consists in heating the water in this tank by pipes, through which the vapour from a dry *soffioni* ("Il foro Filippo") passes, and by this means a certain amount of water is evaporated in the precipitating tank, and thus brings up the degree of concentration of the solution to 400 milligrammes (6 grains) per litre (1¾ pint). The boring that furnishes the steam is 63 metres (210 feet) in depth, and the temperature of the water in the tank is maintained at 94° Cent. (202° Fah.). This solution, which has a specific gravity of 11° of Baumé's areometer, is conducted in the usual manner to the evaporators, which are constructed in a similar manner to those at Lardarello, the water being kept at a temperature of 76° Cent. (169° Fah.), by the steam from "Il foro Filippo," and having traversed the entire length of the pans is received into the boiler at the lower end with a specific gravity of from 12° to 50° Baumé, and is crystallized, dried, and packed in the usual manner. The evaporating shed contains three rows of evaporators, 64 metres (207 feet) in length by 3 metres (10 feet) in width. The production is about 26 kilos. 200 grammes per day (57·64 lbs.).

PRESCRIPTIONS.

The following paragraphs are taken from a paper contributed to the *American Journal of Pharmacy* for October, by Mr. M. S. Bidwell, in which several points of interest to physicians and pharmacists are discussed:—

"The first question is on the ownership of the prescription or recipe. To which one of the three parties concerned—physician, patient, and pharmacist—does it belong? It may aid us in answering this question fairly, if we first consider what a prescription is, illustrating it by an example. Suppose a physician to visit consecutively three patients. To the first he may say: 'You need some beef tea: get a piece of the round to make it of. I will give you a note to the butcher, explaining what kind you want.' To the second he might say: 'Send your boy to my office with this memorandum, and the student there will give you the necessary medicine'—the memorandum directing, perhaps, to give him four pills out of the box on the lower shelf, or any other instructions that the student will understand. To the third he gives a recipe, in the usual form, directing the pharmacist into whose hands it may come to put up a certain mixture for the patient's cough. Now, is it not evident that the note to the butcher, the memorandum to the student, and the recipe to the pharmacist are precisely analogous? We may therefore define a prescription to be a confidential letter from a physician to a pharmacist, instructing him to dispense certain medicines according to directions given. So far, then, as these two parties are concerned, it would follow the same rule as any other letter—the recipient being entitled to its custody, but having no right to publish it, or use it in any similar way, without the consent of the writer.

"But there is a third party in this case—the patient; and by universal custom, sanctioned by law wherever the statutes touch the subject, he is entitled to a copy of the document. The original should remain in the hands of the pharmacist, for reasons which need not here be given.

"The second point concerns what is called the renewal of prescriptions, or, more properly, dispensing the same medicines repeatedly on the same recipe. This very common practice has been extensively denounced by physicians, on various grounds, but with a curious and complete disregard of the party most directly interested—the customer. Their usual line of argument on this subject, if carried out to its legitimate conclusion, would forbid the sale or use of any medicines unless by the express direction of a doctor. They say, with perfect truth, that much harm is done by ignorant prescribing, and by unqualified persons dosing themselves and others with medicines whose powers they do not understand. Therefore, the government, or the druggist, or somebody, should henceforth decree that this be done no more. They do not apply or state it so broadly as this; but the principle is evidently the same, whether the medicine were originally prescribed by a physician or not; so that it is here stated in its broadest form, in which shape it is a clear *reductio ad absurdum*. The evident answer, if any answer is needed, would be, that in America every one is presumed to be able to judge for himself, and must be allowed to take his own risk if he will. Any interference on the part of the druggist would naturally be resented as an impertinence, and be met by the just remark that it was none of his business.

"In the more special case immediately under our notice, the reduplication of the prescription cannot be prevented, even if both physician and druggist should try to do so. The patient is entitled to a copy, and can, of course, have the same medicine put up from that, or from a copy of that. Even physicians will hardly claim that no druggist should ever put up any medicine that any physician had ever prescribed!

"There is another complaint often made by physicians, which is, in some respects, the reverse of this, viz., that prescriptions are often 'stolen' from them by druggists and others, and used to their disadvantage, by curing their patients without their help. In the former case, the ostensible ground of complaint was that the recipe might injure the patient; in this, the danger is that it may benefit him, without bringing any pay to the physician. Poor doctor! So long as he does not get his fee, he is equally dissatisfied, whether the patient grows better or worse! Well, it is hard if a man has got hold of an efficient formula for a certain class of cases, to have Tom, Dick, and Harry steal his thunder, and cure just as many and just as well as he can himself, and perhaps make a great flourish about it too. But our pity for him will be lessened if we remember that he himself owes almost all of his prescriptions to others; and it will be reduced to a minimum by the reflection that it is only by the free contribution of many workers that medical science (or any other) can ever be built up. The only way a man can keep others from knowing what he does is to keep it a secret, which, if generally carried out, would throw us back into the dark ages. At the same time it must not be forgotten that, if any one wishes to monopolize any item of knowledge, he has a perfect right to do so, and no one can justly complain of such a course, though no one can admire it.

"Briefly to recapitulate:—

"1. A prescription is a confidential letter from a physician to a pharmacist, the latter having the right of custody, but not the right to make it public. The patient, being an interested party, has a right to a copy.

"2. The druggist's business is to furnish whatever medicines the customer wants, whether prescribed by a doctor or not, the patient taking his own risk.

"3. The physician, like any other scientific man, should be liberal in communicating what he originates, because most of his own knowledge is derived from others; and in this way only can science be advanced. But this obligation is ethical, not legal; something to be desired and recommended, not enforced."

The author concludes with a disclaimer of countenancing the practice of "prescribing across the counter," or prescribing by any unqualified person, which he considers to be a nuisance in the drug business that every intelligent and fair-minded pharmacist will endeavour to abate.

A CHEAP AND CONVENIENT GALVANIC BATTERY, ADAPTED FOR WEAK BUT CONTINUOUS CURRENTS.*

BY W. SYMONS, F.C.S.

For the experiments referred to in a previous paper † a battery was thus constructed. Zinc plates are cut out of ordinary rolled zinc two inches square, with a narrow projection at top of three-fourths of an inch. Doubled round each side of these plates, and fastened with thread, are half-inch strips of fustian, or other stout cloth. Copper wire No. 20 or 24 is wound tight round each plate at intervals of one-eighth of an inch, leaving one and a quarter inch of wire free at the top. The fustian keeps the wire from touching the zinc. A series of ten of these plates, with blocks of wood about an inch thick between each pair, are tied tight together, and the projecting copper wire of each soldered to the next zinc, the terminal zinc and copper having each a wire projecting eight or ten inches. A thin strip of dry deal, of a suitable length, and about an inch and a quarter wide, has nailed round it narrow strips of deal a quarter of an inch square, so as to make a shallow tray. Into this tray is melted a mixture of shellac and resin. While this is still soft the ten pairs of plates, tied together with the blocks of wood, are turned upon it, so that the soldered joints are buried in the resin. In a minute or two the resin is hard, the blocks of wood can be removed, and the ten pairs of plates will be firmly fixed in the wooden tray, the terminal wires being passed through it.

The cells are made of extra stout tinfoil, or thin sheet lead, about three inches long, two and a half inches deep, and five-eighths of an inch wide, double folding the joint at the side, and also at the bottom, after neatly folding in the sides. The top sides of the cells are doubled back over thin strips of wood, about three and a half inches long. These metal cells can be more easily made on a wooden mould than paper ones, and when dipped into a mixture of melted wax and paraffin are impervious to liquids.

These cells are supported and effectually isolated by the projecting slips of wood resting on varnished strips of wood, placed across a box. Forty pairs of such cells may thus be placed in a deal box, 13 inches by 11 inches, and can be easily arranged by binding screws into a series of 10, 20, or 40 pairs, according to the requirements for quantity or intensity.

The liquid used has been one ounce of common salt in 25oz. of water, and by occasionally replenishing the cells with a liquid of half this strength a nearly uniform current may be kept up for weeks or months. But as there is a gradual accumulation of an insoluble salt, I have more recently tried a dilute solution of zinc chloride.

From 20 to 40 pairs of this battery have been sufficient for the experiment described; but as they can be so easily constructed, and when placed in a series of boxes occupy so little space, any experimentalist may soon furnish himself with a series of some hundreds, to serve as a water battery. Of course, when the zinc plates are worn out, the trays and wires can be used again with fresh plates.

Barnstaple, July 27, 1874.

COMMON WILD FLOWERS CONSIDERED IN RELATION TO INSECTS.‡

At the close of the last century, Conrad Sprengel published a most valuable work on Flowers, in which he pointed out that their forms and colours, their scent,

* Paper read before the British Association at Belfast, September, 1874.

† See before, p. 325.

‡ Abstract of an Address by Sir John Lubbock, Bart., F.R.S., at the Belfast meeting of the British Association.

honey, and general structure, have reference to the visits of insects, which are of importance to Flowers in transferring the pollen from the stamens to the pistil. Sprengel's admirable work, however, did not attract the attention it deserved, and remained comparatively unknown until Mr. Darwin devoted himself to the subject. Our illustrious countryman was the first to perceive that insects are of importance to Flowers, not only in transferring the pollen from the stamens to the pistil, but in transferring it from the stamens of one flower to the pistil of another. Sprengel had, indeed, observed in more than one instance that this was the case; but he did not appreciate the importance of the fact. Mr. Darwin's remarkable memoir on Primulæ was published in 1862. In that treatise the importance of cross-fertilization was conclusively proved, and he has since illustrated the same rule by a number of researches on Orchids, Linum, Lythrum, and a variety of other plants. The new impulse thus given to the study of Flowers has been followed up in this country by Hooker, Ogle, Bennett, and other naturalists, and on the Continent by Axell, Delpino, Hildebrand, and especially by Dr. H. Müller, who has published an excellent work on the subject, bringing together the observations of others, and adding to them an immense number of his own.

Every one, indeed, knows how important flowers are to insects; but it is only recently that we have realized, on the other hand, how important, indeed, how necessary, insects are to flowers.

That the colour of the corolla has reference to the visits of insects is well shown by the case of flowers which—as, for instance, the ray or outside florets of *Centaurea cyanus*—contain neither stamens nor pistils, and serve, therefore, mainly, and it would seem entirely, to render the flower-head more conspicuous. Again, night flowers are white, that they may be seen, while their near allies are coloured; thus *Lychnis vespertina*, as its name denotes, is an evening flower, and is white; while *Lychnis diurna*, which flowers by day, is red. The calyx, moreover, is usually green; but when the position of the flower is such that it is much exposed, it becomes brightly coloured, as, for instance, in the berberry or larkspur.

If it be objected that this is *assuming* the existence of these gradual modifications, it may be replied that it is not here purposed to discuss the doctrine of natural selection. The reader, however, may be reminded that Mr. Darwin's theory is based on the following considerations:—(1) That no two animals or plants in nature are identical in all respects; (2) That the offspring tend to inherit the peculiarities of their parents; (3) That of those which come into existence only a certain number reach maturity; (4) That those which are, on the whole, best adapted to the circumstances in which they are placed, are most likely to leave descendants.

No one of these statements is, or can be, disputed, and they seem fully to justify the conclusions which Mr. Darwin has deduced from them, though not all those which have been attributed to him by his opponents.

Now, applying these considerations to flowers, if it is an advantage to them that they should be visited by insects (and that this is so will presently be shown), then it is obvious that those flowers which, either by their larger size, or brighter colour, or sweeter scent, or greater richness in honey, are most attractive to insects, will, *cæteris paribus*, have an advantage in the struggle for existence, and be most likely to perpetuate their race.

In most flowers, indeed, the pistil is surrounded by a row of stamens, and it would at first sight seem a very simple matter that the pollen of the latter should fall on the former. This, in fact, does happen in many cases, but in others, from the structure of the flower, it is impossible. In these cases the transference of the pollen from one flower to another is effected principally either by the wind or by insects. Wind-fertilized flowers, however, as those of birches, poplars, and grasses, are never brightly coloured, and are, indeed, not popularly recognized as flowers.

Every one, however, who has watched flowers, and seen how assiduously they are visited by insects for the sake of honey, will admit that they must often transfer pollen from the stamens to the pistil; in many cases from the stamens to the pistil of the same flower; but in others from the stamens of one flower to the pistil of another. This we will call cross-fertilization.

The importance of this cross-fertilization has been fully proved by experiment. Every breeder of sheep or cattle knows the necessity of avoiding "in and in" breeding, and it is no less necessary to avoid it in the case of plants.

We will now pass to the consideration of the means by which self-fertilization is checked, and cross-impregnation is effected, in plants. In some cases the pollen is simply wind-borne, in others it is carried by insects. These are attracted partly by the pollen itself, partly by the honey; while the bright colour and the scent serve to indicate the spot where the pollen and honey are to be found. The calyx, which is not generally brightly coloured, probably serves as a protection to the honey, and tends to prevent bees and other insects from obtaining access to it by force.

It is an almost invariable rule that wind-impregnated flowers are inconspicuous, but the reverse does not hold good; and there are many flowers, which, though habitually visited by insects, are not brightly coloured. In some cases flowers make up by their numbers for the want of individual conspicuousness. In others the insects are attracted by scent; indeed, as has already been mentioned, the scent, as well as the colour of flowers, has no doubt been greatly developed through natural selection as an attraction to insects. In confirmation of this it is stated that when insects are excluded, the blossoms last longer than is otherwise the case; that when flowers are once fertilized, the corolla soon drops off, its functions being performed. But though bright colours and strong odours are sufficient to attract the attention of insects, something more is required. Flowers, however sweet-smelling or beautiful, would not be visited by insects unless they had some more substantial advantages to offer. These advantages are the pollen and the honey; though it has been suggested by Sprengel that some flowers beguile insects by holding out the expectation of honey which does not really exist, just as some animals repel their enemies by resembling other species which are either dangerous or disagreeable.

In our ordinary flowers the transference of the pollen from one flower to another is effected by insects, and the colour, the scent, and the honey are the attractions by which the visits of insects are secured. That the beauty of flowers is useful in attracting insects is shown, moreover, by those genera in which we find species which vary very much in size and beauty. Thus we have two common species of Mallow (*Malva sylvestris* and *Malva rotundifolia*), which agree closely with one another in other respects, but of which the former is much larger than the latter, and Sir John showed that the former is dependent for its fertilization on the visits of insects, while the latter is capable of fertilizing itself. To show that this is no isolated case, he brought forward several other examples of the same fact, especially one very striking one in the genus *Geranium*. *Geranium pratense* is one of our larger species, and is nearly twice as large as *Geranium pyrenaicum*, which again is nearly twice as large as *G. molle*, while *G. molle* itself is considerably larger than *G. pusilum*. Now, in *G. pratense* the pistil does not come to maturity till all the stamens have ripened and shed their pollen, and the flower, therefore, is absolutely dependent on insects for its fertilization. In the second, *G. pyrenaicum*, some of the stamens have shed their pollen before the pistil is mature, but the visits of insects are, therefore, not absolutely necessary. In *G. molle* the pistil matures still earlier; while lastly, in *G. pusilum*, it matures even before the stamens. Here, therefore, we have a complete series, and the more the flower is dependent on insects the longer it has become. As already mentioned, the self-fertilization of flowers is guarded against in various ways, Very frequently the stamens and pistils do not ripen at the same time.

In other cases the pistil ripens before the stamens. Thus the Aristolochia has a flower which consists of a long tube with a narrow opening closed by stiff hairs, which point backwards, so that it much resembles an ordinary eel-trap. Small flies enter the tube in search of honey, which from the direction of the hairs they can do easily, though, on the other hand, from the same cause, it is impossible for them to return. Thus they are imprisoned in the flower; gradually, however, the pistil passes maturity, the stamens ripen and shed their pollen, by which the flies get thoroughly dusted. Then the hairs of the tube shrivel up and release the prisoners, which carry the pollen to another flower.

Again, in the common Arum we find a somewhat similar mode of fertilization. The well-known green leaf encloses a central pillar, which supports a number of pistils near the base, and of anthers somewhat higher. Now, in this case nothing would at first sight seem easier or more natural than that the pollen from the anthers should fall on and fertilize the pistils. This, however, is not what occurs. The pistils mature before the anthers, and by the time the pollen is shed have become incapable of fertilization. It is impossible, therefore, that the plant should fertilize itself. Nor can the pollen be carried by wind. When it is shed it drops to the bottom of the tube, where it is so effectually sheltered that nothing short of a hurricane could dislodge it; and although the Arum is common enough, still the chances against any of the pollen so dislodged being blown into the tube of another plant would be immense.

As, however, in Aristolochia, so also in Arum, small insects which, attracted by the showy central spadix, the prospect of shelter or of honey, enter the tube while the stigmas are mature, find themselves imprisoned, as the fringe of hairs, while permitting their entrance, prevents them from returning. After a while, however, the period of maturity of the stigmas is over, and each secretes a drop of honey, thus repaying the insects for their captivity. The anthers then ripen and shed their pollen, which falls on and adheres to the insects. Then the hairs gradually shrivel up and set the insects free, carrying the pollen with them, so that those which then visit another plant can hardly fail to deposit some of it on the stigmas. Sometimes more than a hundred small flies will be found in a single Arum. In these two cases there is obviously a great advantage in the fact that the stigmas arrive at maturity before the anthers. Generally, the advantage is the other way, and the stamens ripen before the pistil.

Of this the common so-called Nasturtium (*Tropæolum*) is an interesting case. It produces much honey, which is situated in a long hollow spur. The flowers are much visited by insects, which thrust their proboscides down the spur in search of honey. When the flower first opens neither the stamens nor pistils are mature, and they are all turned slightly downwards. Very soon, however, one of the stamens turns upwards, so as to stand just at the entrance to the spur, and in such a position that the under side of the proboscis of any insect wanting the honey almost inevitably rubs against it and carries off some of the pollen. One after another the eight stamens raise themselves and occupy this position, a process which occupies several days, after which they turn down again to the original position, and the pistil in its turn raises itself to the mouth of the tube. From this beautiful arrangement it is evident that the bees and other insects visiting this flower for the sake of the honey inevitably dust themselves with pollen from the younger flowers, and transfer it to the pistil of the older ones.

Attention must now be called in more detail to some of our common wild flowers, in order to show how beautifully they are adapted to profit by the visits of insects, and how the various parts are arranged so as to favour not only the transfer of pollen from one flower to another, but also its deposition on that part of the pistil which is especially prepared for its reception. Wherever the pistil projects beyond the stamens, it is obvious that a bee alighting on the flower would come in contact first with the former and subsequently with the latter. In flying from flower to flower, therefore, she would generally fertilize each with the pollen of one which had been previously visited.

In few flowers is the adaptation of the various parts to the visits of insects more clearly and beautifully shown than in the common white dead nettle (*Lamium album*). The honey occupies the lower contracted portion of the tube, and is protected from the rain by the arched upper lip and by a thick rim of hairs. Above the narrower lower portion the tube expands and throws out a broad lip, which serves as an alighting place for large bees, while the length of the narrow tube prevents the smaller species from obtaining access to the honey, which would be injurious to the flower, as it would remove the source of attraction for the bees, without effecting the object in view. At the base of the tube, moreover, there is a ring of hairs, which prevent small insects from creeping down the tube and so getting at the honey. *Lamium*, in fact, like so many of our other wildflowers, is especially adapted for humble-bees. They alight on the lower lip, which projects at the side so as to afford them a leverage by means of which they may press the proboscis down the tube to the honey; while, on the other hand, the arched upper lip, in its size, form, and position, is admirably adapted not only as a protection against rain, but also to prevent the anthers and pistil from yielding too easily to the pressure of the insect, and thus to ensure that it presses the pollen which it has brought from other flowers against the pistil, and, on the other hand, carries away a fresh supply from the anthers.

If we compare Lamium with other flowers we shall see how great a saving is effected by this beautiful adaptation. The stamens are reduced to four, the stigma almost to a point. How great a contrast with the pines and their clouds of pollen, or even with such a flower as the Nymphæa, where the visits of insects are secured, but the transference of the pollen to the stigma is, so to say, accidental! Yet the fertilization of Lamium is not less effectually secured than in either of these.

From the position of the pistil, which hangs down below the anthers, the bee comes in contact with the former before touching the latter, and, consequently, generally deposits upon the stigma pollen from another flower. The small processes on each side of the lower lip are the rudiments of the lateral leaves with which the ancestors of the Lamium were provided. Thus, then, we can see how every part of this flower is either—like the size and shape of the arched upper lip, the relative position of the pistils and anthers, the length and narrowness of the tube, the size and position of the lower lip, the ring of hairs, and the honey—adapted to ensure the transference by bees of pollen from one another, or, like the minute lateral points, is an inheritance from more highly developed organs of ancestors. Sir John Lubbock then called attention to certain species of the genus Salvia, a form allied to the dead nettle, but in which the back of the bee does not come in contact with its arched upper lips, and consequently does not touch the anthers in their natural position. They possess, however, a very curious tinge point, so arranged that the proboscis of the bee, in passing down the tube, presses one arm of a lever, and thus brings the other, which bears the anther, down on to the back of the bee.

The common heaths (*Erica tetralix* and *Erica cinerea*) present another very ingenious arrangement. In *Erica tetralix* (the cross-leaved heath), for instance, the flower is in the form of a bell, which hangs with its mouth downwards, and is almost closed by the pistil, which represents the clapper. The stamens are eight in number, and each terminates in two cells, which divergslightly, and have at their lower end an oval opening; but, though this opening is at the lower end of the anther cells, the pollen cannot fall out, because each cell, just where the opening is situated, touches the next anther cell, and the series of anthers thus form a circle surrounding the pistil, and not far from the centre of the bell. Each anther cell also sends out a long process, which thus form a series of spokes standing out from the circle of anthers. Under these circumstances, a bee endeavouring to suck the honey from the nectary cannot fail, firstly, to bring its head in contact with the viscid stigma, and thus to deposit upon it any pollen derived from a previous visit; and secondly, in thrusting its proboscis up the bell, it inevitably comes in contact with one of the anther processes, which acts like a lever, and dislocates the whole chain of anther cells, when a shower of pollen falls from the open cells on the head of the bee. In many cases the effect of the colouring and scent is greatly enhanced by the association of several flowers in one bunch or raceme, as, for instance, in the wild hyacinth, the lilac, and other familiar instances in the great family of Umbelliferæ.

This arrangement is still further taken advantage of, as in the common wild chervil (*Chærophyllum sylvestre*). In this group the honey is not, as in the flowers just described, situated at the bottom of a tube, but is exposed, and is therefore accessible to a great variety of small insects. The union of the florets into a head is, moreover, not only of advantage in rendering them more conspicuous, but also effects a considerable saving of time, as it enables the insects to visit a given number of flowers more rapidly, and, consequently, renders their fertilization more certain than if they had stood singly. The self-fertilization which, in small flowers such as these, would otherwise naturally occur, is provided against by the fact that the stamens ripen before the pistil, and the latter is not mature until the former have shed their pollen; so that the flowers cannot, therefore, fertilize themselves in some cases, as, for instance, in *Myrrhis*. The flowers of one head are all, firstly, in the male condition, and subsequently in that with mature stigmas, none of them arriving at the second stage until they have all passed through the first. It will be seen that in these florets the petals are not symmetrical, the outer ones being considerably larger than the others, and in many umbellifers the florets themselves, on the outer edge of the bunch, or umbel, are considerably larger than the minor ones. This distinction is carried still further in the composite, where also the florets are so closely packed that the whole umbel is commonly—though, of course, incorrectly—spoken of as a flower. For instance, the heads of the common daisy are not, strictly speaking, flowers, but bunches of flowers closely packed together on a common base or receptacle. The advantages of this arrangement are, first, that the flowers become much more conspicuous than would be the case if they were arranged singly; secondly, that the facility with which the honey is obtained renders them more attractive to insects; thirdly, that the visits of the insects are more likely to be effectual, since the chances are that an insect which once alights touches several, if not many, florets. In the large white daisy the flower-heads consist of an outer row of female florets, in which the tubular carolla terminates on the outer side in a white leaf or ray, which, doubtless, is useful in making the flower conspicuous. The minor florets are also tubular, but are small, yellow, and without rays; each of these florets is furnished with stamens as well as a pistil. The stamens are united on their minor sides, so as to form a closed tube, within which the pistil lies; they ripen before the pistil, and the pollen is discharged into the upper end of the tube above the head of the pistil. When the flower opens the pollen is already ripe, and fills the upper part of the stamen tube. The pistil, however, also continues to elongate, and at length pushes the pollen against the upper end of the tube, which gives way, and thus the pollen is forced out of the tube. The pistil itself terminates in two branches, which at first are pressed closely to one another, each terminating in a brush of hairs; the style elongates, the brush of hair sweeps the pollen cleanly out of the tube, and it is then soon removed by insects. When the pistil has attained its full length the two branches open and curve downwards, so as to expose the stigmatic surfaces, which had previously been pressed closely to one another, and thus protected from the action of the pollen. From this arrangement it is obvious that any insect alighting on the flower-head of the chrysanthemum would dust its under side with the pollen of the younger flowers, which then could not fail to be brought into contact with the stigmatic surfaces of the older ones. As the expansion of the flowers begins at the outside, and thence extends to the centre, it is plain that the pollen of any given flower cannot be used to fertilize one situated on its inner side; consequently, if the outer row of florets produced pollen, it would, in the great majority of cases, be wasted. These florets, therefore, do not produce pollen, while the saving thus effected enables them to produce a larger corolla. It is also interesting to observe that, in these outer flowers, the branches of the pistil do not possess the terminal brush of hair, which, in the absence of pollen, would be useless. In other composites, as in the marigold, while the ray flowers produce no pollen, the disk flowers develop no stigmas. In this case the pistil of the ray flower does not require or possess the terminal brush of hairs, as there is no pollen to be swept out. The central flowers, on the other hand, though they develop no stigmas, require a pistil in order to force the pollen out of the anther tube; hence the pistil is present. This alteration of the function of the pistil is extremely curious. In the flowers hitherto described, while the several species offer the most diverse arrangements, we have met with no differences within the limits of the same species, excepting those dependent upon sex.

Perhaps no group of flowers offers more remarkable adaptations than the orchids, which have been so admirably described by Mr. Darwin. As an illustration of our English species, the common early purple orchis (*Orchis mascula*), may be taken as being one of the commonest, if not the commonest, species, and a fair example of some of the remainder, which, however, differ in many interesting and important points. In the case of *Catasetum*, one of the *Vandeæ*, which, as Mr. Darwin says, "are the most remarkable of all orchids," the pollinia and the stigmatic surfaces are in different flowers; hence it is certain that the former must be carried to the latter by the agency of insects. The pollinia, moreover, are furnished with a viscid disc, as in orchis; but from the large size of the flower and the position of the honey, the insect has no inducement to approach, and, in fact, does not touch the viscid disc. The flower, however, is endowed with a peculiar sensitiveness, and actually throws the pollinium at the insect. Mr. Darwin irritated one of these flowers in Sir John Lubbock's presence; the pollinium was thrown nearly three feet, when it struck and adhered to the pane of a window. This irritability, however, is confined to certain parts of the flower.

In one other tropical flower, the very curious *Marcgraavia nepenthoides*. The flowers are disdosed in a circle, and beneath them are suspended some pitcher-like vessels, which secrete a sweetish liquid, and thus attract numerous insects. These again bring birds, which can hardly fail to brush against the flowers, and thus convey the pollen from one to the other.

Some species possess flowers of two or more kinds, which sometimes, as in the violet, are adapted to different conditions, but more frequently are so constituted as to insure cross-fertilization. In some of the violets (*V. odorata*, *canina*, etc.), besides the blue flowers with which we are all so familiar, but which produce very little seed, there are other autumnal flowers almost without petals and stamens, and which indeed have none of the appearance of true flowers, but in which the seeds are produced.

(To be continued.)

The Pharmaceutical Journal.

SATURDAY, OCTOBER 31, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal to MESSRS. CHURCHILL, *New Burlington Street, London, W Envelopes indorsed " Pharm. Journ."*

CRAMMING AND LEARNING.

ONE addition to the elements of the "education" turmoil consequent upon the enlargement of the area of examinations during recent years has been the application of an ugly name to an uglier practice, in so loose a manner that its definition by different persons varies through almost an infinity of gradations. "Cram," which has no classic pedigree in the dictionary of JOHNSON or WEBSTER, appears to be equally destitute of a settled character, and whilst in some quarters hands are held up in pious horror at the bare mention of it, a few of our correspondents not only claim acquaintance with it, but assert that it is a reputable and valuable friend. Of course, when a barbarous, slangy nomenclature is adopted, no one can say with authority what is the exact meaning to be attached to it. But in the application of this word to pseudo-study, there is probably more than a chance resemblance to the name of a practice that comes into vogue in the poultry-yard about this time of the year; for, to some minds at least, the word indicates in both instances a gorging to repletion, but in neither case a healthy normal assimilation.

The vigorous denunciation by Mr. GILES of a something called "cram" has, we hope, been endorsed by the majority of all pharmacists who have heard or read it. That there is, however, a minority who disagree with it, is evidenced by several letters we have received; but these letters show that the disagreement arises sometimes from a failure to perceive truly the position taken by Mr. GILES and others in this matter, and sometimes from a failure on the part of the writers to perceive their own position in regard to it.

Let us deal with the misunderstandings in the order in which they are stated. Some of our correspondents assert that this is a mere battle of schools. One is of opinion that in Mr. GILES's remarks he had a particular school in view, and that their effect has been to "drag a well-known name through the mire." Another asserts that the object of this and similar condemnations is to obtain a larger number of students in the Society's school. What Mr. GILES may mean beyond what he said we are not in a position to affirm; what he has said is on record, and can be appealed to. So also can the history of the Pharmaceutical Society in respect to education. And we venture to say that in any case where a shadow of obloquy has fallen upon school or pupil it has been perceptible to the outside world only in proportion as the one has advertised its willingness to provide methodical assistance in baffling the examiners, or the other has sought out and adopted such methods. In fact, Mr. SCHACHT's warning to the British Pharmaceutical Conference in Brighton, that cramming was quite as possible at Bloomsbury Square as elsewhere, was only an anticipation of Mr. GILES's words when he said, "Every school is, of course, subject to be abused by candidates who—caring only for the specious pretensions of a certificate—enter for these short periods, and it is only when the school wilfully lends itself to the abuse that it can fairly be held responsible." As to the imputation of interested motives, it is not worth notice, except to remark that if pharmaceutical education were the reality desired by Mr. GILES, not only would all existing real schools of pharmacy be filled, but others would have to be created.

The stigmatizing of the votary of "cram" as an accomplice in a fraud is resented by those who look upon examination as an evil imposed upon them by an arbitrary government, and, blind to its real object, seek to overcome it in the most ready way, as well as by others who assert that all study is "cram." Any argument we could offer to the former would probably be thrown away; we can only hope that they will in time acquire clearer views. With the latter we have more sympathy. Their right to consider cram and study as synonymous terms, if so it pleases them, we cannot deny; but we do deny that what is considered by them to be study is more than "cram." One correspondent, urging this point, curiously, but quite unwittingly, illustrates the difference we would draw between them. He says that, having passed the Preliminary examination in a country town, he immediately purchased a work on botany and commenced a systematic study of it, getting up early in the morning and searching the lanes and woods for specimens, in order better to understand the subject. Here we have all the materials for a truly scientific education; the corroboration of statements made in books by personal observation and experience. But chemistry did not fare so well at this gentleman's hands. A manual was purchased, about forty or fifty pages, more or less, read, some of it twice over—not a word, however, about experiments —and then he "got into a complete fog," from which he does not appear yet to have emerged. Nor will he do so until he studies chemistry after the same fashion as he did botany.

Committing to memory a variety of information differs widely from the practical application of it. A knowledge of scientific principles is valuable to the pharmacist, as a pharmacist, only in so far as it enables him to understand and systematize the experience which he obtains in the every-day life of the pharmacy.

But it is the scientific knowledge and practical experience combined that are demanded for the safety of the public and the welfare of the calling. Knowing, therefore, how much more easily the former is simulated than the latter, the Board of Examiners seek by the new regulations to render more practical—not to increase the stringency of—the examinations. No higher standard is set up than before, only its attainment is questioned by a more searching test. Mr. GILES and many others rightly conceive that a compulsory curriculum of two or three years would help to abolish the scandal of contracts to fit men, within a few weeks, to foil the examiners. Whether this assistance may be required, or whether the new regulations will prove to be sufficient to the task, we heartily wish a speedy success to these efforts to stamp out a system, by whatever name it may be called, which has really engendered fraud by assisting men knowingly to pass for what they were not!

GODFREY'S LABORATORY, MAIDEN LANE. 1680.

THIS old building, to which is attached some traditionary interest, has at length been converted into a sacred edifice in communion with the Church of Rome, and bears the name of Corpus Christi. The ground plan of the laboratory is left unchanged, no re-arrangement having been required. A church porch replaces the ancient doorway, while the side entrance to the right is gained by the removal of the furnaces erected for the Hon. ROBERT BOYLE, in order to work out his phosphorus experiments.

They have long fallen into disuse; only one, having been of late years employed in making various charcoals. The carmine boiler stood where the font has been erected: further on, a wooden beam stretched lengthways down the aisle, and served as the spring for a huge iron pestle. Next came the still and condensing vats, and an unwieldy looking but most serviceable screw-press. The fireplaces for the stills and furnaces were admirably contrived, and the secret of their construction was never successfully imitated in their re-setting. They were under the superintendence of an old man, who, though not great in chemical theories, had an unrivalled talent in the art of lighting fires, using the least possible material and avoiding smoke. When a local act compelled the introduction of a smoke-consuming contrivance his mind was much aggrieved at the (to him) useless innovation. One day a fire broke out on the premises, which did no extensive damage; but it quietly licked up some rows of ancient glass vessels, used at that date in pharmacy, which might have been included amongst the treasures of the Antiquarian Society.

The high altar and the choir occupy the space once known as the *Carmine Room*, where two of the processes of its manufacture were carried on, and where the pigment was finally kept in stock. The light still falls in the most favourable direction: the aids conducive to the production of a fine colour being a free current of dry air, indirect sunshine, and tolerably hot weather. Carefully to be avoided was a close, muggy morning, when the whole *make* would be lost.

Amongst the historical curiosities of the Laboratory was an application made to supply the *Anointing Oil* at the coronation of his Majesty GEORGE the FOURTH.

The following is the extract from the *Times*, June 8, 1821:—

"The next petition was from the Chymists, Southampton Street, Strand, praying that they might be allowed to prepare and supply the oil to be used in anointing his MAJESTY at the coronation, as their house had performed that office at the coronation of GEORGE 3rd. The petition was returned to the applicant on the ground that the Court had no jurisdiction in the case, and he was told to apply to the office of the LORD CHAMBERLAIN."

Modern appliances have of necessity disturbed the reign of cumbrous apparatus; but few of the congregation who listened to the Archbishop of WESTMINSTER at the Consecration Service were aware of the strange transmutation that had taken place.

The Phenix is left undisturbed in its old position in Southampton Street, where it has ample leisure to muse over the mutability of human things.

THE CULTIVATION OF MEDICINAL PLANTS ON RAILWAY BANKS.

A LETTER has been forwarded to the *Garden* by Mr. JAMES M'NAB, of the Royal Gardens, Edinburgh, upon a topic which has often been discussed by railway travellers, namely, the turning of railway banks and slopes to a more profitable account. Among other suggestions he points out that many plants suitable for the production of essential oils might be successfully cultivated upon them, such as the peppermint, spearmint, lavender, thyme, and balm, and in many places the hundred-leaved and damask roses. Other plants, some more immediately connected with the healing art, which he thinks could be profitably grown in such localities, are the chamomile (*Anthemis nobilis*), horehound (*Marrubium vulgare*), rue (*Ruta graveolens*), tansy (*Tanacetum vulgare*), the wormwoods (*Artemisia Abrotanum* and *A. Absinthium*), elecampane (*Inula Helenium*), wild convolvulus (*Convolvulus sepium* and *C. arvensis*), henbane (*Hyoscyamus niger*), belladonna or deadly nightshade (*Atropa belladonna*), monkshood (*Aconitum napellus*), bittersweet (*Solanum dulcamara*), foxglove (*Digitalis purpurea*), the great mullein (*Verbascum thapsus*), and the chicory (*Cichorium Intybus*). The wake-robin (*Arum maculatum*) would also succeed well, and its tubers might be found to yield a superior starch to that produced by the plants grown in woods, which is its native habitation.

OLIBANUM.

THE *Boswellia* trees, yielding gum olibanum, are so common in the Central Provinces of India that it is estimated 10,000 tons annually could be procured from Chanda and the Nerbudda valley alone.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the twenty-sixth session was held at the Royal Institution, on Thursday evening, the 22nd inst., the President, Mr. Alfred H. Mason, F.C.S., in the chair.

The minutes of the preceding meeting were read and confirmed.

Mr. Richard Evans was elected a member, and Mr. E. Jones was elected an associate of the Association.

The following donations were announced:—Specimen of Stearopten, of Chinese Oil of Peppermint, to the museum from Mr. Farries, London; *The New York Druggists' Circular*, January to October, from Mr. Mercer, Montreal; current numbers of the *Pharmaceutical Journal;* and Dr. Muter's 'Introduction to Pharmaceutical and Medical Chemistry,' from the President.

The question box was opened, and several questions were discussed, relating to Chilian Iodine, Jaborandi, Croton Chloral, etc. Several members took exception to an article in the *Chemist and Druggist* respecting the affairs of the Association, stating that the statements contained therein were inaccurate.

The President then delivered his

Inaugural Address.

"It has been the usual custom to commence the work of our session with an inaugural address from the presidential chair. It has pleased your Council to honour me with the privilege this evening; but when I look back to those addresses which have on similar occasions emanated from my predecessors, I cannot help feeling misgivings of a most serious nature as to my ability to follow in their footsteps, without discredit to myself and disappointment to you; therefore, in anticipation, I must ask your indulgence for any shortcomings, and proceed to inaugurate the twenty-sixth session of the Association.

"Having for our object the advancement of chemical and pharmaceutical science, we are essentially an educational body, composed of various elements—I trust seeking the same end; instituted by its founders as an offspring chiefly to second the efforts of the Pharmaceutical Society of Great Britain in raising the condition of British pharmacy and improving the status of the British pharmacist. I do not, therefore, purpose troubling you with any *résumé* upon the merits or otherwise of the Adulteration Act (further than that in my opinion it has been productive of great gain to the analytical chemist, and of considerable benefit to the general public), or upon the desirability of early closing, uniform prices, the snare of patent medicine stamps, etc., and similar questions which have been raised in this room, as I am convinced that, whenever we have allowed trade questions to be brought forward, they have always been productive of evil, and led to differences which I trust, gentlemen, have long ere this passed into oblivion. We are not a trade body, nor can we legally permit such discussions. I say this because I believe it is the opinion of some of our members that we should admit such.

"Admitting that we are an educational body, let us for a few moments consider the advantages of a pharmaceutical education. Pharmacy is not a trade. Pharmacy is an art and a science; and this fact becomes more and more evident as the rapid advancement of science determines the equally rapid progress of pharmacy, in common with the industrial arts. The basis of every exact science is observation; the experience gained thereby leads, on the one hand, to reasoning power, and to the establishment of fundamental principles, and, on the other hand, to the generalization of scientific truths. It is a guide to synthesis, as well as to the opposite method of investigation, analysis.

"The selection of all medicinal substances of unexceptional purity; the recognition of all adulterations and impurities; the manufacture of chemical and pharmaceutical preparations by the formulas of the Pharmacopœia; the collection, drying, and preservation of all crude drugs, their proper comminution and exhaustion by maceration or displacement, the compounding of physicians' prescriptions with correctness and nicety, belong to the art of pharmacy. While the knowledge of the reasons why a prescription should be prepared in a particular way, of the causes which affect the success of percolation, of the influence of heat, moisture, atmosphere, age, etc., upon drugs, of the development in plants and their parts, of the active principle or principles; of the causes of success or failure in carrying out any process or manipulation connected with pharmacy, properly belong to science in its bearing upon pharmacy.

"Further, in the study of pharmacy we find ourselves aided by natural philosophy, chemistry, botany, zoology, geology, and mineralogy. Time this evening will only permit me to enlarge upon chemistry, as most important in its influence upon the development of medicine, and the selection of curative agents; the science which deals with the relations of the various kinds of matter to each other, the labours of whose students are influencing the investigations of every other branch of natural science, are felt in numerous trades and manufactures, and are of the utmost importance in their bearings upon every-day life. It is not many years ago when the brines left after the separation of common salt from saline spring or sea water were without value; now immense quantities of bromine are recovered from it, and that element has not only become an indispensable article in many of the arts, but medicine has also appropriated it for the cure of disease. Its compounds, too, which in our time were but chemical curiosities, are now to be found in every dispensary, and are prescribed by every physician. The oily and tarry products of our gas factories were supposed for a long time to be valueless, until chemistry converted some of them into brilliant colours of every shade and hue, which are now employed in dying fabrics and various commodities. The mother liquor from soap was thought to be a waste product, until uses were found for its most important constituents, and glycerine is now such an indispensable agent in pharmacy, medicine, the arts, and the household, that we may well wonder how civilized mankind could get along without an article which, in its natural combination, is daily employed everywhere.

"Owing to the investigations of chemistry, many articles of materia medica have been displaced, and others, doubtless, sooner or later, will pass into deserved obscurity.

"Acidulous fruit, the sorrels, and other acidulous drugs are gradually being retired from active service, since the pure acids, upon which their virtues depend, are being prepared in large quantities, and in condition fit for long preservation. Since the vegetable alkaloids have been discovered, and the processes for their manufacture perfected, their employment in medicine has gradually increased, and, as a matter of consequence, the corresponding increase in the use of the crude material has been prevented. But chemistry is not content even with such results. By processes of substitution it furnishes new remedies of valuable medicinal properties, which will probably take the place of older remedies. Chloral, croton chloral, and monobromated camphor are instances, among others, of such innovation. Already chemistry has prepared a new way for replacing time-honoured medicines, by offering apo-derivatives of alkaloids, at least one of which, apomorphia, promises not only to hold its place against various mineral emetics, but threatens even to supersede such a valuable emetic as ipecacuanha, and to render fears groundless should the plant be gradually exterminated.

"Too true it is that, whilst your Council are desirous to do all in their power to attain the objects of our Association by assisting students in chemistry and pharmacy, of late their provision has fallen off, not from any want of material, but owing to a lack of sympathy from those for-whom such classes are formed. But is this Society singular in this respect? No! Kindred associations, and even the parent Society herself, groan beneath the weight of 'cram,' against which there has been of late so just an outcry, but which will probably exist so long as examination is made the only test of knowledge. There are hopes, however, of better days.

"It was my privilege to hear the able address delivered to the students at Bloomsbury Square at the commencement of the present session. I may take exception to some of its precepts, but I commend its careful perusal to every student in pharmacy.

"We have plenty of evidence from great authorities, such as Lord Derby, Disraeli, Gladstone, and others, that compulsory examination, taken alone, is quite insufficient to produce a demand for real education, and we must admit that examination, *per se*, never was, and probably never can be, a thorough test of competency. But the evil is not found among pharmacists only; analytical and consulting chemists are also in the same category, and it is painful to hear of analytical chemists offering to perform analyses for fees which cannot cover the outlay of pure reagents, and asking clients the significant question, whether they are buying or selling the sample which they bring for analysis.

"Permit me to call your attention to the experience of Professor Huxley on examination. He says, 'Examination—thorough, searching examination—is an indispensable accompaniment of teaching; but I am almost inclined to commit myself to the very heterodox proposition that it is a necessary evil. I am a very old examiner, having for some twenty years past been occupied with examinations on a considerable scale, of all sorts and conditions of men and women, too—from the boys and girls of elementary schools to the candidates for honours and fellowships in the universities. I will not say that in this case, as in so many others, the adage that familiarity breeds contempt holds good; but my admiration for the existing system of examination and its products does not wax warmer as I see more of it. Examination, like fire, is a good servant but a bad master; and there seems to me to be some danger of its becoming our master. I by no means stand alone in this opinion. Experienced friends of mine do not hesitate to say that students whose career they watch appear to them to become deteriorated by the constant effort to pass this or that examination, just as we hear of men's brains becoming affected by the daily necessity of catching a train. They work to pass, not to know; and outraged science takes her revenge. They do pass, and they don't know. I have passed sundry examinations in my time, not without credit, and I confess I am ashamed to think how very little real knowledge underlay the torrent of stuff which I was able to pour out on paper. In fact, that which examination, as ordinarily conducted, tests, is simply a man's power of work under stimulus, and his capacity for rapidly and clearly producing that which, for the time, he has got into his mind.' He further says:

"'No doubt, a great deal is to be done by the careful selection of examiners and by the copious introduction of practical work to remove the evils inseparable from examination; but under the best of circumstances I believe that examination will remain but an imperfect test of knowledge, and a still more imperfect test of capacity, while it tells nothing about a man's power as an investigator.'

"In olden days an indenture of apprenticeship (which in our case probably necessitated a good premium as well), duly endorsed by the master with a satisfactory reference as to character, etc., during the period of probation, was a *sine quâ non* qualification to secure a position as a qualified journeyman; and what did that amount to but a compulsory education. Is it too much for those who organize pharmaceutical examinations that they should require a curriculum of compulsory education, as has been suggested, evidence of a three years' pupilage, or apprenticeship, and, further, evidence of having attended lectures in a recognized school of pharmacy?

"Admitting, therefore, our own responsibility in this matter, as an Association, let us see what means we employ to meet the case. Besides our School of Pharmacy, which has done good work, and which I trust will be well supported during the present session, we have, during the period of our existence, accumulated a collection of standard works upon chemistry, botany, pharmacy, materia medica, etc., which makes our library almost complete. Further, we duly receive various journals published at home and abroad; we have raised a museum, which is well stocked with specimens, and these are for the free use of our members and associates. We also offer opportunities for younger men to come here and take part in discussions, and afterwards to come round here, face the audience, and give us the benefit of their investigations by reading papers, etc. Further, we have the advantage of receiving valuable papers, etc., from those of greater experience. Bacon says: 'He that questioneth much shall learn much.'

"With every possible desire to avoid egotism, I address you this evening as living evidence of the advantages of our Association. Some ten or eleven years ago I was admitted as a member of our body, and under favourable circumstances, for, as an assistant, I was not expected to sacrifice the enjoyment of the evening out 'once a week,' but my principal generously placed the opportunity to attend these meetings at my disposal. I well remember that I used to attend to the duties most religiously, take notes, and on my return home write out a *résumé* of the paper I had heard read. Here I read my maiden scientific paper, if I may so term it, and now, unworthy, I confess, I am honoured with your presidency, comparatively young. To all my younger brethren permit me to say, 'Do thou likewise.'

"During the recess the meetings of the British Association and of the British Pharmaceutical Conference have been held. The value of such associations cannot be overestimated, for in this way men of similar purpose are brought into personal contact, and an intimacy springs up which leads to an interchange of the results of experiments, besides an interest in watching the workings of those with whose faces we are familiar. Can we have greater proof of the necessary part which purely abstract chemistry bears on pharmaceutical manipulation than the thoroughly worked out communication on the chemistry of cinchona bark, by Dr. Vrij, and, passing other important papers, we cannot over-estimate the value of the four papers on hydrocyanic acid. However unstable that medicine may be, its therapeutic value is too securely planted in the mind of the medical profession to be ever lightly abandoned. Here, therefore, comes one of the special duties of the pharmacist, to exhibit this remedy in a form in which its unstable composition is least liable to change. The wonderful influence of glycerine in the preservation of hydrocyanic acid is remarkable. I would only urge, in testing these experiments, the absolute necessity of using Price's glycerine, foreign glycerine not being of sufficient chemical purity to ensure satisfactory results. Certainly these practical researches have considerably advanced our knowledge of the subject.

"The administration of phosphorus is another subject probably suitable for the further investigation of the pharmacist. Here again glycerine combined with alcohol is advantageous, and such a solution, suggested by Mr. Williams, is now being largely prescribed by London medical men.

"In these days of high pressure the lack of novelties is evident. Occasionally our expectations are raised by the appearance of a condurango bark, and we are led to wonder how it is that the marvellous properties of such a medicine disappear in transit to England? From the Brazils, *viâ* Paris, a few months ago, we received 'Guarana,' now a recognized medicine of value, and we are looking for some confirmation from the same source of the supposed virtues of 'Jaborandi,' described as an energetic diaphoretic and sialagogue. Eucalyptus globulus has proved useful in therapeutics, and as a fever destroyer, and the perseverance of Mr. Baildon in reviving Cortex Rhamni Frangulæ deserves our appreciation.

"Chemical investigation will ever result in new discoveries, and the most interesting of late is probably the conversion of coniferin into the active principle of vanilla, by Messrs. Tiemann and Haarmann, of Berlin. In their communication the authors commence by describing the preparation of coniferin ($C_{16}H_{22}O_8$), the raw material used being the juice from recently felled and barked pine trees in spring time. This is split up by digestion at a gentle heat, with a small quantity of emulsion. The vanillin thus obtained ($C_8H_8O_3$) is at first inodorous, but in the course of time acquires a faint odour of vanilla. The chemical world are indebted to these gentlemen for their announcement. In former days there seemed to be a kind of fatality about great discoveries. Men stumbled across valuable ideas, and learned, too soon, important truths, which lay dormant, only to be appreciated by the world after their departure.

"The history of arts and sciences offers many examples. Faraday, in 1825, found benzol in the tarry residues of gas-works, but that illustrious chemist obtained, whilst living, neither fame nor profit for his discovery, which remained buried in the archives of the Royal Institution until the attention of the scientific and industrial world was drawn to the chemical properties of the substance, almost forty years later on.

"Before concluding, permit me to say a word or two about the session just inaugurated. Your Council have arranged for a course of lectures on Inorganic Chemistry, Preparation of Chemical Products used in Pharmacy, and Qualitative and Volumetric Analysis, to be delivered by Mr. Edward Davies, F.C.S., Lecturer on Experimental Physics, Queen's College, etc., assisted by Mr. M'Gowan, late Young's Burser, Andersonian University, Glasgow. The course will extend over six months, should a sufficient number of students apply for admission, ten being the minimum. It has been thought more to the interest of students and the convenience of employers to hold the classes from nine to ten a.m. In the name of our Council, let me entreat of you young men to avail yourselves of the opportunities we offer you. These lectures are such as will, with diligence on your part, materially assist you in your further studies. You are probably aware that the examinations of the Pharmaceutical Society have been altered, not made more stringent, but more practical. The Council propose to grant certificates of attendance to those who merit them, and, further, Mr. Davies has kindly offered a prize for the best student during the session. Professor Attfield has also consented to send down some examination papers, and report the results, and upon those results I propose to place prizes at the disposal of those who rank first and second. These prizes are offered, not as an inducement to attend the classes, but as an appreciation of your desire to promote the interests of the Liverpool School of Pharmacy, by your diligence and ability. To all those masters who have apprentices in this town I would say, 'Beware of your responsibility, and encourage your students to join these classes.'

"Your Council proposes to vary the business of the Association by making the alternate meeting of a conversational character, by which means members may be brought more into personal contact. Any objects of interest may be exhibited and explained, difficulties which arise in manipulation may perhaps be solved, difficult and extraordinary prescriptions might be discussed, and I would suggest entire freedom in the matter. Once a month we propose to have papers on scientific subjects, and I have already promises which I trust will make our session a very successful one. I rely upon your unanimous and individual support. Let each one of us feel that upon himself—his own work—the success of the Association depends.

"Homer says :—

'By mutual confidence, mutual aid,
Great deeds are done, and great advances made.'

May this be our experience!

"Gentlemen,—My best energies are at your service. I sincerely thank you for the honour that has been conferred upon me. I thank you for your kind attention this evening, and I trust the twenty-sixth session of our Association may, if possible, be more successful than any of the preceding."

Mr. Abraham moved that the thanks of the meeting be given to the President for his excellent address, with all of which he thought he could cordially agree, except that he did not concur with the President and others in thinking that candidates should not be admitted to the examinations of the Pharmaceutical Society unless they had passed through a prescribed curriculum. He appreciated very highly systematic instruction by lectures, demonstrations, and practical courses of instruction, but he thought that such restrictions would not only tend to discourage private study, but would work an injustice in the case of those who had not the means of pursuing a regular course of study. The argument, he understood, was that examinations would not sufficiently test the qualifications of candidates. He could not believe this. It might be difficult or impossible to test them during the minutes now devoted to the purpose; but why not, if needful, extend the time? The India Civil Service examinations sometimes occupied more than a week, and ours might be equally extended rather than adopt the alternative proposed, and refuse examination to a self-educated man. Let the examination be adapted to the occasion, and he believed they would answer their purpose.

Dr. Cook seconded the motion, but said he had listened to the address with a great deal of pain and sorrow. It was much *too pharmaceutical*, and he did not agree that the Association was of the nature described. He had, a few days previously, devoted some time in going over the books, etc., of the Association, and he found that whenever the pharmaceutical element had been brought so much to the front—and the Society was under pharmaceutical *régime*—it had not prospered. His opinion was that it was a strictly scientific chemical society, and if properly guided in this spirit it would prosper. The President had alluded to Professor Faraday and his discovery of benzol; if such men had confined themselves to pharmaceutical chemistry these discoveries would have never been made.

Mr. Edward, F.C.S., Vice-President, supported the motion. He did not agree with Dr. Cook, that the objects, etc., of the Association had been erroneously brought before them, and, speaking as a scientific chemist, he considered that they could not overrate the value of the study of pharmaceutical chemistry. He had much pleasure in agreeing with the views of the President.

Mr. Martin Murphy, F.C.S., supported the motion, and said it was generally understood that a Chemists' Association did not necessarily consist of scientific analytical chemists, but of chemists and druggists as well.

Mr. Shaw supported the motion, and thought Dr. Cook to be in error. He said the Society in London had given the matter much consideration; he agreed with the views of the President.

Mr. J. T. Armstrong, F.C.S., agreed with Dr. Cook. He had much pleasure in putting the motion to the meeting, which was carried with acclamation.

The President thanked the members for their compliments. He was not surprised to hear Dr. Cook's objection. He, however, hoped before the session closed that gentlemen would be satisfied with the work done, for he had received promises of several papers of a scientific nature from chemists of eminence, and the intermediate evenings might be appropriated to pharmacy proper, which subject had rather than otherwise been neglected by them of late. The next lecture would be on "the atomic theory," by Mr. Siebold, of Manchester, editor of the 'Year Book of Pharmacy.'

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Carbon and certain Compounds of Carbon.*

BY PROFESSOR BARFF.

In a recent course of Cantor Lectures, delivered before the Society of Arts, Professor Barff treated of carbon and certain compounds of carbon, especially with a view of making suggestions for the improvement of heating, lighting, filtering, and other apparatus. We propose to give in the following abstract the chief points of those lectures.

Introducing the subject by some remarks upon the importance of the application of scientific principles in all arrangements for heating and lighting, he said he could not conceive how any one could arrive properly at the conception of any apparatus for the production or economizing of heat, or for lighting or for any other kindred purpose unless he had a knowledge of the scientific principles involved in his invention. For example, if he does not know the way in which heat passes from a hot body to the bodies surrounding it, how can he know how to economize that heat? Thus, a person puts a fire into an iron grate with an iron back, and with iron all round it. Now, what does this act imply? He puts in and about his fireplace something which takes away almost all the heat, or a large portion of the heat which is being generated, and that is evidently a mistake; therefore, it is necessary that a person who is thinking about heating apparatuses, should know something about the conducting power of the materials he has to deal with. We know now by experience that a fire-clay back to a grate is of great advantage, and throws out much of the heat into the room. Again, advice has been given that people should mix chalk with their coals in order to produce greater warmth. That is a very good plan, no doubt, but by mixing chalk with coal not an iota more heat is generated from the coal than before; you do not make heat, you cannot produce it. The substance which is burned yields a certain amount of heat, and no more; it can be drawn out slowly or quickly, but only a certain amount of heat will be got from its combustion. This may be illustrated by the burning of charcoal in oxygen, and comparing the rapid combustion with the slow combustion which the same carbon undergoes when in the form of a piece of wood, or leaves, or sawdust, it is allowed gradually to decay and oxidize slowly through a long period of time; the quantity of heat given off in that slow combustion of the carbon would be exactly the same as the quantity given off in the more rapid burning of the charcoal. No skill on earth could make it give out more heat on its combustion than it had given out; the time in which it is being given out can be regulated, but you cannot regulate the quantity if all be burnt. Take a Bunsen burner; there is a certain amount of heat being given off, but if the hand be put to it it will feel very little heat indeed. But if into that flame a solid substance be put and made red hot it will feel much more heat. The solid substance does not generate heat; it only acts as a conservator or reservoir, and gives it out slowly, so that if a number of Bunsen burners were burnt in a room which it was wanted to warm, a certain amount of heat would be evolved in the combustion of the carbon and hydrogen in the gas, but the room would not be made comfortably warm; such a source of heat would not be sufficient for comfort. But if we take some solid matter that will not burn away, such as asbestos or solid lime, and put that into these burners and get it red hot, then we do get the heat, not increased in quality, but only regulated as to its radiation, that is to say, regulated as to the quantity that is given out from the source of heat in a given space of time. This principle is applied to grates, fireplaces being arranged with lumps of asbestos and gas burners under them. When the gas is first turned on, little or no heat is felt from it because the flame does not radiate the heat in such a way as to make it appreciable to the senses; but with the same quantity of gas burning, as the asbestos gets red hot, according to some it will give out as much heat and be as comfortable as a common coal fire.

From these remarks it will be seen how important it is that anyone who is going to invent an apparatus for heating should know, at least, these principles, namely, how heat is absorbed, how it is given out, and how it is conducted. The lecturer said he had heard of a person who had for years devoted himself to making stoves, grates, and so forth, but when the question of how it is the smoke goes up a chimney was mentioned, he expressed himself quite ignorant of the principle. That might seem strange, but that gentleman was not in the wrong according to his own views, for he entered the business many years ago, and formerly it was not thought necessary that persons should have scientific knowledge to do things involving scientific principles. It is only of late years that we have begun to appreciate the value of scientific knowledge. Thus, Dr. Graham, in his introductory lecture, almost felt it necessary to apologize to his audience of brewers for talking of science, when they had been going on for so many years making good beer without it. But it is most important, as far as possible, to get to the bottom of scientific principles. By the system of education which is being adopted now throughout the land boys are being taught science most admirably, and the rising generation will most of them know something about scientific principles.

Carbon appears largely distributed in nature. In the air we breathe there is a great quantity of carbonic acid, the quantity of which is being sustained continually by our breathing, for we are perpetually breathing it out, and it is being perpetually absorbed by plants. Again, there is chalk, which is carbonate of lime, there is also dolomite, which is carbonate of lime and magnesia, and there is also magnesite and other carbonates existing in nature, so that we have large quantities of carbon existing in the form of carbonates.

The lecturer then, by various experiments, illustrated the difference which there is in the heating of substances out of contact with air, and heating them in contact with air. If wood be perfectly charred, and the action then allowed to go on in the presence of air, the charcoal will gradually disappear as a gas, formed of the charcoal combined with the oxygen of the air; and nothing then will be left behind but the several substances contained in the wood which are not destroyed by the action of heat, *i.e.*, the ash. When any organic substance is heated out of contact with air, we speak of the process as one of destructive distillation, by which is meant that the substance, as such, is destroyed, that it is not resolved into its ultimate constituents; that is to say, that the elements which compose it are not separated from one another, but that it is broken up into compounds more or less simple than the elements formed in the substance itself. For example, when wood is destroyed as wood, we speak of it as destructive distillation, and if the products were collected we should find that they contained the same elements that the wood contained, only in different chemical combinations.

Carbon exists in all organic substances, but it exists in some in such proportions that when they are exposed to the action of this destructive distillation, no residue of charcoal is left behind at all; the charcoal all passes away

* Abstract of a course of Cantor Lectures, delivered before the Society of Arts.

along with the other elements, forming new substances. An instance of this is a substance which is obtained from the sorrel plant, which also exists in rhubarb and other acid plants; a potash salt, commonly called binoxalate of potash, from which can be obtained oxalic acid, which contains carbon, oxygen, and hydrogen in such proportions that the carbon and oxygen unite together to form two gases, carbonic acid and carbonic oxide, and the hydrogen unites with the remainder of the oxygen to form water. The consequence is that when oxalic acid is heated no carbon is left behind.

It is necessary, therefore, to bear in mind that there are these two classes of bodies; those which yield a quantity of carbon after the other substances have been thrown off, and those which yield none, because these will have to be alluded to again when speaking about coal.

Charcoal is very porous, and if thrown into water it will float. But charcoal is heavier than water, for, although it will float, it is for the same reason that an ironclad will float. Fill the ironclad with water, and down it goes; but it is very difficult to fill charcoal with water. If anybody could get over that difficulty, he might make a very large fortune, because then he would be able to impregnate wood through and through with a solution of a silicate which would render it thoroughly uninflammable.

Charcoal has a wonderful power of absorbing gases, and that has been explained by different persons in different ways. The knowledge of this fact was applied years ago, and was described by Dr. Stenhouse, the inventor of charcoal respirators. They are arranged to cover the nose and mouth, so that persons may breathe through them in a poisonous atmosphere without being affected by the poison. Those respirators contain charcoal in a state of fine division, and there is no doubt they are very useful. A quantity were made for the troops sent out on the Ashantee expedition, so that the soldiers might wear them when exposed at night to the malarious influences of that marshy country. Whether they were used or not the lecturer did not know, but he said there was no doubt whatever that charcoal will prevent the introduction into the lungs of very poisonous gases in small quantities. He had heard it said that a person could breathe an atmosphere of prussic acid or of strong ammonia, but he should say, from his experience with ammonia, that it was impossible. Still, it was no reason because the respirator would fail in these extreme cases why, where the quantity was great, that it should not be particularly useful to persons attending the sick bed of persons suffering from contagious or infectious diseases. Another substance which has the same power as wood charcoal, only to a much greater extent, and is much more energetic and active, is spongy platinum.

Another principle which animal charcoal possesses—and of extreme importance in a domestic point of view—is that of deodorizing tainted meat and absorbing bad smells. If putrid flesh be covered with animal charcoal all the bad smell will be absolutely destroyed. The charcoal absorbs the bad smell, and, more than that, it oxidizes the bad gases, burning them up, so that the substances which produce the bad smells are not absorbed to remain in the charcoal, but they are oxidised and burnt most effectually. This action has been spoken of as catalytic, a long name used with regard to substances which, although not acted upon themselves, yet have the power of producing chemical action in other bodies. But it appeared as if an action quite different from that goes on —an oxidating process—not through the absorbent power of the charcoal necessarily, but because there is an oxidation of the charcoal going on there slowly, although the charcoal is not a substance readily and easily oxidised, and that induces the oxidation of the escaping effluvia. Whether that view is right or not the lecturer said he did not know; he merely stated it as held by some.

Now, to what use can this be applied? Often it happens, particularly in the summer time, that a leg of mut ton, sent home on the Saturday night from the butcher and wanted for roasting on Sunday, during a muggy night will become tainted, and, in fact, entirely spoilt for the Sunday dinner. Now, it is quite certain that the process of decomposition that has gone on during the night has not been enough to render the meat unwholesome. There is no great putrefaction taking place—speaking of putrefaction in the ordinary acceptation of the term. If that meat be covered with charcoal, and left all night, the smell either will not occur or else it will be done away with. But one would not like to cover it with charcoal and so blacken the meat. Have a cupboard made, or a small box, and line it with charcoal in powder, and that will answer the same purpose. Make a muslin bag about three inches every way smaller than the box, drop it into the box, and then fill the space all round with animal charcoal. If the lid of the box is treated in a similar manner animal charcoal will be all round the meat, and on putting the meat in if it is not tainted it will not get tainted, and if it has become tainted it will lose that tainted smell.

Animal charcoal has the power of decolorizing and deodorizing water, and destroying the substances which give it colour and smell.

Charcoal filters can be easily obtained. But if it is not wished to buy one, some animal charcoal may be mixed with sand, and it will act perfectly in an ordinary filter.

Graphite is made into crucibles for melting cast iron and other substances, and they are employed for that purpose because graphite will stand such a tremendously high temperature without igniting with the oxygen of the air.

One of the properties of this substance is that when reduced to fine powder it can be pressed into hard blocks, which are as hard, if not harder, than the lumps of natural graphite. Those blocks can be cut into strips and made into lead pencils. Formerly, the best pencils were made from native lumps of blacklead, but now the best are made from the compressed graphite.

Another kind of graphite is formed in the manufacture of coal gas. When the retorts are heated to a high temperature, and the evolution of coal gas is going on rapidly, there is a deposition from the coal gas of carbon in the upper part of the retorts which forms that particular substance which is called artificial graphite; it is a sort of coke, for coke is an artificial graphite, just as is the charcoal or the amorphous carbon got by the heating of wood. The uses to which this substance is applied are various. For instance, pieces are used for the Bunsen's battery, instead of the platinum, which is used in Grove's battery, and is much less expensive, though it is liable to certain defects. Carbon points are made out of that sort of coal graphite, and used for the electric light. They are placed on the terminals of the battery point to point, the negative at the top and the positive underneath. It is extremely interesting to notice that one of these points makes no mark upon a piece of white paper, or hardly any, but the other one marks like a blacklead pencil. The negative terminal is apparently unaffected, but in the positive the charcoal, or graphite, is converted into a substance similar to natural plumbago. Some years ago some experiments were performed with a battery of 600 cells, and it was found that carbon could be volatilized; at least it was thought so. In a vacuous space the operator brought the points together, and found that a sort of brownish vapour was given off, and that crystals of a substance like graphite were formed on the side of a glass vessel. He then got some perfectly pure sugar charcoal, attached a crystal to the negative pole and one to the positive pole, and connected them with a battery. He found that when the galvanic current had passed for some time particles aggregated together, and formed a mass similar to plumbago. At the positive pole this conversion of graphite into plumbago takes place, and at the negative pole there is next to no change at all. That is a most interesting fact.

The diamond is the purest form of carbon we possess. This native graphite is formed in crystals, and also without crystallization in a form called amorphous. It is the amorphous which is adapted for making pencils. But it also occurs in the crystalline form, and crystallizes in what is called hexagonal bodies belonging to the rhombohedral system. The diamond crystallizes in octohedra, but not always, for some diamonds crystallize in dodecahedrons, and in others the faces of the dodecahedrons have three separate facets. The diamond is not pure carbon, though it is the purest form in which we have it, for when a diamond is burned in oxygen a residue is left behind—an ash—and that ash strangely has a sort of cellular structure. The diamond is usually of a bright light colour, and it refracts light wonderfully, being excessively dense. Its density is 3·55, or $3\frac{1}{2}$ times as dense as water, and it is the hardest substance in nature. For that reason it is used for cutting glass, but a cut diamond will not do for that purpose ; the natural crystalline point must be used, otherwise the cut will be very jagged. Sometimes diamonds are pink, sometimes green, and some are perfectly black and opaque.

(*To be continued.*)

Parliamentary and Law Proceedings.

Infringement of the Pharmacy Act.

In the Bloomsbury County Court, before George Lake Russell, Esq., Judge, on Thursday, October 22, George Day, of 3, Farringdon Road, contractor, was sued for a penalty, according to the particulars, which were as follows—"To amount of penalty incurred by the defendant, in selling or keeping open shop, for retailing, dispensing, or compounding poisons, or a poison, contrary to the provisions of the Pharmacy Act, 1868 (31 and 32 Vict. cap. 121), £ 5."

Mr. Flux appeared for the plaintiff, and the defendant appeared in person.

Mr. Flux, in opening the case, said that the defendant was sued under the 15th clause of the Act of Parliament, in respect of a penalty incurred by him consequent on the compounding of a medicine which contained prussic acid as an ingredient, and on the sale of a packet of oxalic acid.

The defendant objected to the jurisdiction of the Court. He produced a paper, showing that, in respect of the sale of oxalic acid, he had been convicted before a magistrate, and contended that he could not be twice placed in any peril in respect of one sale, and that, as regards the sale of prussic acid, a letter, written to him by Mr. Flux, had conveyed the impression that it would not be relied upon in this case.

Mr. Flux said that his letter had not been intended to convey the impression to which the defendant referred, but that, having regard to the defendant's statement, he (Mr. Flux) would elect not to proceed upon the sale of prussic acid, but to take a stand upon the sale of oxalic acid, and rely upon his view of the Act of Parliament, which was that by the sale of oxalic acid, improperly labelled, the defendant had been rightly convicted by a magistrate under the 17th section, and that by the same sale of oxalic acid, he (not being a registered chemist and druggist) had incurred a penalty under the 15th section, which was rightly sued upon in that action ; so that the conviction before the magistrate was no bar in the action.

The Judge reserved for consideration the point raised by the defendant, and directed that the evidence should be proceeded with.

Mr. Ward, examined by Mr. Flux, proved, that on Tuesday, August 4, he, at the shop No. 4, Farringdon Road, asked for a small quantity of oxalic acid, and that he was supplied with the packet produced, labelled, "Oxalic Acid. Poison. H. W. Howse, Operative and Analytical Chemist, 29th, Exmouth Street, Clerkenwell, one door from Farringdon Road," and paid one penny for it. That he afterwards handed the packet, in the condition in which he had received it, to Dr. Redwood ; and, that the defendant had in his presence admitted himself to be the proprietor of the shop, and that several letters produced were in his (defendant's) handwriting.

Dr. Redwood, examined, proved that he had received from the last witness the packet produced; that he had analyzed the contents, and found them to consist of oxalic acid.

The witnesses were cross-examined at length by the defendant, without any material fact being elicited.

The defendant was then sworn, and addressed the Court, contending that he was right in keeping open the shop, although he was a contractor, and not a chemist and druggist ; he having purchased the business of Mr. Howse, and had that person's authority to use his name in the business. He said that he had employed a manager whom he believed to be competent to conduct the business ; and he had sustained loss in the conduct of the business, and he urged that he ought to be protected from the harsh proceedings of the Pharmaceutical Society, who had become his prosecutors and persecutors, on the information of persons whose names ought to be discovered and held up to public scorn.

William West, called by the defendant, proved, that he had been many years employed in the business of a chemist and druggist, and was competent to conduct it, and did conduct the defendant's business on the occasion when the sale complained of had been effected, and until about a month ago, when he left the defendant's employment. That the defendant had left to him full discretion, and never taken any personal part in the conduct of the business, and that, after the conviction in the police court, no sale was, so far as known to him, made at the shop.

Cross-examined by Mr. Flux, witness admitted that he did not leave defendant's employ until about a month ago, and that the shop had continued open until that time, but he could not say whether it still continued open. Could say that a brass plate, which bore the words "Howse, Chemist," had been removed, but declined to say whether the labels bearing the words "Howse, Chemist," had or not continued in use. Admitted that a letter, dated May 22, 1874, and purporting to be signed by the defendant as G. Day, was in his (witness's) handwriting, and signed by him. And would also say, that a paper, handed by him in the 7th August, on the occasion of his calling on Mr. Flux, was in his handwriting. Denied that the letter and paper were written with the knowledge or sanction of the defendant, or that he had informed defendant of them. On the witness being asked whether he was, or ever had been, on the Register of Chemists and Druggists, the Judge said that he might decline to answer, on the ground that his answer might tend to criminate himself, and thereupon he declined to answer the question.

Mr. Flux pointed the Judge's attention to the fact that, whether the witness had or not been on the Register of Chemists and Druggists could be ascertained by reference to the printed Register, in the hands of the Court, and he referred to it as showing that the witness was not a duly qualified chemist and druggist. He also read the correspondence to prove that the defendant had not been used harshly, and that, on the contrary, all proper consideration had been shown to him, and he had persistently and defiantly offended.

The Judge said: I have considered the Act of Parliament, and am of opinion that it is a beneficial Act, passed in the interests and for the protection of the public ; and that this is not a case which should lead me to strain the law in the defendant's favour. I have considered the 15th and 17th sections of the Act, and am of opinion that the conviction at the police court was for a distinct received offence, under the 17th section, viz., for "Selling oxalic acid without affixing the name and address of the seller to it;" and that the defendant is properly sued for a separate penalty, consequent on an offence under the 15th section, although the two offences were committed at the one time, and by the one act. The defendant appears to be an educated man and a man of intelligence, and one who ought to have known and respected this law, which regulates the sale of poisons, and is intended to protect the public against the many fatal and other accidents which might arise if the sale of poisons was not regulated. I am the more careful to say this because I see many poor people here, and they may be persons who cannot distinguish between the duly qualified chemist and one who is not so qualified. I have read the correspondence, and I think that by the letter of October 10, the defendant was defiant; and I agree also in the observation made in reply, that it is not expedient that the names of parties who may give information regarding offenders under this Act of Parliament should be disclosed. I have therefore to give a verdict in favour of the plaintiffs. The defendant will have to pay the £5 penalty, with the costs of these proceedings.

The Defendant: I have no doubt that your Honour has given a conscientious judgment, but I ask that a case may be stated upon which I can take the decision of the Court of Queen's Bench.

The Judge: Mr. Flux, have you any objection?

Mr. Flux: Not the least.

The Judge: You can have a case stated, if, on further consideration, you think it desirable.

Reviews.

An Elementary Treatise on Practical Chemistry and Qualitative Inorganic Analysis; specially adapted for use in the Laboratories of Schools and Colleges, and by Beginners. By Frank Clowes, B.Sc. Lond., &c. London: J. and A. Churchill, 1874. 8vo, pp. 327. *7s. 6d.*

It seems almost incredible that with the crowd of text-books on practical chemistry already in existence, bearing the familiar names of Fresenius, Harcourt, Galloway, Odling, Roscoe, Valentin, and others, there should be any sign of a demand for a new one on the same subject. Such, however, appears to be the case, the largely increased development of science-teaching in the public and other schools of the country constituting, we presume, the *raison d'être* of the volume we have before us.

So lately as ten or fifteen years ago there were probably not half a dozen schools in the kingdom where experimental science was cultivated as a recognized part of the general curriculum, and certainly the number of school laboratories in existence could not have exceeded two or three. In those days the science-teaching in schools was conducted almost exclusively by a set of peripatetic lecturers, who went the round of the establishments within a given circuit, and who were looked upon by both masters and pupils as a sort of supernumerary whose services would be assessed at about the same fee as those of the dancing master, but who occupied in the estimation of both a position of far less respect and importance.

But all this is changed nowadays, and chemistry and natural philosophy run neck-and-neck with Greek grammar and Latin prose composition.

Even in the old days, however, there was a certain number of schools where science was regarded with no disfavour. Foremost amongst these was the College at Queenwood, in Hampshire, an establishment to which we shall be doing no serious injustice when we say that it owes its excellent reputation mainly to the teaching of physical science, which for many years past has formed a prominent and characteristic part of the scheme of education pursued within its walls, and in no small degree to the names—Tyndall, Frankland, Debus—of some of the teachers who have laboured there. The author of the book before us is at the present time "Science Master" in Queenwood College, and he tells us that his work was commenced in order to supply a course of practical chemistry to his own classes. If we are to understand from this that the contents of the book represent without exaggeration the nature and extent of the practical work done by the boys in the Queenwood laboratory, we may fairly congratulate Mr. Clowes on the creditable character of their performances.

The standard of proficiency in natural science to which boys having Latin and Greek, history and geography, arithmetic and algebra, and half a dozen other things besides their play to think about, may be brought by systematic training under a teacher who knows how to make his subject attractive, is certainly surprising.

This book is specially adapted for school use, and will probably find its way into the hands of many teachers who have the instruction of classes of young students. It is a book which, faithfully used, will do more than teach a boy to recognize in a mere mechanical way a few metals and salts; it will encourage and, indeed, compel him to use all his faculties of observation and reason, and go very far towards giving him a sound and practical knowledge of the chief elements and their inorganic compounds. The plan of the book is not very different from that of several others of similar pretensions, but its details present advantages which will recommend it strongly.

The first section is devoted to experiments illustrating the methods of preparation and properties of some important gases and other bodies. Section II. gives directions for making and using apparatus required in chemical analysis, and in both these sections it will be found that every article mentioned is of so simple a character and so minutely described that any intelligent boy can prepare the whole for himself without appealing to the teacher for more than occasional assistance or advice.

In the sections devoted to qualitative analysis "Tables of Differences" are introduced, which contain for each analytical group of radicles a summary of the difference of behaviour exhibited by its several members with the same reagents. This plan was employed in nearly the same way in Galloway's 'Manual of Qualitative Analysis,' and to him, we believe, belongs the credit of having originally introduced this most instructive system.

So far as we can discover, the tests and methods of separation recommended by the author have been judiciously selected. Full instructions are also given with regard to the entry of the results of analysis in the note-book. For young students especially there is nothing to which greater attention should be paid than the systematic record of every experiment performed, with a full account of the inferences to be drawn from the result. At first this practice consumes a little time and seems tedious, but long experience of its beneficial effects has convinced us that the student should never be permitted to neglect it. Mr. Clowes, we notice, uses the word "acid" in places where we should consider "acid radicle," or some phrase of that sort, more strictly accurate. The qualitative reactions commonly employed for the detection of chlorides, nitrates, and sulphates must surely be applicable to *all* salts which bear those names. Moreover, there is a positive error in the statement made in the book among the examples (pp. 193—199), that a certain white crystalline substance given for analysis contains Pb and HNO_3, that a second white solid contains Ca and H_3PO_4, a third Ca and $H_2C_2O_4$, and, again, that sulphate of barium contains barium and sulphuric acid, H_2SO_4. The chief objection to such lapses is that they require explanation from the teacher.

It is to be regretted that a work otherwise so carefully compiled and so truly commendable should exhibit more than a few blemishes in its literary character. No extraordinary command of English is required to correct such phrases as "at first commenced," "place into" a spoon or jar, or "each such," a screeching alliteration which occurs several times. The author will soon have an opportunity of altering all this. We recommend him to make a good use of it when it comes, and in the next edition to avoid errata.

Handbook of Natural Philosophy: Hydrostatics and Pneumatics. By Dionysius Lardner, D.C.L. New edition. Edited by Benjamin Loewy, F.R.A.S. London: Lockwood and Co. 1874.

The popular treatises of Dr. Lardner have done good service in time past in bringing the truths of science within the reach of general readers in a pleasant and not too severe form. Professedly popular, they were still accurate as far as they went, so that the reader who afterwards extended his study beyond their limits found that he had little or nothing to unlearn. Hence, remembering the good qualities of the early editions, we welcomed this new issue under the care of Mr. Loewy.

The volume which formerly treated of Hydrostatics, Pneumatics, and Heat has been divided, the last subject being reserved for a separate volume, and the book now before us devoted to the two former. This allows room for a considerable increase of matter, the work extending to 344 pages instead of 236, as formerly.

The general arrangement of the contents has not been materially changed, although to a large extent re-written, the alterations consisting for the most part of the expansion of the theoretical portions and the addition of new matter rendered necessary by modern scientific progress.

After considering the fundamental properties of liquids, the laws of liquid pressure, the equilibrium of immersed and floating bodies, and the application of these laws in a multitude of contrivances, such as the hydraulic press, embankments, levels, wells, ships, instruments for determining specific gravities, etc., the statics of gases are treated in a similar manner, barometers, air pumps, syphons, and balloons being taken as illustrations. The remainder of the book is devoted to the study of the dynamics of liquids and gases, and is also fully illustrated.

We must confess, however, to a little disappointment as regards the new edition. The writing is at times rather obscure; many things are still retained which, however appropriate in earlier issues, are now archaic; and new matter, which we think it is but reasonable to expect, we have not been able to find.

The paragraphs on recent improvements in the hydraulic press are in parts very far from clear, and the same may be said of those relating to the Torricellian experiment.

Concerning the hydraulic press used by Robert Stephenson to raise the tubes of the Britannia Bridge, we find it stated that "22 tons of fluid incandescent iron were required for this enormous casting. After being left for seventy-two hours in the mould in which it was cast, the mould was detached from it. *It was still red hot!* It was then left to cool, and it was *ten days* before it was sufficiently cool to be approached by operatives well inured to heat." Now, however astonishing such a casting was a quarter of a century ago, yet in view of more recent productions—such as the anvil block of the Woolwich steam hammer, weighing 103 tons—surely the italics and notes of admiration might have been spared.

We are surprised to find our old friend the atmospheric railway still standing its ground. Yet here it is just as in former editions, and without a word of qualification, as if it or a rope were quite usual for working steep inclines. We are told, too, that the use of a locomotive is almost impracticable on an incline of 1 in 50, although such and even steeper inclines are regularly worked by them in several places.

Again, in describing the action of the paddle-wheel and screw in propelling ships, the old engraving representing the most primitive kind of wheel, with fixed paddles, is still shown, and although the waste of power which occurs when the paddle-board is not vertical is demonstrated, nothing is said about the feathering paddles now almost universally employed. The account of the screw is still worse, for we are told that "the screw is usually formed by constructing an helical vane, turning spirally round an axle," and the illustration exhibits accordingly a true "screw," although every one must be aware that the modern propeller is not formed like a screw at all, but consists of two or more blades set round an axis at the same point.

We notice a small inaccuracy in the account of the mercurial barometer, where it is stated that the pressure of the vapour of mercury is "so slight that it could not be measured by the most accurate and delicate means that could be applied;" whereas, according to Regnault, the tension of mercury vapour at 20° C. is ·037 mm.—an amount quite easy to measure.

In the way of omissions, we may mention that nothing is said of Gay Lussac's very convenient form of syphon barometer, and that Andrews' valuable experiments on the behaviour of gases under great pressure are not referred to.

We look in vain, too, for an account of Gifford's injector, or the steam blast, and although the hydraulic press is fully described no mention is made of the application of hydraulic power to lifts and cranes. Hydrometers, with arbitrary scales, by Baumé, Cartier, and Beck, are described, but no explanation is given of the use or supposed advantage of these peculiar scales. Although, as we have before mentioned, the old atmospheric railway is again described, we are disappointed to find that its modern successors, "the pneumatic despatch tubes" and the pneumatic tubes of the postal service for the conveyance of parcels and messages, are not mentioned.

We have given a rather long list of defects, but felt it a duty to indicate some of the points at which improvement might have been made, and a good book made better and more nearly on a level with the present state of scientific and technical knowledge. In spite of these imperfections, we think it is a work which will be very useful as far as it goes, but must express a doubt if it will satisfy the hope expressed in the "advertisement," that it will be a valuable manual, especially for students preparing for the pass examination of the University of London, unless that refers only to the matriculation examination. Apparently this hope is not so restricted, for in the "preface" it is said to be sufficient for those who "desire to acquire that general knowledge of these sciences which is necessary to enable them to graduate;" but we fear that a student who, on these subjects, reads this book alone for the degree examinations would run some little risk of failure.

BOOKS RECEIVED.

Companion to the Latest Edition of the British Pharmacopœia, comparing the Strength of its Preparations with those of the United States and other Foreign Pharmacopœias, etc. By Peter Squire, F.L.S., etc. Tenth Edition. London: J. and A. Churchill. 1874. From the Author.

A Priced Catalogue of Druggist's Sundries, Proprietary Articles, Shop Fittings, Show Cases, and Surgical Instruments, manufactured and sold by Lynch and Co. 1874.

Obituary.

Notice has been received of the death of the following:—

On the 15th October, 1874, Mr. Thomas Blunt, Pharmaceutical Chemist, of the Wyle Cop, Shrewsbury. Mr. Blunt had been a member of the Pharmaceutical Society since 1853.

On the 9th September, 1874, Mr. Francis W. Wheaton, Chemist and Druggist, of Bournemouth.

On the 11th October, 1874, Mr. Thomas Scarby Mason, Chemist and Druggist, of Wolverhampton.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Education.

Sir,—The original object of the Pharmaceutical Society was to raise the status of the pharmacist, and the mode by which it sought to do this was by stimulating education and restricting the exercise of pharmacy to those who could give satisfactory evidence of being pharmaceutically educated. But where there is a prize to be won there are always those who desire to win it without the labour of a race—those who wish to enjoy the higher status without the education upon which alone it ought to depend. The existence of this class is the main source of difficulty to the examiners, and the existence of this spirit in the students is their main source of failure. This disposition, either in teachers or learners, cannot be too much deplored nor too strongly condemned, and must be my justification for presuming to lead your readers again through a path so often trodden.

No one dispassionately considering the subject would require to be told that education is a leading out or developing of power, and that pharmaceutical education should include development of the powers of observing, comparing, classifying, and judging all materials and processes which come under the pharmacist's view, and, above all, it must include the development of his power of *doing* all things required of him in the practice of his art; and no one need be told that such an education cannot take place in the course of a few months devoted to study. It is the duty of the examiners to see that this process of growth has progressed to a satisfactory extent before they pass a student, and the more the teachers and learners persist in simulating a genuine education the more the examiners will, of necessity, develope the examination required to discriminate between a true and a spurious learning. Those who tremble before the growing severity of the ordeal have to thank mainly themselves or their false friends for the position they are in.

A definite curriculum, though much objected to by some, will undoubtedly come in the course of a few years, not as a substitute for examination, but to render it more improbable that any one who has passed through the curriculum and the examination has only that smattering of knowledge against which the public have a right to be protected. An Act of Parliament may compel a student to go to the fountain of knowledge, but ten acts cannot compel him to drink; hence the necessity for following a curriculum with an examination, to sift out and reject such as are too indolent to avail themselves of such opportunities as they are compelled to come within reach of.

But there is another consideration which has been too much overlooked in the discussion of this question, and it is of the more importance, as it affects the better class of students and the public.

In the prospect of an improved *status* we have always included an improved pecuniary position commensurate with the increased education and responsibilities, and this can only be accomplished by diminishing the number of those entering the trade, a restriction which, in a free country, can only result from the legitimate difficulties of attaining the standard which all are free to attempt.

We hear frequent complaints of the difficulty of getting apprentices, and suggestions that youths must be tempted into the trade by cheap education, gratuitous lectures, and help from the funds of the Society to pay the expenses of local institutions which, in many cases, have little claim to be considered educational agencies, but which are supposed to make the youth's path to knowledge easy. All this appears to me to be mistaken policy. We ought rather to rejoice in the paucity of apprentices, as the first step towards the diminution of competition among principals.

Anything of the nature of leniency towards those now in course of study only tends to prolong into another generation the battle against adverse circumstances which now compels the pharmacist to associate patent medicines, perfumery, and pickles with prescriptions, and to distribute his attention among so many branches of business that his pharmaceutical lore becomes rusty with little use, and the public are left only with the services of dispensers who are not well qualified though well examined. By these same adverse circumstances the students who have laboured earnestly and with success are driven into other paths where earnest work meets a better reward.

It may be asked how would I meet the present difficulty, and I would reply, that no one should undertake to teach an apprentice the art and mystery of pharmacy who is not competent to do it, and willing to give time and attention to the task. Those who are not prepared to give instructions for work, they should expect to pay with money for the services of assistants who have got their instruction elsewhere. Nothing can do so much to promote pharmaceutical education as a willingness on the part of employers to pay fairly for the services of competent assistants. Those who take care to pay a small day's wage for a long day's work, and then subscribe handsomely to "the Association," can only be regarded as wearing an outside liberality as a cloak for their selfishness. We cannot expect men to act in a purely disinterested spirit, and pay more than market value for services; therefore, we must look to the care which is quite natural on the part of those who have services to dispose of, the care that they secure for their labour a fair *quid pro quo*, either in the form of money or opportunities for improvement in any part of their calling in which they still require education.

There are times when the cessation of toil is the truest wisdom. When we have done our duty time is on our side, and will do the rest.

Pharmaceutical reformers, having established the machinery which should produce the desired results, have now a period of comparative rest, in which they have to watch its operation and guard it against casualties.

A few hundred rejected students may be regarded as indicative of its working well rather than otherwise, for it is the only evidence which will bring conviction to the minds of those interested that the necessity for education is a reality. The rejection of a few hundred incompetent men would be a blessing to all in the trade, and all competent men about to enter it. It would be a blessing to parents, by convincing them that they had better not bring up to the trade any youths who have not an aptitude for it; and to the rejected men themselves it would be a blessing in disguise. A man had better turn grocer than remain for life an Associate of the Pharmaceutical Society.

Barnard S. Proctor.

11, *Grey Street, Newcastle, October* 22, 1874.

Preliminary Examination Question.

Sir,—I remark the following amongst the questions for the Preliminary Examination published in your last number:—"State the plural of (*inter alia*) *die*." This is not the first time that I have seen the same question, which has therefore somewhat the appearance of a "catch," and in the interests of fair play I am led to ask the examiners *which* answer they would like to have?

What do they mean by "die," and why does not the question specify what is intended?

The plural of "die," known in mechanics, is "dies," and would always be so written amongst practical mechanicians; the plural of "die," known to gamblers, is "dice." May I ask the examiners whether they require both plurals to be given, or will they be content with either, or, if not with either, which?

In the meantime I confess myself

Puzzled.

October 26, 1874.

Colchicum Autumnale.

Sir,—In the *Pharmaceutical Journal* of this week (October 24), at page 328, there is an editorial note, headed "Poisoning of Cattle," and at page 325 there is a statement by J. Pierre, on the toxic action of the *flowers* of *Colchicum autumnale*.

Now this medicinal plant abounds in some parts of the grazing land about this place (North Somerset); the flowers appear in August and September; the leaves and the seed appear in April.

I have never heard of cattle being injured by the *flowers*; grass is abundant in summer, and the cattle pass by the flowers; but in spring, when hungry cattle are turned into a field where the *leaves* of the colchicum abound, and the grass is insufficient, they eat voraciously and indiscriminately, and, in some cases, it is well known they have been poisoned by the leaves of the colchicum, and, I am informed on the authority of an honest cattle dealer, on opening the dead cow, the colchicum leaves have been found rammed hard together, so as altogether to stop the passage.

The farmers try to destroy the colchicum; the most effectual plan appears to be to plough the land.

I do not pretend to be a scientific botanist, but I can affirm the truth of the above statement.

JOSEPH LEAY.

Downside, Chilcompton, Bath, October 24, 1874.

ADULTERATION.

Sir,—We are promised additional legislation on this subject in the ensuing session of Parliament, and it having been sufficiently discussed from legal points of view, I propose to regard it from one of reason and equity.

The evidence educed by the parliamentary committee having shown that comparatively little adulteration is practised, and that scarcely anything of a deleterious nature is used, the tables of mortality further demonstrating that the public health was never better than of late years, and, as it may be safely inferred, competition insures that as good articles as are paid for are usually sold, I submit that no valid reason existed for the imposition of such a measure.

I am no advocate for adulteration, and believe those who are willing to pay legitimate prices for good articles find no difficulty in procuring them; but every tradesman knows there are numbers of bargain-hunting persons, ever aiming at something beyond their station, who are not content with good articles at fair prices, and those who humour their tastes obtain such custom; hence arise silk and woollen goods, cheapened by admixture with cotton, cotton lowered by jute, good wrought-iron displaced by inferior cast, moulded glass made to represent that which is cut, and shop windows glittering with tinsel ornaments for the poor, plated nickel for the middle class, and gilded silver for the rich. And is the press, the legal profession, or even the clerical, exempt from the same practice of substituting the apparent for the real? And the gentlemen known as "*promoters*"—do not they annually extract millions from a confiding public, under representations and calculations the most baseless and fallacious?

Seeing, then, that what is called *adulteration* is often a trade arrangement under which the tastes and wishes of the buyer are satisfied, the question arises. Why should the seller of an ounce of mustard, or cheap coffee, be compelled to state that the former is coloured by so many grains of turmeric, or the latter mixed with a certain portion of chicory, any more than the seller of a fifty-guinea piano should be compelled to explain that the rosewood in its composition is represented by a thin slip of external veneer? And as the public speaker, or writer, may indulge in any amount of specious argument or misrepresentation, so that he does not, by traitorous language, endanger the peace, or, by becoming personal, inflict individual injury, why should not the commercial law be assimilated to the literary, and the public prosecutor only called in when something positively deleterious is substituted for the wholesome, leaving those who think they are imposed upon to the remedy of ceasing to deal with the impostor, or instituting proceedings for the redress of the individual wrong?

I therefore suggest that when the subject is again discussed in Parliament, it be provided that a clause shall be proposed, enacting that prosecutions are only to be instituted at the public expense when any admixture is found which would be *injurious to the health* of those using it, and that in all places returning members to Parliament the tradesmen affected by such legislation should combine and seek an interview with their representatives, to discuss the subject with them, and point out the oppressive character of the present enactment, requesting them to support such amelioration as it may be determined to propose, and they may then hope to secure for the subject a more reasonable consideration than it has at present received.

A COUNTRY CHEMIST.

R. B. H.—When citric acid is treated with strong sulphuric acid a disengagement of carbonic oxide ensues, even without the application of heat. But if the temperature be sufficiently raised, the odour of acetone is perceived, and carbonic anhydride is given off.

M. J. Bentley.—The water always will separate from your mixture if stirred after it has "set." The manipulation should be *secundum artem*—more easily performed than described.

"*Hampton.*"—(1) Formula will be given next week. (2) According to Dr. Weber (*Brit. Med. Journ.*, Feb. 14, 1874), Apollinaris Water contains in 10,000 parts, 25·5 of solid matter, consisting principally of carbonate of soda (12·57), chloride of sodium (4·66), sulphate of soda (3·0), and carbonate of magnesia (4·42). It is also said to be richer in free carbonic acid than almost any other spring.

"*A Student.*"—(1) The sulphur is used in combination with the oil for the extinction of the mercury. (2) Because in that state the properties for which it is used are most fully developed.

Quæstio.—Your letter has been handed to the Secretary.

A. C. G.—You will find ample information upon the subject in our advertising pages.

S. Wylde.—A portion of the iron becomes oxidized, and the iodine liberated colours the solution. A coil of iron wire passing through the whole depth of the liquor will prevent liberation of the iodine; and filtration into the syrup, when dispensed, will separate any oxide of iron that may have been formed. It is not possible to make a syrup which will be the same as the B.P. syrup in the manner you mention, because syrup of iodide of iron contains less water than simple syrup does.

"*An Apprentice.*"—In the other lines the quantity is the direct object of the transitive verb; in the line quoted "aquam" is the direct object.

"*Alpha.*"—The formula for phosphorus pills recommended by Dr. Radcliffe was as follows:—

Phosphorus	6 grains.
Suet	600 ,,

Melt the suet in a stoppered bottle capable of holding twice the quantity indicated; put in the phosphorus, and, when liquid, agitate the mixture until it becomes solid. Roll into 3 grain pills and cover with gelatine. Each pill will contain $\frac{1}{33}$ grain of phosphorus.

G. P.—Wanklyn's "Water Analysis," published by Messrs. Trubner.

G. W. Hamilton.—It would not be difficult for a person possessing the qualifications described by you to obtain an "assistantship with a good chemist."

J. Stevens.—There is no recognized formula for such a preparation.

J. M. J.—You will find a formula for Pepsine Wine in the number for February 28 last, p. 195.

A Young Pharmacist.—We do not think the question instanced by you would be at all out of place in an examination intended to test chemical knowledge, and under certain circumstances it would have a direct pharmaceutical bearing.

R. R.—Mr. Erasmus Wilson's formula for hair wash was published in vol. iv., p. 179.

V. Hughes.—Probably the failure results from unskilful manipulation.

W. W.—The silicates of potash and soda may be readily purchased in a tolerable state of purity, and there is no great difficulty in preparing them pure on a small scale.

"*Cautious.*"—We think a dispenser would be quite justified in declining to dispense such a prescription.

T. G. Hives.—See a paper by Mr. Wanklyn on the relative value of disenfectants, in vol. iv., p. 205.

F. Balkwill.—The ink may be discharged from thick paper by gently rubbing it with a sponge moistened with dilute nitro-hydrochloric acid.

J. B. Shilcock.—If you will point out what part of the subject has not been dealt with in our remarks upon your letter, we shall be glad to consider it further. Though we regret that our comments upon your letter are not satisfactory to yourself, they will suffice to show that we did not consider the publication of your letter would serve any useful purpose.

"*Extortion.*"—We think the case you refer to in your letter is one that you would do well to take legal advice upon before giving publicity to the facts mentioned.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Jackson, Mr. Pocklington, Mr. Bevan, Mr. D. Williams, "A Correspondent," "At Fault."

THE CHEMICAL NOMENCLATURE PROPER TO AN INTERNATIONAL PHARMACOPŒIA.*

BY THOMAS GREENISH, F.C.S.

An International Pharmacopœia has for several years been an idea floating before the eyes of the pharmacists of every European nation. It had been little more than an idea until the Congress in St. Petersburg, grappling with the difficulty, aimed at reducing its requirements to some tangible form. How far success has attended those efforts will be left for time to determine. There certainly was not wanting at that Congress either the energy or the will, but the difficulties were great. Some points on which a definite opinion was pronounced may be mentioned.

The Latin language is to be restored to its former position, and will, I believe, be very generally welcomed as an old familiar friend. The Russian pharmacist may not understand English directions, and the English pharmacist will most certainly not understand the Russian, but both should be conversant with the Latin.

The metrical system of weights and measures will be introduced, and the greatest simplicity is recommended in galenical preparations. The minimum of the active principle in narcotic and drastic drugs permitted will be stated; also the maximum of impurity allowed where absolute purity is not thought necessary.

The very general agreement and unanimity on these points indicate progress,—one step at least in the right direction; but there is still a question on which the Congress did not pronounce a definite opinion. I refer to nomenclature, the object in view being to secure a uniform and fixed nomenclature, the one best adapted for an International Pharmacopœia.

The decision was left to the Permanent International Pharmacopœia Committee, whose seat is in St. Petersburg, a few of the delegates requesting that the system of Berzelius should receive consideration.

Since the return of the delegates to England they have received a letter from that Committee, requesting that each Pharmaceutical Society should state what nomenclature it considered best adapted for an International Pharmacopœia.

Thinking it probable that the favourable opinion of the Berzelian nomenclature expressed at the Congress by a few might be very generally entertained, I was induced to write to the President on this point, and also with the view of eliciting what really was meant by the system of Berzelius, and at the same time requesting a few examples, applicable to the chemicals of the Pharmacopœia. In reply, he states that a few delegates only suggested the nomenclature of Berzelius, and that in his opinion it was not the best nomenclature for a pharmacopœia. He says further, that if adopted for a pharmacopœia, "acetate of lead" would be written "acetas plumbi," "muriate of quinine" "murias quiniæ," and "muriate of morphia" "murias morphiæ," which he considers would be very objectionable. He adds that the nomenclature of the Austrian Pharmacopœia was formerly that of Berzelius, but it is now altered, not from a theoretical but from a practical necessity. Several mistakes had occurred in dispensing; the last case of poisoning was due to an assistant having dispensed from a bottle labelled "murias morphiæ," which he had mistaken for "murias quiniæ." He thinks that had the one been labelled "morphiæ murias," and the other "quiniæ murias," the probability is the error would not have occurred.

I may add that I have received a letter on this subject from a high authority, Professor Dragendorff, of the Dorpat University, Russia, one of the delegates at the recent Congress. He also objects to any system of such names as Carbonas kalicus, in which the metal or basis occupies a secondary place, and agrees, he says, in principle with the names such as Potassii carbonas, the employment of which Professor Attfield urged in his Paper on Nomenclature, read before this Society in 1871.

It must, I think, be admitted as desirable that the nomenclature should not conduce to errors in dispensing, that the system adopted should be generally acceptable, that it should be as uniform and permanent as possible, and yet that the Pharmacopœia should be abreast of the science of the day. The question, therefore, before the meeting is what chemical nomenclature it considers the best to be adopted in an International Pharmacopœia? and to this question the pharmacists of Great Britain, in common with those of other countries, are requested to furnish an answer.

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, November 4, 1874.

THE CHEMICAL NOMENCLATURE OF AN INTERNATIONAL PHARMACOPŒIA.*

BY PROFESSOR ATTFIELD.

The question put to English pharmacists by the Permanent International Pharmacopœia Committee, now sitting at St. Petersburg, lies within narrow limits, We are not asked to discuss the subject of an International Pharmacopœia, nor its whole nomenclature, but simply the (Latin) chemical nomenclature appropriate to such a work.

Before answering this question some deliberation is necessary. Our own British interests must not alone be considered. The chemical nomenclature of an International Pharmacopœia, printed in the Latin language, should harmonize as much as possible with the Latin nomenclature of every national pharmacopœia, of which it is more or less the international representative, and when translated into the respective vernacular languages, should clash as slightly as possible with the chemical names commonly met with in those languages.

On one point, at the very outset, I have a definite and strong opinion. The nomenclature under discussion should reflect modern unitary ideas, and not the old binary or dualistic hypotheses respecting the constitution of chemical substances. Nitre must not be termed potash nitrate, or nitrate of potash, or nitrate of oxide of potassium (KO,NO_5—old atomic weights; or K_2O,N_2O_5—new atomic weights), but potassium nitrate, or nitrate of potassium (KNO_6, old atomic weights; or KNO_3, new atomic weights). Blue vitriol must not be regarded as copper oxide sulphate, or sulphate of oxide of copper (CuO,SO_3, $5\,HO$), but as copper sulphate, or sulphate of copper ($CuSO_4,5\,H_2O$). For the modern unitary views are not only held by nearly all chemists in all countries, and taught in all English and nearly all foreign educational chemical works, but are recognized officially either in the names, synonyms, or notation of most pharmacopœias, and at most pharmaceutical and medical examining boards. In the Austrian

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, November 4, 1874.

Pharmacopœia appears Magnesium sulphuricum, while Magnesia sulphurica and Sulphas magnesiæ occur only as synonyms. In the German Pharmacopœia we find Ammonium carbonicum, not Carbonas ammoniæ. In the French Pharmacopœia the Sel d'Epsom is still termed Sulfate de magnésie, but Sulfas magnesicus is given as a synonym. In the British Pharmacopœia modern chemistry is recognized by the insertion of modern chemical formulæ, side by side with the old, and that in the next edition a very simple and effectual modification of modern chemical nomenclature should be introduced, is admitted with singular unanimity by the leading chemical, medical, and pharmaceutical authorities of Great Britain, and all the English journals of medicine and pharmacy. It will be for the International Committee to ascertain the nomenclature of pharmacopœias generally, and to collect opinions respecting projected alterations in the chemical nomenclature of such pharmacopœias, but I may just add a quotation from the preface of the recently issued United States Pharmacopœia: "Some alteration has been made in the chemical nomenclature of the pharmacopœia in order to place the work in accord with the progress of chemical science. Without adopting the new nomenclature of chemistry to its full extent, such modification of the former designation of substances has been introduced as to give uniformity; all the salts of the alkaline metals are designated as of the particular metal, and not of its oxide; thus, Barii carbonas is substituted for Barytæ carbonas, Calcii carbonas præcipitata for Calcis carbonas præcipitata, Potassii citras for Potassæ citras, etc. These changes have been made with deference to the nomenclature which is now being employed by chemists, and the modifications thus made will probably soon be the language of pharmacy." I repeat that, in my opinion, some form or forms of modern chemical nomenclature should alone occupy the leading place in an International Pharmacopœia. In such a work of reference synonyms, new and old, may freely be placed under the leading name of a salt, but the names at the heads of the sections should be consistent with the well and widely accepted modern unitary chemical ideas. If this course be carried out, the proposed Pharmacopœia will promote harmony, if not identity, in the chemical nomenclature of pharmacy throughout the world.

Assuming, then, that the claim for modern chemical nomenclature in the International Pharmacopœia is admitted, the second point for consideration is, which modern arrangement or order of Latin words should be employed in the system of names. Shall we have Sulphas cupri, Sulfas cupricus, Cupri sulphas, or Cuprum sulphuricum. Each of these names already occurs in one or other of the more recent pharmacopœias, and each is in accordance with modern chemical views. Shall we have Nitras potassicus, Nitras potassii, Nitras kalicus, Nitras kalii, Potassium nitricum, Kalium nitricum, Kalii nitras, or Potassii nitras. Each of these, or an equivalent, is to be found in recent pharmacopœias, and each is a modern name. The President of the International Congress, lately held at St. Petersburg, draws attention to the Austrian Pharmacopœia, and prefers such a name as Morphinum hydro-chloricum rather than the synonym Chlorhydras morphicus, also given in that pharmacopœia, because, as a matter of practical necessity in the avoidance of mistakes, he would have the more important word placed first in the name, the leading word being more likely than the terminal word to be correctly caught by the eye of a dispenser. I agree with Mr. von Waldheim in the opinion that the name of the basylous constituent of the salt should come first in the name, not because of its medicinal or toxicological importance, for occasionally the acidulous element, or group of elements, is the more powerful, as in Sodii arsenias, but because in the nomenclature of the majority of pharmacopœias, old or recent, the name of the basylous element is so placed, and because uniformity of plan in such a matter is extremely desirable.

Excluding, therefore, names in which the acidulous constituent is placed first, as Sulphas cupri, Sulfas cupricus, Nitras potassicus, etc., there remains the question, which of the two or three varieties of modern chemical nomenclature, in which the metal or basylous constituent has the leading place, is best worthy of selection for employment in an International Pharmacopœia. Shall the authors of that work employ the term Cupri sulphas with English-speaking nations, or adopt the German form of the name, Cuprum sulphuricum? Shall we have Potassii nitras, or Kalium nitricum? Would the French like to see their Protoiodure de mercure and Deutoiodure de mercure termed Hydrargyri iodidum viride, and Hydrargyri iodidum rubrum respectively, or Hydrargyrum subiodatum and Hydrargyrum iodatum rubrum; their own Latin synonyms being Ioduretum hydrargyrosum and Ioduretum hydrargyricum?

One or other of the two varieties of modern chemical nomenclature of which the names just given are illustrations will probably be selected for use in the International Pharmacopœia. Before deciding which is the better, a glance over the following more extended lists may be useful.

LATIN CHEMICAL NAMES EMPLOYED IN THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA.	LATIN CHEMICAL NAMES EMPLOYED IN THE GERMAN OR AUSTRIAN PHARMACOPŒIAS.
Ammonii carbonas	Ammonium carbonicum.
Ammonii chloridum	Ammonium chloratum.
Argenti nitras	Argentum nitricum.
Atropiæ sulphas	Atropinum sulphuricum.
Bismuthi subnitras	Bismuthum subnitricum.
Calcii carbonas	Calcium carbonicum.
Calcii chloridum	Calcium chloratum.
Calcii phosphas	Calcium phosphoricum.
Cupri sulphas	Cuprum sulphuricum.
Ferri lactas	Ferrum lacticum
Ferri phosphas	Ferrum phosphoricum.
Ferri sulphas	Ferrum sulphuricum.
Hydrargyri chloridum corrosivum	Hydrargyrum bichloratum corrosivum.
Hydrargyri chloridum mite	Hydrargyrum chloratum mite.
Hydrargyri oxidum flavum	Hydrargyrum oxydatum flavum.
Hydrargyrum ammoniatum	Hydrargyrum bichloratum ammoniatum.
Magnesii carbonas	Magnesium carbonicum hydro-oxydatum.
Magnesii sulphas	Magnesium sulphuricum.
Manganesii oxidum nigrum	Manganum hyperoxydatum.
Morphiæ acetas	Morphinum aceticum.
Plumbi acetas	Plumbum aceticum.
Potassii acetas	Kalium aceticum.
Potassii bicarbonas	Kalium bicarbonicum.
Potassii bitartras	Kalium hydrotartaricum.
Potassii carbonas	Kalium carbonicum.

Potassii et sodii tartras	Kalium natrio-tartaricum.
Potassii nitras	Kalium nitricum.
Potassii iodidum	Kalium iodatum.
Quiniæ sulphas	Chinium sulphuricum.
Sodii chloridum	Natrum chloratum.
Sodii sulphas	Natrum sulphuricum.
Strychnia	Strychnium.
Zinci sulphas	Zincum sulphuricum.

Either of these two systems of names is in accord with the existing state of chemical science; each is already employed by great nations. Which should be adopted in an International Pharmacopœia?

The names found in the United States Pharmacopœia will doubtless be introduced into the next British Pharmacopœia. All authorities, as I have said, are agreed on this point; and English-speaking pharmacists therefore would prefer these Latin names—those of column 1. The French also would probably prefer them, as more consistent with the genius of their own language. On the other hand, German-speaking pharmacists would prefer such names as those now employed in the Austrian Pharmacopœia—those given in the second column of the foregoing table. Would either of the two classes of pharmacists just mentioned be likely to give up the use of one of the two sets of names in favour of the other. I think not. Irrespective of the merits of either variety, and the advantages of international uniformity of pharmaceutical nomenclature, I am convinced that the general bodies of medical practitioners and pharmacists could not be brought to accept any general alteration in a whole nomenclature. This subsidiary question need not be discussed; it is a case of *non possumus*.

Here we may leave the matter in the hands of the International Pharmacopœia Committee. In the general body of the work one or other of these two varieties of modern chemical nomenclature will, in my opinion, have to be employed. Perhaps, however, in the headings of sections both varieties might be represented. Thus, Ammonii chloridum *vel* Ammonium chloratum. This would be the leading name, printed in uniform capitals; then would follow synonyms (of which there should be the fullest number), then characters, tests, and any processes that may be introduced, and so on to other matters of the section. Finally, I trust that the work will have a copious alphabetical index, containing all synonyms as well as chief names.

[*The discussion on this and the previous paper is printed at p. 372.*]

SUGGESTIVE NOTES ON THE PHARMACY OF AMORPHOUS PHOSPHORUS.*

BY ARTHUR WM. POSTANS.

Before treating of amorphous phosphorus I will make a few introductory and other remarks on the pharmacy of ordinary phosphorus.

For some time past a demand has been springing up for preparations of phosphorus, and the frequent reference to the subject has shown clearly enough, in the words of one of the medical journals, that convenient forms for the administration of this powerful therapeutic agent are amongst the desiderata of modern pharmacy.

We have now many, and some of them elegant, forms for its administration—French and English—and it is still a question whether the compilers of the Appendix to the British Pharmacopœia selected the most thoroughly useful formula for the official phosphorus pill mass. The combination of a resinous balsam like tolu, with yellow wax to form pills, is objectionable on account of their questionable solubility in the stomach. The Pharmacopœia orders—

Phosphorus	2 grains.
Balsam of Tolu	120 „
Yellow Wax	60 „

Put the phosphorus and balsam of tolu into a wedgewood mortar, about half full of hot water, and when the phosphorus has melted and the balsam has become sufficiently soft, rub them together beneath the surface of the water until no particles of phosphorus are visible; add now the wax, and as it softens mix it thoroughly with the other ingredients. Allow the mass to cool without being exposed to the air, and keep it in a bottle immersed in cold water. It may be softened with a few drops of rectified spirit when made into pills.

Might not a dispenser conclude from this hint about rectified spirit, that, in order that the balsam of tolu and wax may be dissolved in the stomach, so as to set free the phosphorus, it is advisable that the patient should take a few drops of spirit, probably in the shape of a good dose of hot brandy and water before each pill?

This pill mass was under discussion at an evening meeting in May last, and I now revert to the subject because I cannot concur in the result of that discussion, which seemed to be in favour of the official formula. I quite agree that the process is practical, so far as it goes, but it does not go far enough. Pharmacy justly takes cognizance of the influence of the gastric fluid on medicines. It is necessary for us to consider not only the nature of the drug or element to be dealt with, and the best mode for dispensing it, but whether or not, when introduced into the stomach, it will as speedily as possible be set free, so as to accomplish the object of the prescriber. This last condition is not satisfactorily fulfilled in the phosphorus pill mass of the appendix.

Probably there is no method which can be so universally adopted for the preparation of phosphorus pills as that by which it is dissolved, with the aid of a gentle heat, in prepared suet, the operation being conducted in a closed vessel.

The pills may then be rolled out, coated with gelatine, and preserved in bottles. It is scarcely necessary to remark that, according to this process, there is no doubt whatever of their solubility in the stomach, and the rapid liberation of the agent enclosed.

With these remarks on the pharmacy of ordinary phosphorus, I will pass on to some suggestions respecting the red or amorphous phosphorus.

As is well known, amorphous phosphorus was discovered by Schrötter, and is prepared by exposing, for fifty hours, common phosphorus to a temperature of from 460° to 480°, in an atmosphere which is unable to act chemically upon it. At this temperature it becomes red and opaque, and insoluble in bisulphide of carbon. Free phosphorus is soluble, while allotropic phosphorus is quite insoluble in bisulphide of carbon. I can confirm by experiments the statements that red phosphorus powder is insoluble in ether, alcohol, or proof spirit, chloroform, olive and cod liver oils: it does not become luminous in the dark until its temperature is raised to about

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, November 4, 1874.

390°, and it has very slight tendency to combine with the oxygen of the air. When heated to 500° it is re-converted into ordinary phosphorus.

Amorphous phosphorus, I find, is readily manipulated pharmaceutically. I am desirous to draw the attention of therapeutists to this form of the element, and to suggest for their consideration the question, whether phosphorus in this very convenient condition for manipulation would have any value in medicine.

Possibly some pharmacist has already met with this substance in a prescription. If so I should be glad to know his experience regarding it. I myself have altogether failed to find an appropriate solvent, so as to present it in a liquid condition, and can therefore form no opinion as to the chemical or physical action of such a solution. Possibly solution might reconvert it, for from hot oil of turpentine, in which it is slightly soluble, the element is deposited as ordinary phosphorus.

By way of experiment I mixed together the following:—

Amorphous Phosphorus	. . . . .	6 grains.
Liquorice Powder Extract of Taraxacum	of each . .	3 ,,

And found the result to be pharmaceutically a good pill mass, which was rolled into 6 pills; specimens of them were silvered, saccharated, coated with tolu, and put into ordinary pill boxes. At the expiration of a week or so they were found to be as well-preserved as when first made; moreover, I found amorphous phosphorus could readily be mixed with electuaries or confections.

Of course in no case must chlorate of potash be mixed with it, for, if it should, an explosion may result; but, this excepted, it seems to be compatible with almost all powders.

Possibly, in the event of medical men prescribing it, there would be no objection to the use of the powder itself, mixed with an equal quantity of sugar, and taken in jam, jelly, or treacle.

A useful preparation could be introduced by mixing it with black currant paste, to form a lozenge, "of any strength desired."

So much for the pharmacy of amorphous phosphorus. A few days ago I mentioned the subject to my former teacher, Professor Attfield, who very kindly went into the matter with me, and seemed disposed to the opinion that something might be done with amorphous phosphorus, and suggested the advisability of getting some medical men to take up the subject scientifically, bearing in mind the following facts, namely, that amorphous phosphorus can be manipulated easily by the pharmacist, is readily compounded as pills, electuaries, or confections, and that, having diminished chemical energy, there probably would not be the same difficulty, delicacy, or necessity for giving it in such fractional doses as those in which ordinary phosphorus is administered.

We are told that in some cases the ordinary phosphorus in moderate doses acts rather violently, and sometimes the symptoms of poisoning show themselves. Pereira says, after its absorption phosphorus acts as a stimulant to the nervous, vascular, and secreting organs; it excites the mental faculties, and raises the temperature of the skin, increases the frequency of the pulse, and promotes the secretions. He goes on to say allotropic phosphorus is changed into the ordinary kind by friction, so that it answers the purpose of the match maker quite as well as the other variety, while it does not emit vapours when exposed to air. It was formerly described as an oxide, but is now shown to be nothing else than phosphorus in the masked or allotropic form.

In the manufacture of lucifer matches with the ordinary kind the workmen are occasionally liable to necrosis of the jaw bone, whereas, in the case of amorphous phosphorus, it is said to be non-poisonous, and that in the manufacture of these matches it answers precisely the same purpose as the other phosphorus, and the workmen do not find any injurious results from being constantly at work with it.

Touching this point, however, I think it would be interesting to know from some large manufacturer of the patent safety match his experience in the preparation, and some of the details connected with its use, and how far the received statement is correct—that *no* injurious results arise from its manipulation by the men, women, and children employed in such factories, and if anything remarkable or unusual is experienced by those who are constantly at work in its atmosphere, with the symptoms, if any, and the remedy employed.

If in the manufacture of lucifer matches it is found to be perfectly harmless, and yet to answer in every respect precisely the same end as the ordinary phosphorus, surely we may imagine that therapeutically it might to some extent be adopted when the more active one could not so well be given. Here, however, pharmacy touches therapeutics. I simply introduce the suggestion, and in so doing would express a hope that some medical gentleman will take up the matter therapeutically. In the event, too, of any pharmacist having already experimented with amorphous phosphorus, or had his attention drawn to it by prescriptions in which possibly it may have been ordered, perhaps he would kindly communicate his experience to an evening meeting. In short, we desire to know whether this intermediate form of phosphorus has any right or title to be used in medicine for the treatment and cure of disease.

Since writing the foregoing my attention has been drawn to the fact that Dr. Bednar, of Vienna, recently reported very active symptoms as the results of prolonged administration of amorphous phosphorus in small doses. This fact supports me in the opinion that an investigation of the subject would be attended by useful results.

[*The discussion on this paper is printed at p.* 373.]

JABORANDI.

BY WILLIAM MARTINDALE, F.C.S.

Two notices of this new drug have appeared in the *Pharmaceutical Journal** within the last few months. They refer to an article which was brought to Paris from Pernambuco, by Dr. S. Coutinho, who states that this "Jaborandi, the name under which the Indians designate the new substance, is" (the produce of) "a shrub which grows in the interior of some provinces of the North of Brazil, the leaves of which somewhat resemble those of the bay-tree."

Its properties as a diaphoretic and sialagogue are remarkable. The mode of employing it, Dr. Coutinho states, "is very simple; it is only necessary to bruise the leaves and small branches, and make an infusion of four to six grams in a cup of hot water.

* *Pharmaceutical Journal*, 1874, pp. 850 and 911.

Ten minutes after the administration of this infusion—it is not necessary to drink hot fluids—the patient, who should take the precaution to go to bed and be well wrapped, is quickly covered with perspiration, which does not cease to be produced for four or five hours, and which is such that the linen ought to be changed often during that space of time. During this time also there will be an abundant salivary secretion and a bronchial excretion not less abundant, to such an extent that it will be painful for the patient to speak, and his mouth will quickly be filled with liquid. This excretion, in quantity, may equal a litre and more."

A drug producing such physiological effects might be of great service in combatting many diseases, and having with difficulty procured two small consignments from Paris, a little of which I present to this Society, I witnessed a trial of it by Dr. Ringer, at University College Hospital, on two boys under his care. Professor O'Leary, of Cork, was also present. Half a drachm, infused in a little boiling water for ten minutes, was given to each, the whole was swallowed without straining. As stated by Dr. Coutinho, in ten minutes the perspiration became visible on the face of one of the boys, and the whole body soon became enveloped in it; this continued for more than an hour while I waited. The sialagogue effect in this case was not so marked, although the secretion of saliva was above normal. In the other case the salivation was most marked, but the diaphoretic action not perceptible, the boy's face became covered with a suffused flush, the secretion of saliva was very profuse, he had a disinclination to speak, and appeared much depressed. The temperature in both cases fell quite one degree, although at first it was raised a little, and the pulsation also was quickened while the action of the medicine lasted; notes were taken of these, but they are not in our province. Eventually sickness was produced in both cases, but this was after I had left. As the doses were small, half a drachm for boys of about eleven years of age, the trial was sufficient to prove that the drug has a powerful physiological action. Dr. Ringer will, I expect, ere long publish more on this head.

It has been stated in French journals* that there are several kinds of Jaborandi known in Brazil. I am satisfied that the sample I have obtained is the same as that which Dr. Coutinho and Professor Gubler experimented with at the Beaujon Hospital, as M. Adam, the pharmacien at that hospital, informed my correspondent where a little of it could be purchased, so that for authenticating further supplies that may arrive my sample will be of service. The whole leaf is said to be large and impari-pinnate; a translation of Professor Gubler's description of it has appeared in the *Pharmaceutical Journal*. Unfortunately, my sample is broken up into much the same condition in which we receive henbane leaves in commerce, and portions of the petiole are mixed with it. The lamina, which is about the thickness of Alexandrian senna, is much reticulated; the veinlets are raised, and show very distinctly on both sides of the leaf; the margin is entire, and a little re-curved, probably the effect of drying. Judging from a piece picked out measuring three-quarters of an inch across, and which was a complete half section of a portion of the leaf from the mid-rib to the margin, I should think the entire leaf or leaflet is about two inches broad by about four inches long; but this, of course, is doubtful. The lamina contains a number of glands, which are arranged very regularly about half a line apart. These give a peculiar pellucid, dotted appearance to the leaf when looked through towards the light, similar to that in buchu and other rutaceous and hypericaceous leaves. The odour is very characteristic, resembling that of a mixture of Indian hemp, matico, and cubebs. So much is the odour of the last two present, as to lead one to suppose that it must be nearly allied to them, yet it has little pungency in taste. According to Professor Gubler,* Professor Baillon, by comparing Dr. Coutinho's samples of Jaborandi with the Brazilian plants in his Herbarium has been able to assure himself of the identity of Jaborandi with a species of the N. O. Rutaceæ, the *Pilocarpus pinnatifolius*, Lem. But I think this is an error, although the description of the whole leaf given by Professor Gubler exactly agrees with that of some fresh leaves of *Pilocarpus pinnatifolius* obtained by Mr. Holmes from Kew Gardens. The margin of the leaflets of the latter becomes a little recurved on drying, but the veinlets appear much more raised on the under surface of the leaf than on the upper. The dotted glands are about the same size, perhaps a little more numerous than those on the Jaborandi. But the odour and taste of the leaf of *Pilocarpus pinnatifolius*, when dried and bruised, is very distinct from that of Jaborandi; its odour resembles that of the ivy leaf bruised, and the infusion in boiling water smells somewhat like that of boiled spinach. The taste is peculiar, rather pungent, and produces a tingling sensation upon the tongue. The administration to a boy, 12 years of age, of half a drachm of it infused in boiling water, in about 20 minutes produced merely a little flushing in the face, the diaphoretic and sialagogue action were entirely absent. Of course these leaves were from a plant of hot-house growth; grown in its natural habitat its effects might be different; but still, Dr. Ringer and others, as well as myself, who watched the cases, and examined the leaves and infusions of both, were satisfied this was not the same as the Jaborandi we had tried before.

I have mentioned that the somewhat aromatic odour of Jaborandi would lead one to suppose that it was the produce of one of the Piperaceæ, but botanists think differently. Professor Oliver, at Kew (as well as Professor Baillon), thought it was a rutaceous leaf. Yet there is a species of pepper undoubtedly called Jaborandi, the *Piper Jaborandi*, Velloso, the reticulations of which, by reference to specimens in the British Museum Herbarium, I find are much like those of this obtained from Paris; but the dots are arranged mostly in parallel rows on each side of the smaller veins, and are more numerous and smaller than on the other, the leaf also is more papyraceous, and I think larger, than the leaf or leaflet of Jaborandi. Its leaf also is simple, not pinnate, as the whole leaf of Jaborandi has been described by Professor Gubler. By comparison with the leaves of other species of *Piper* at the British Museum and Kew, by the kind permission of Mr. Carruthers and Professor Oliver, I was not able to make out any that resembled my sample. If it be a pinnate leaf, it was, perhaps, a waste of time to look in that Natural Order for it.

The *Monniera trifolia*, Aublet, N.O. Rutaceæ, goes by the name of Jaborandi in some parts of Brazil,† but the leaflets of this are small, not larger than that

* *L'Union Pharmaceutique*, 1874, p. 120.

* *L'Union Pharmaceutique*, 1874, p. 123.

† *L'Union Pharmaceutique*, 1874, p. 186.

of the common privet, which it somewhat resembles. Among the rutaceous plants which Mr. Holmes and I examined at Kew, *Ticorea jasminiflora* and *Galipea heterophylla* most resembled the sections of leaf I picked out of the Jaborandi. Until we get a further supply, which is expected ere long, including the organs of reproduction, we shall, I think, be unable to say what the name of the plant is that yields the drug under our notice. From what I have lately learnt this kind of Jaborandi is well known in Pernambuco.

As regards the chemistry of the drug, Dr. A. Rabuteau has examined it, but with no very definite results. He finds* that it contains—(1) a volatile principle, inert; (2) a part soluble in water, and devoid of taste, also inert; and (3) a part insoluble in water, but soluble in alcohol, and possessing a bitter taste. On this last he found, by experiment upon himself, depends its sialagogue and other effects. He did not find any alkaloid or definite active principle present in it.

NOTE ON JAPANESE OIL OF PEPPERMINT.

BY JOHN MOSS, F.C.S.,

Late Demonstrator in the Laboratory of the Pharmaceutical Society.

At the last evening meeting of the Society, the opening meeting of the session, there was placed on the table a specimen of so-called crystallized oil of peppermint, this having been presented to the museum by Messrs. Cyriax and Farries. The specimen excited considerable interest, and did not seem to have been previously met with by those who examined it. I therefore thought it might be useful to ascertain what was known of the body, and, if it presented any points of interest, to place these before the Society. I may premise that the particular sample in question is part of a parcel which was received from Japan, in a cylindrical tin canister, along with a bottle of the liquid oil, a specimen of which is presented to the museum by Messrs. Corbyn & Co.

It appears that in 1862 a memoir on crystallized oil of peppermint, from Japan, was presented to the Chemical Society by Oppenheim.† This chemist speaks of the substance coming to this country in considerable quantity in earthenware jars, and of its being adulterated with sulphate of magnesium—to which it has a close resemblance in crystalline form—to the extent of 10 to 20 per cent. This is far from being the case now, for the result of many inquiries is to find that the body is almost unknown here (indeed, Mr. Hanbury is the only gentleman to whom I have applied who is at all acquainted with it);‡ and, so far from being adulterated with sulphate of magnesium, the specimen on the table, if not absolutely pure, is at least free from all impurities not derived from the original oil.

Oppenheim called the subject of his experiments, *camphor or stearopten of peppermint oil*, and also *menthol*. In Dr. Attfield's 'Manual,' peppermint camphor is styled, more systematically, I think, hydrous menthene, *menthene* ($C_{10}H_{18}$) being the hydrocarbon which is known to be common to several, if not all, varieties of peppermint oil. Oppenheim found that his camphor fused at 36° C., and boiled at 210° C.; that it was very slightly soluble in water, very soluble in alcohol, ether, bisulphide of carbon, fatty and essential oils, and in alcoholic solutions of the caustic alkalies—from the soda solution it crystallized in long needles. It was insoluble in aqueous alkalies. It liquefied in a current of hydrochloric acid or of sulphurous acid gas, resuming the solid crystalline character unchanged on exposure. From solution in strong acids it was separated by water as an oil, which soon solidified with properties unchanged. Having repeated these experiments, I have no hesitation in saying that the present specimen, if not the identical body examined by Oppenheim, is a physical isomer of it; for I find that it fuses at 39° C., re-solidifies at 37·5° C., and boils at 215° C. It should be stated, however, that the boiling point remained stationary for some seconds at 210° C., so that there is the probability of this specimen being a mixture of Oppenheim's camphor, with a more condensed body having higher fusing and boiling points. There may be a number of such isomers, for Dumas,* by exposing at 0° C. American oil of peppermint, which resembles the Japan oil in furnishing crystals at a relatively high temperature, obtained crystals which, when purified, fused at 25° C., and boiled at 208° C. In other characters they resemble the crystals from Japan oil. By exposing the liquid Japan oil to cold for some days (a great part of the time below 0° C.) I failed to obtain crystals. It is therefore probable that this oil has already yielded such as it is readily capable of doing. This is indeed what one might expect, for it is not easy to see the object of sending both crystals and liquid into the market, if the original product does not spontaneously deposit the former, and so give an inconvenient mixture of solid and liquid. Both Oppenheim and Dumas concur in ascribing the formula $C_{10}H_{20}O$ to the bodies they examined. Time, or the want of it, has not permitted me to verify this. The menthol from spearmint described by Gladstone† has the formula $C_{10}H_{14}O$. It boils at 225° C. Oppenheim considers, on very good grounds, that the body from Japan oil is a monatomic alcohol, $\left.\begin{matrix}C_{10}H_{19}\\H\end{matrix}\right\}O$ *menthylic alcohol*, or *hydrate of menthyl*.

In an experiment with liquid Japan oil it commenced boiling at 206° C, the temperature rose to 210° C, where it was stationary for some time, and finally reached to 218° C. This, therefore, is a mixture of two or more bodies; but as menthene, according to Oppenheim, boils at 163° C, this hydrocarbon does not enter into the mixture.

Crystallized *Chinese Oil of Peppermint* is mentioned in the work 'Pharmacographia'‡ recently issued by Mr. Hanbury in conjunction with Dr. Flückiger. It is there referred with reserve to *M. arvensis*. Oppenheim distinctly gives *M. piperita* as the source of the camphor he examined, and he does not hint at a Chinese origin. It is stated in 'Pharmacographia,'§ that to distil *M. arvensis* with *M. piperita* ruins the flavour of the oil yielded by the latter plant. I consider this strong positive evidence that *M. arvensis* is not the source of Japan oil, for this oil is not greatly inferior to the best Mitcham oil in point of fragrance. If a demand for it were to arise in this country (by confectioners, etc.), there is little doubt that it could be supplied at a low price

* *L'Union Pharmaceutique*, 1874, p. 135.

† *Journ. Chem. Soc.*, xv., 24.

‡ Dr. Flückiger (*Pharm. Journ.* [3], ii., p. 321) speaks of solid *Japanese peppermint oil* having been met with in European trade during the past few years.

* Gerhardt, 'Traité de Chémie Organique,' iv, 357.

† *Journ. Chem. Soc.*, 24, 10.

‡ p. 434. § p. 436.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 7, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

RECRUITING FOR MEDICAL DISPENSERS.

"A competent and steady dispenser can obtain a salary of £30 per annum, besides board and lodging." "The work is by no means arduous, and those engaged in it would always be well fed and sheltered." Attention "youths of both sexes" in Great Britain, who may be suffering from competition in overcrowded callings! This new land, flowing with milk and honey, is within your view, and the modern JOSHUA who will portion out your lot in it is an M.D., who makes the announcement through the medium of the *Daily Telegraph.* Brought into competition with such a benefactor, Sergeant KITE and his colleagues ought soon to have to take off their recruiting ribbons and wait for harder times, leaving the War Secretary to bless the great invention of "skeleton" regiments; whilst the "Song of the Shirt" should surely at once become but a relic of a state of things which has passed away!

But who has created this glorious prospect? Can we answer the question without being thought egotistical? Nay! So let the "M.D." answer it for us; and he says the Pharmaceutical Society! It is to the action of the Pharmaceutical Society the fact is due that "medical practitioners are greatly in want of assistants competent to dispense medicines and keep books," for—says M.D.—their difficulty "has been considerably increased since the Pharmaceutical Society has set up examinations of a high standard." Lest therefore, in these days of Conservative reaction, even the myriad-tongued *Daily Telegraph* should not make itself heard by all, we gladly help in proclaiming that food and shelter in a medical dispensary, and £30 a year, are to be had for little more than the asking.

But will recruits flock to the standard? "I can call spirits from the vasty deep," boasted GLENDOWER. "Why, so can I," retorted HOTSPUR, "or so can any man; but will they come when you do call for them?" An analogous question arises here. Judging by the aid of experience communicated from all parts of the country, we are inclined to believe that even "M.D.'s" dazzling promises will not attract many "youths of both sexes," and, speaking frankly, we hope they will not. For it will not do to lose sight of the fact that many pharmacists offer in vain better—we will not say more liberal—terms to qualified assistants; whilst their desire to give a remuneration still more in keeping with the skill and education which conscientious pharmacists now expect their assistants to possess, is curbed by the fact that they too often have to compete with the "open shop" of a medical practitioner, served by an "assistant competent to dispense medicines and keep books," but without any pharmaceutical qualification. Therefore, if unable to give much encouragement, we will venture a little advice to medical practitioners suffering from the "assistant" famine, and that is, to abandon as far as possible the work of dispensing medicines and selling drugs, proprietary preparations and the like, to those whose legitimate vocation it is.

Of course the old retort will be made with respect to chemists and druggists prescribing over the counter, and we confess we wish it had not so much force. But if one thing more than another has tended to perpetuate this unhealthy practice, it has been the custom which has obtained so widely with medical practitioners in respect to their assistants. Unfortunately the Pharmaceutical Society's "examinations of a high standard" are not yet compulsory upon the assistants, either of medical practitioners or of pharmacists. There has been, therefore, and there still is, nothing to prevent the drafting of a "youth" from an "overcrowded calling" into the dispensary. Of course, when there, he would not be allowed to dispense medicines until he is "competent," but whilst acquiring the moderate amount of pharmaceutical experience that has hitherto given the right to commence business as a chemist and druggist, he has also become accustomed to the practice of prescribing for small ailments in his employer's absence. Is it strange, then, that the taste, once acquired, should be persistent, when it is found helpful also in filling the till? The taste is one, however, which the Pharmaceutical Society has never assisted to develop.

Should sufficient interest be excited by the manifesto of "M.D.," to induce him to send another communication to the *Daily Telegraph*, we suggest that he should take the opportunity of stating how long an interval would be required generally between the drafting of a "youth of either sex" from an "overcrowded calling" into the dispensary, and the time when the youth is deemed sufficiently "competent" to receive the munificent stipend of a gentleman's servant.

THE SCHEELE MEMORIAL.

WE are sorry to note, from the report of the discussion at the meeting of the Council last Wednesday, that the invitation issued by the pharmacists of Sweden to the pharmacists of other countries, and officially communicated to the Council of the Pharmaceutical Society, to assist in defraying the expense of erecting a monument to SCHEELE in his native town, has hitherto practically received no response in Great Britain. Some of our readers will thank us for informing them that subscriptions may be paid to MR. ELIAS BREMRIDGE, 17, Bloomsbury Square.

TIPPLING IN BITTERS.

THE instinctive deference to the principles identified with Good Templarism that manifests itself in the various disguises under which alcohol is imbibed is probably as widely diffused as is the love for fermented liquors. With SAIREY GAMP it took the form of a teapot; with some of her patronesses—if we may believe the Saturday Reviewer—it probably cropped up as toilet necessaries. In the United States this modern PROTEUS appears to have assumed the garb of "bitters," and it is stated by the *Boston Journal of Chemistry* that "thousands of persons, who would never touch ardent spirit in its ordinary forms, take these disguised drams habitually." It appears that Mr. HENRY VAUGHAN, the State Assayer of Rhode Island, has lately made an analysis of thirty varieties of these "bitters," including all the favourite "brands" in the market. He reports that he found the amount of alcohol in them to vary from 6·36 to 59·14 per cent. Twenty-three out of the whole number contained more than 30 per cent., while only six fell below 20 per cent.

COD-LIVER OIL.

IN a recent letter describing the fisheries about Newfoundland, it is estimated that the total catch of cod along the coast is not less than 1,650,000 quintals, and the quantity of oil extracted from their livers one and a quarter million gallons, valued at about £200,000. Nearly all of this oil, it is added, is shipped to England, the duty in the United States being so high at present as to almost prohibit its importation, otherwise much more of it, if not all, would go to that market.

TOOTH-ACHE PENCILS.

IN reply to a letter forwarded by us to the Board of Inland Revenue respecting the doubt which exists as to the necessity of affixing a stamp to tooth-ache pencils, we have been informed by the Secretary to the Board that "Harvey's Tooth-ache Pencil is not liable to a stamp."

PHARMACIES IN PARIS.

THE *Lancet* states that, according to the Census recently published by the Prefecture of the Seine, there are in the city of Paris 618 pharmaceutical establishments, and 298 in the suburbs.

WE have been informed that at the last meeting of the Directorate of the Austrian Pharmaceutical Society, Mr. THOMAS GREENISH was elected an Honorary Member, and Mr. FRANCIS SUTTON a Corresponding Member, of that Society.

THE Chair of Chemistry in the University of Dublin is now vacant, through the resignation of Dr. APJOHN.

Transactions of the Pharmaceutical Society.

GENERAL MEETING—BENEVOLENT FUND.

A general meeting of the Members and Associates in Business of the Pharmaceutical Society, and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Friday, October 30th, for the Election of FOUR ANNUITANTS.

Mr. T. H. HILLS, President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, and having examined the voting papers, brought up the following

REPORT.

We, the undersigned scrutineers, appointed at the tenth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following result:—

	Votes Polled at		TOTAL.
	Election, 1873.	Election, 1874.	
1. Atherton, William	....	374	374
2. Beaton, Elizabeth	895	944	1,839
3. Bellingham, Henry James	....	2,820	2,820
4. Linging, Bine	129	154	283
5. Markland, Edwin	....	893	893
6. Moss, Mary	1,351	1,147	2,498
7. Phillips, Dorothy	....	481	481
8. Wick, Sophia	....	1,318	1,318

Nine voting papers were informal, and were disallowed.

ALEX. BOTTLE, *Chairman.*
THOMAS GREENISH.
J. ROBBINS.
WALTER DUTCHMAN.
HENRY HILLIER.
GEORGE W. SANDFORD.
ROBERT HAMPSON.

October 30, 1874.

The Chairman declared the following duly elected:—

ELIZABETH BEATON.
HENRY JAMES BELLINGHAM.
MARY MOSS.
SOPHIA WICK.

MEETING OF THE COUNCIL.

Wednesday, November 4th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Frazer, Greenish, Hampson, Mackay, Owen, Radley, Rimmington, Robbins, Sandford, Savage, Schacht, Stoddart, Sutton, and Williams.

The minutes of the previous meeting were read and confirmed.

THE NORTH BRITISH BRANCH.

Mr. MACKAY said that, having received from the Secretary a copy of the report of the deputation which recently visited Edinburgh, he had called together the members of the North British Board of Examiners, and read it to them. They were very pleased to find that the arrangements in Edinburgh met with the approval of the deputation, and determined to carry out the few suggestions on matters of detail contained in the report. He might also mention that great satisfaction was felt at that part of the report which suggested that in future there should be, at least once a year, a visit by some members of the London Board to Edinburgh, and a reciprocal visit by some members of the Edinburgh Board to London. So much good feeling had arisen from the interchange of opinions by members of the two Boards, that it was believed this practice would tend to produce good results which could not be attained in any other way. Mr. Mackay also stated the formal arrangements which would be necessary for granting a lease of the new premises in Edinburgh to the Society.

The Scheele Memorial.

The President inquired how many subscriptions had been received towards the Scheele memorial.

The Secretary said he had not yet received any.

Mr. Williams announced, as a commencement, a subscription of one guinea each from Messrs. J. Bell and Co., Mr. Hills, and himself, and said he should be happy to receive any further names.

Mr. Greenish suggested that the subscription list should be left in the office, as he objected, on principle, to such matters being brought before the Council formally.

Mr. Williams said the subscription list should be placed in the office, and he hoped to find a considerable number of names added to it.

The Congress at St Petersburg.

Mr. Greenish said he had received the *Austrian Pharmaceutical Journal*, containing the President's report of the recent Congress. Mr. v. Waldheim's report to the Austrian Pharmaceutical Society, of which he is the Vice-President, was practically identical with the one which had been already submitted to the Council by himself and Mr. Sutton. Mr. v. Waldheim also expressed very warmly indeed his pleasure at the sympathy and support he had received, as President of the Congress, from the English delegates, especially as, their institutions being so different, they had no direct interest in some questions before the meeting. The Pharmaceutical Society of Austria had paid the Society of Great Britain the compliment of naming one of the English delegates an honorary, and the other a corresponding, member of that Society. His object in rising, however, was principally to supply an omission which had been made on the former occasion, and, as had been done by the Austrian Society, to move a vote of thanks to the St Petersburg Society and its President. He would therefore move—

> "That the Council of the Pharmaceutical Society of Great Britain desire to convey to his Excellency Privy Councillor von Trapp, to the Pharmaceutical Society of St Petersburg, and to the Organization Committee their best thanks for the cordial reception experienced by the delegates of this Society at the International Pharmaceutical Congress at St Petersburg."

He thought such a resolution would be an act of international courtesy, and was quite sure it would be as highly esteemed as it was richly deserved.

Mr. Schacht, in the absence of Mr. Sutton, had much pleasure in cordially seconding the motion, which was carried unanimously.

Elections.

MEMBERS.

Chemists and Druggists.

Harvie, John..........................Airdrie.
Pare, Henry Burton..................Bolton-le-Moors.
Pinkerton, John Stark ....Glasgow.

ASSOCIATES IN BUSINESS.

Minor.

Hitchcock, James.................... Stonebroom.

Modified.

Girvan, John ....Liverpool.

ASSOCIATES.

Minor.

Davey, Thomas Sercombe............Exeter.
DeCarle, Horace Edward ....Norwich.
Fenton, Thomas........................Edinburgh.
Fowler, Thomas........................Torrington.
Kempster, Frederick Augustus ...Clapham.
King, George ....Surbiton.
Owen, Rowland..........................Holyhead.
Roebuck, Alfred ....Manchester.
Smithurst, John.......................Nottingham.

Modified.

Samuel, James Burck ....Leighton Buzzard.

APPRENTICES OR STUDENTS.

Francis, Rawson Parke...............Diss.
Savory, Arthur Ledsam ....London.

Two members who had neglected to pay their subscriptions in proper time were ordered to be restored to their former status, on payment of the current year's subscription and a fine.

Finance.

The report of this Committee was read and adopted, and sundry accounts ordered to be paid.

Benevolent Fund.

This Committee reported that it had held two meetings since the last Meeting of the Council, and recommended that the following grants be made :—

Ten pounds to a registered chemist and druggist, now out of employment, but formerly in business for seven years in Suffolk.

Fifteen pounds to a registered chemist and druggist, aged 68, formerly in business in the Minories.

Ten pounds to the widow of a late annuitant at Liverpool, being the second grant this year.

The consideration of another case was adjourned, in order that the Committee might see the applicant personally.

The Regulations had been discussed by the Committee, but the further consideration thereof was adjourned to the next meeting.

Letters of thanks were read from some of the successful candidates at the recent election, one of which contained a suggestion that the limit of age should not be rigidly insisted on in special cases of affliction, such as blindness, paralysis, or other disablement. The letter was referred to the Benevolent Fund Committee.

The Report and recommendations were received and adopted.

Library, Museum, and Laboratory.

The Report of this Committee contained a recommendation for the purchase of the following books for the library :—

'Southall's Organic Materia Medica.'
'Garrod's Materia Medica.'
'Index to Journal of Chemical Society.'

The Librarian had reported that the average attendance in the library from July 8th to August 1st was, in the day 16, at night 6 ; and from the 1st to the 13th of October, daily 13, at night 5. The number of books issued between July 8th and October 13th had been, in London 248, to the country 113, the number of places being 49. He had also presented the following list of 16 books which are missing from the library :—

'Barber's Companion to the British and London Pharmacopœias,' 6th edition, 1872.

'Bloxam's Laboratory Teaching,' 1869.

'British Pharmacopœia,' 1867.
'Clendon's Observations on the Extraction of Teeth,' 1843.
'Cooke's Botanic Terms,' 1862.
'Dyer's Intensity Coils: How made and how used,' 2nd edition, 1867.
'Hogg on Skin Diseases,' 1873.
'Jones's Natural History of Animals,' vol. 1, 1852.
'New York College of Pharmacy Alumni Association, Third Annual Report.'
'Orme's Introduction to the Science of Heat,' 1871.
'Parlatore's Coniferas Nonas Nonnullas,' 1863.
'Pereira's Selecta è Præscriptis,' 11th and 12th editions.
Piesse's Art of Perfumery,' 1862.
'Thorpe and Muir's Qualitative Chemical Analysis,' 1874.
'Timbs's Knowledge for the People,' parts 5, 7, and 10. 1871.

Professor Attfield had reported that in the Practical Chemistry Class, up to the 14th October, there had been forty entries since the commencement of the session, and that forty students were now at work.

The Curator of the Museum had prepared a code of rules, which he suggested should be sanctioned by the Council for the guidance of students using the museum, and of which the Committee approved. One of the proposed rules was to the effect that conversation should not be allowed in the museum.

The VICE-PRESIDENT said if they withdrew from the students the privilege of meeting in the museum, it was a question whether there was any other room in the building which they could give them for the purpose, because he conceived it was a great advantage to students to be able to meet and talk over matters in which they were interested. He himself did not see much objection to a conversation taking place in the museum.

Mr. GREENISH said the objection on the part of the Curator was to young men going in and lounging about, sitting on the table, with walking-sticks under their arms, and gossiping about all kinds of matters not at all connected with their studies. The Committee most heartily approved of the whole of the rules.

Mr. SAVAGE thought the rules were very good, but he agreed with the Vice-President, that some room should be appropriated to the use of the students for conversation.

Mr. WILLIAMS thought the musuem was the most convenient room available, as conversation there seemed less objectionable than anywhere else.

The PRESIDENT thought they had better leave the matter as it was at present. If the students required a room to meet in for any particular purpose, no doubt it would be found for them on application.

Mr. ROBBINS said he apprehended the Curator would not prevent students speaking to one another in an ordinary way, but he only wanted power to put a check to too much sauntering about and gossiping.

The Report was received and adopted.

HOUSE.

This Committee presented a report with reference to certain details connected with the gas-lighting of the library, museum, etc.

LAW AND PARLIAMENTARY.

This Committee reported the result of certain legal proceedings taken by the solicitor against offenders under the Pharmacy Act, the details of which have already appeared in the Journal.

The SECRETARY stated that one of the parties referred to, who had obtained leave to appeal to a superior court, had that morning paid the fine and costs, so that it was probable no further proceedings would be taken.

After some further conversation, the Report was received and adopted.

REPORT OF EXAMINERS.

October, 1874.

	Candidates.		
	Examined.	Passed.	Failed.
Major, England and Wales	2	0	2
Minor, " "	7	2	5
Modified, " "	27	14	13
Preliminary,			
England and Wales,	222	90	132
Scotland,	21	9	12
	243	99	144
	279	115	164

Certificates Received in Lieu of Preliminary.

2 College of Preceptors.
1 Royal College of Surgeons of England.
1 Society of Apothecaries.
1 University of Durham.
1 University of Oxford.
—
6

ELECTION OF EXAMINERS.

The PRESIDENT reminded the Council that at the next meeting they would have to elect the Board of Examiners for the ensuing year.

Mr. WILLIAMS said he thought it was desirable that the Council should know some time beforehand who were the candidates, in order that they might have an opportunity of considering whether it would be advisable to make a change or not. He therefore suggested that any member of the Council should mention the name of any pharmaceutical chemist he would like to have appointed. He would also suggest that they should only elect twelve instead of fourteen. There had recently been a great pressure on the examiners, but they had reason to believe that that was now over, and that for the next year, at any rate, there would not be so many candidates. He therefore thought it would be as well only to appoint twelve examiners, though, of course, they could at any future time elect two more if it were necessary.

Mr. GREENISH said this was a most important question, and one on which he had already more than once expressed his opinion. He felt it was exceedingly difficult to get good Examiners either in London or in the country, and if gentlemen residing in the country were chosen, a considerable expense was involved. He intended to propose that each member of the Board should be ballotted for separately, because it would be exceedingly invidious to leave out any member who had been on the Board for many years, and to appoint another in his place, but at the same time he thought it most important that there should be an occasional change, and he saw no other mode of accomplishing it. It was astonishing how soon examiners got into a groove, until at last young men coming up to be examined could pretty well ascertain the character of the questions which would be asked. He also thought there should not be any gentleman on the Board who was not practically engaged in that on which he professed to examine. He considered it was their bounden duty to have the Examining Board in the highest state of efficiency possible, without any reference to individual feeling.

Mr. SAVAGE thought it would be desirable for the Secretary to communicate with gentlemen proposed to be elected or re-elected, in order to ascertain whether they wished to retire or would serve if elected.

Mr. HAMPSON thought this was a very excellent suggestion, and also approved of the plan proposed by Mr. Greenish.

The VICE-PRESIDENT said the Board of Examiners would look upon it as utterly impracticable to reduce the number from 14 to 12. At the last examination there was a discussion whether the Board, as now constituted, would be able to get through the work in a day, and whether there would not be a difficulty to complete the Minor examination in one day, on account of the addition of practical chemistry to the subjects. It would, therefore, be premature to contemplate reducing the number of examiners at present, and imposing on the twelve gentlemen who were left more arduous duties than they now had. He agreed that it was the duty of the Council to select the best men the Society could procure as the Board of Examiners, but when it was proposed to elect them by ballot, he would refer to the 10th section of the bye-laws, which said that the Council should "appoint" the Board of Examiners. He took it that "appointing" was not "balloting." The Council ought to look about and see where they could themselves find the best men for the position, and not look upon them as candidates who were to be elected like annuitants on the Benevolent Fund. He should not at all scruple, if he believed that any member of the Board, from any cause, was not a fit man, to do his duty openly by appointing a younger and better man in his place, and he did not want the protection of the ballot in so doing. He maintained that they had no power to elect from a list of candidates.

Mr. Savage said there was a general bye-law which allowed a ballot to be taken on any question, if it were demanded.

Mr. Greenish remarked that when, some twelve months ago, he made a somewhat similar suggestion as to the desirability of changing the members of the Board of Examiners, no notice was taken of it; but several of the examiners had spoken to him upon the subject privately, and every one of them considered that it would be an advantage if such a plan were carried out.

Mr. Schacht said, although they all agreed that it was desirable to have an occasional change, because no doubt a man might ultimately drop into a kind of groove, there was no doubt that the duty of examining involved qualities which were learned by experience, and therefore he did not think a man would be so efficient an examiner the first year as he would be the third or fourth. He had understood from some very able examiners that they really considered the duty of examining well as one of the most arduous duties of their lives; in fact, it was quite a problem to themselves to sound the capacities of candidates. It was, therefore, clearly not a quality that an ordinarily clever or capable man must necessarily possess, and therefore he did not think any plan should be adopted which would tend to change the Board very much, but rather one by which they could gradually superimpose a good element upon rather an inefficient one. His notion upon the matter was that the word "choice" was the correct one, and he did not think it could best be performed by going through the process individually. If there were a list of fifteen or sixteen names, out of which fourteen were to be chosen, each member of the Council would no doubt conscientiously do his utmost to select the best names.

The President wished to bear his testimony to the excellence of the Board of Examiners, having had the honour of presiding at several examinations since he had been President of the Society. He thought they had a most excellent set of examiners, at the same time he was quite ready to do all he could to obtain better, if possible. But they must be careful, before getting rid of those who had served them so well, that they had as good men to fill their places. He did not think it possible at present to reduce the number of examiners, if the duties were to be performed satisfactorily.

Mr. Sutton said if they had good men on the Board they had better keep them; if not, they must try and replace them, but they must be careful not to make any change which would not be for the better.

Mr. Betty said the question raised by th Vice-President was, whether they could elect examiners by ballot? He should like to have it decided.

Mr. Sandford, having referred to the bye-laws upon this point, said he understood Mr. Williams's wish was that any member of the Council who desired to bring forward the name of a gentleman to act as examiner should give notice before the time of election, that it might be ascertained beforehand whether he would serve if elected. He did not consider "candidate" was the right term to apply. The Council could only "appoint" a certain number, and if any fresh examiners were appointed, some of the old ones must be omitted; upon a vote being taken a ballot had in such cases been usually adopted as a matter of delicacy.

Mr. Williams said his only object in mentioning the matter was, that if the names were not mentioned until the next Council meeting, there would be no time to consider them. In his opinion, they could not direct too much care, time, and attention to the appointment of the Board of Examiners, or to any mode which could be suggested for the better carrying out of the arrangements. He was quite sure that this examination question was the one great question which the Society would have more seriously to consider than any other, and if any improvements could be made in the present Board it was their duty to adopt them.

Mr. Hampson said it was almost impossible to agree on the best men unless they had time to consider their qualifications. He understood there was a resolution passed at the last Council meeting referring to this point.

The Secretary said the question was raised, but no resolution was passed.

Mr. Frazer said he wanted each member of the Council to exercise his individual judgment with regard to each examiner, and he could not see any mode by which this could be done, except by nominating them individually. If fifteen names were proposed, he would rather vote for them individually than in a mass.

Mr. Greenish remarked that Mr. Williams had said that they should get the best men; but there might be two men equally good, and he considered it most important that the Board should be gradually changed. It was not altogether a question whether A. was better than B., for they might be equal; but if A. had been on the Board for a certain length of time, he considered it would be a better test of the efficiency of the students that another examiner should take his place.

Mr. Williams thought it was the intention of the Act that there should be occasional changes in the Board.

Mr. Robbins thought the question would be very easily decided; for instance, if any gentlemen liked to propose two other names, there would be sixteen, and each member would then have simply to strike two out of the list in order to leave fourteen, who would be elected. If there were anyone whom it was considered desirable to remove, it could easily be done in that way.

After some further conversation, it was moved by Mr. Sandford, seconded by Mr. Williams, and unanimously resolved:—

"That as the Board of Examiners for the ensuing year must be appointed at the next meeting of Council, it is desirable that any member of Council desirous of introducing any pharmaceutical chemist as an Examiner, should send the name of such person to the Secretary before the 23rd inst."

Mr. Sandford said this would give the Secretary an opportunity of ascertaining from the person nominated whether he was willing to serve, and the name could then be put on the agenda for the next Council meeting.

It was also resolved:—

"That the Secretary be instructed to communicate with the present Board of Examiners, and any others who may be suggested as suitable persons for examiners, asking if they are willing to accept office if elected."

The International Pharmaceutical Congress.

Mr. Greenish begged to present to the Council a photograph of the members of the recent Congress at St. Petersburg. In connection with this subject, it would be in the recollection of the members that a resolution was passed at the last meeting, that the International Congress be invited to hold its next meeting in London. He had written to ascertain to whom this invitation should be sent, and was informed that the invitation to the next Congress had always been sent in the form of a letter from the inviting Society to the President of the previous Congress, who would direct it in turn to the Presidents of the Pharmaceutical Societies of different countries. He would, therefore, propose that the resolution be conveyed in that manner to the President of the last Congress, and he should like it to be signed by the President and Vice-President of this Society.

This suggestion was acceded to.

PHARMACEUTICAL MEETING.

Wednesday, November 4th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read and confirmed, the following donations to the library and museum were announced, and the thanks of the Society were awarded to the donors :—

To the Library :—'Calendar of University College, London, 1874-5,' from the College ; 'Calendar of the Royal College of Surgeons of England, 1874,' from the College ; 'Medico-Chirurgical Transactions,' vol. 59, from the Royal Medical and Chirurgical Society ; 'Pharmacographia,' by Prof. Flückiger and D. Hanbury, F.R.S., from the Authors ; 'Index Plantarum Officinalium in Horto Chelseiano, 1730,' by I. Rand, from Mr. E. M. Holmes ; 'Sur la Recherche des Substances Amères dans la Bière,' by Dr. Dragendorff, from Dr. J. Morel (Translator).

To the Museum:—A specimen of Jaborandi, from Mr. Martindale ; a specimen of Japanese Oil of Peppermint, from Messrs. Corbyn and Co.; a specimen of Crystallized Stearopten of Japanese Oil of Peppermint, from Messrs. Cyriax and Farries ; a number of specimens of the Drugs of Morocco and Brazil, from Dr. Leared ; a specimen of genuine Turkey Rhubarb, from Mr. Greenish.

THE NOMENCLATURE PROPER TO AN INTERNATIONAL PHARMACOPŒIA.

The CHAIRMAN then called upon Mr. Greenish to introduce the discussion upon this subject. This Mr. Greenish did by reading a Paper, which is printed at page 361.

The PRESIDENT said this was a most important question, and well worthy consideration and discussion. He would call upon Professor Attfield to open the debate.

Professor ATTFIELD, before reading his paper, said he must apologize for preceding his seniors on an international question like this—one in which England should clearly have a prominent voice. The simple reason was that, having had the pleasure some three years ago of publishing a paper on chemical nomenclature generally, and on that which would probably be employed in future editions of the British Pharmacopœia—a paper which had been very favourably received by most authorities, chemical and medical, as well as pharmaceutical, in England and elsewhere—he anticipated that something more than a mere opinion would be expected from him. He had therefore written down a few remarks on the general principles which he thought should be followed in discussing the question, and he had endeavoured to bring that question to a distinct issue. As he understood, they had not to entertain the question of publishing an International Pharmacopœia or not, or the general character of such a work, the preparation of which he believed was in the hands of a committee already appointed, so that they really had no voice in those matters.

Mr. SUTTON said that was not so. Every one had a voice in the question of construction.

Professor ATTFIELD was glad to hear this statement from one of the delegates to the recent Congress. He had feared that the general principles of construction had been, or might be, fixed without seeking international opinions. Clearly, however, the question they had to consider that evening related not to the general nature of an International Pharmacopœia, nor to its whole nomenclature, but simply to its chemical nomenclature, or rather to the Latin chemical nomenclature appropriate to an International Pharmacopœia, and to that question he should confine his attention.

Professor ATTFIELD then read a paper "On the Chemical Nomenclature of an International Pharmacopœia,' which is printed at p. 361.

Professor REDWOOD entirely concurred in what had been stated by Professor Attfield, who for several years past had taken a great interest in this subject, and who had certainly contributed greatly towards the establishment of a greater amount of uniformity and consistency among pharmacists and medical men with regard to the chemical nomenclature of medicines than previously existed. Indeed, so far as he could gather, they were indebted to him in great measure for the introduction, on the other side of the Atlantic, in the United States Pharmacopœia, of the system which he had advocated some years ago. He (Dr. Redwood) had previously expressed his opinion as being favourable to such a change as had been suggested by his colleague—in principle, if not in every particular detail—and he did not doubt that whenever a new edition of the Pharmacopœia came out, a similar nomenclature to that now adopted in America would be adopted. It must be borne in mind, however, that in the adoption of any new system of nomenclature as applied to pharmacy, they were limited to a considerable extent by what was practicable ; the nomenclature of the Pharmacopœia was to be used by medical men, and to be understood by pharmacists ; names were but representatives of things, and when persons had once thoroughly learned the language, and become acquainted with the things which certain names represented, it was not an easy matter, especially in mature life, to change the language they had been in the habit of employing. Now, the medical men in most extensive practice were not young men ; but, generally speaking, men who had acquired their scientific knowledge some half century ago, and who were not prepared to go to school again. In recommendation of the proposal made some years ago by Dr. Attfield, and now again brought forward, it may be said that while it would reconcile the nomenclature of the Pharmacopœia with modern views in chemistry, it would at the same time make the system of names more specific, clear, and consistent with itself, and, which was a still greater recommendation, it would involve a very small amount of change, one which would be inappreciable as used by medical men, for the abbreviated names as recommended would not differ from those now in use. The difference was in the termination, and the termination generally, of the basylous constituent of a salt. He had indeed found, in discussing the matter with medical men, that very little difficulty would be found in adopting it. As the English language was spoken over so large a portion of the globe, he hoped and thought they might have reason to expect that the nomenclature adopted in the proposed International Pharmacopœia might be one which, while applicable to the Latin language, would be strictly applicable to English also, and would necessitate very little change on the part of English physicians and pharmacists. He was very glad that the subject had been introduced by one of the members of the recent Congress at St. Petersburg, and hoped the opinion of the members would go forth almost unanimously upon it.

Mr. GROVES said it appeared to him that if any change were made in the nomenclature of the Pharmacopœia, it ought to be a final one ; and with that object they ought, if possible, to avoid any approach to adopting a particular chemical theory. Chemical theories were changing from day to day; probably before the end of the present generation a very serious alteration indeed would take place, and therefore, if any nomenclature were adopted as expressive of the theory of the day, it would probably soon require another change. From this consideration he was rather inclined to look with favour on the nomenclature adopted in the German Pharmacopœia. Many of the terms certainly sounded barbarous to an English ear; perhaps they might be softened down, but they did not express any theory.

Mr. Ince said he would limit his remarks entirely to the Latin nomenclature of the proposed International Pharmacopœia. He disagreed with the views expressed by the last speaker, for the following reasons:—The proposed Pharmacopœia was to be in Latin, and he believed the time would come when the official Pharmacopœia of every country would again be issued in Latin, though an edition in the vernacular might also be published; consequently, in framing the nomenclature to be employed, the genius of the Latin language should be followed as closely as possible, and no attempt should be made to depart from it. Now, looking at the two lists of names given by Professor Attfield from this point of view, there could not be a shadow of doubt that those which had been adopted in the United States must be followed, whilst those in the other column could not, if the book was to be published with any pretensions to correct Latinity. For instance, the terms Argenti nitras, Calcii carbonas, etc., were precisely what one would expect to find in a work written in Latin, whilst the names contained in the German and Austrian Pharmacopœias were to a considerable extent German and Austrian adaptations. To take the Latin for distilled water: if you followed the English form exactly you would have Destillata aqua, but following the Latin construction it would be Aqua destillata. Looking at the matter simply from this point of view, there was an immense superiority in the names suggested by Professor Attfield, which he hoped therefore to see adopted.

Mr. Martindale desired briefly to call attention to one or two instances of the Berzelian nomenclature; the perchloride of mercury was called Chloretum hydrargyricum, whilst calomel was called Chloretum hydrargyrosum. How was this to be modified to suit prescribers? The same thing occurred with regard to the two chlorides of iron, Chloretum ferricum and Chloretum ferrosum. The question was whether they should adopt a nomenclature with inflexions for such compounds at the termination of the words, or as prefixes. He thought the prefixes were certainly much better adapted to the contractions used in prescriptions, and they were generally used both in England and on the Continent. He quite agreed with what had been said by Professor Attfield as to the nomenclature of Berzelius, which had been used in many continental pharmacopœias. Such names might be given as synonyms, but it would be scarcely possible to adopt them as headings.

Mr. Bland thought this discussion was rather premature, though he appreciated the desire of Mr. Greenish and other gentlemen to be in the first ranks of advanced pharmacy. In fact, he was reminded of the time-honoured direction of Mrs. Glasse with regard to cooking a hare—first catch it. In like manner he would say, first catch your International Pharmacopœia, and then talk about the nomenclature to be adopted. Mr. Greenish said he had had the idea floating before his mind for some time, but he ventured to doubt whether the vision would be realized before the present generation of pharmacists had all gone to that bourne from whence no traveller returned. At any rate, before its realization, there would be plenty of time for new chemical theories to arise, and the present so-called unitary notation, which he could not believe would have a very protracted existence, would doubtless have given place to another. He could also confirm what had been said by Dr. Redwood about the difficulty of inducing medical men to adopt any alteration in the Pharmacopœia; and more than that, there were special types of disease and modes of treatment which seemed indigenous to particular countries, which it would be difficult to transplant to other localities where similar diseases did not prevail.

Mr. Sutton desired to state most unreservedly that the whole question of an International Pharmacopœia was quite open to their discussion, and would so remain for a long time. The Congress had, very wisely in his opinion, arranged that their meetings should only occur at intervals of four or five years, and as to this particular question, Mr. Greenish and himself were simply commissioned to bring it before the Society, in order that all members might express their opinions freely as to the nomenclature which should be adopted. What was agreed to at the Congress was this, that if an International Pharmacopœia were to be formed—for that was not yet settled, and he was not quite certain whether they would be any the better for one—but assuming such a thing should be considered advisable, that it should be as short and accurate as possible, so as to embrace all those things as to which differences of practice might seriously affect the public health. They could not introduce numerous articles which were in common use abroad, but they wanted some universal system of using powerful drugs, so that a prescription would be understood in the same sense all over the world, and that, perhaps, might, in the course of a few years be attained. Foreigners had notions of their own about nomenclature, which were sometimes very different from those current in England; but at any rate, if Latin were used, as Mr. Ince had said, it ought to be as good Latin as possible. To show the prevalent misconceptions about this matter, he might mention that a member of the Congress had stated that the English method was to say Acetas plumbi, whereas he thought they should say Plumbum aceticum, which was more correct because the most important name of the two came first. It was, however, quite new to him (Mr. Sutton) to hear that the English did say Acetas plumbi; and inasmuch as they said Plumbi acetas they were substantially at one with their critic. To show how important it was that they should consider this subject, one very enlightened member of the Congress had remarked that the English were very heterodox, but unfortunately they were so important they could not be shut out. Therefore, if they could arrive at anything like uniformity of opinion, there was no doubt it would be treated with great respect, and very probably adopted.

Mr. Greenish said that one or two of the members of the Congress mentioned the system of Berzelius, and the Permanent Committee at St Petersburg was requested to consider it. When they left that city, it was thought that the determination of this point would be left mainly to that Committee; but since then a letter had been received in which it was particularly mentioned, each society being requested to send an answer as regards the nomenclature. It appeared that the Berzelian nomenclature was mentioned by a delegate from Denmark.

The President, in closing the discussion reminded the members that the Congress had been invited to hold its next meeting in London, before which time he hoped some definite opinion would be arrived at.

The Pharmacy of Amorphous Phosphorus.

Mr. A. W. Postans then read a Paper entitled "Suggestive Notes on the Pharmacy of Amorphous Phosphorus," which is printed at p. 363.

The President said this was a most interesting subject, but they would be in a much better position to discuss it after further therapeutical experiments by the medical profession.

Mr. Mackay remarked that phosphorus was just now a very fashionable remedy, and if this amorphous variety could be used instead of the highly poisonous phosphorus, of which they had known so much, it would be a great boon. He remembered, however, that some time ago a lecturer in the North, when speaking of these very substances, had referred to the amorphous phosphorus as being almost entirely harmless, so much so that he believed as much as an ounce had been given to a dog without producing any bad effect. As far as he knew, it had never been tried therapeutically, and it was therefore much to be desired that experiments should be made. With regard to that terrible disease, necrosis of the jawbone, which used to affect those employed in the manufacture of lucifer matches, he might mention that not long ago he had had an opportunity of going through Messrs. Bryant and May's factory, where he found that not only the red, or amorphous, but the ordinary phosphorus was used in very large quantities, and he therefore inquired whether those engaged in the manipulation were subject to this disease, and if so, whether those who used the amorphous kind enjoyed any immunity. He was surprised to find, however, that, going back for a great many years, there had not been a single case of disease in the manufactory, even in the use of ordinary phosphorus, which was attributed by the manager to the fact that the most complete ventilation was insisted upon at all seasons of the year, so that the men and boys seemed to be really working in the open air instead of in closed chambers, as had formerly been the practice.

Professor ATTFIELD said that amorphous phophorus had been used in medicine some years ago, though not extensively, except by a few practitioners. He was informed by a person engaged in the trade, that though there was a considerable demand for it some ten or twelve years ago, it had lately been seldom required. At that time, however, thereapeutists did not seem to know so much about the peculiar effects of phosphorus as they did now, when it was very generally prescribed, and therefore it occurred to him that with this increased knowledge therapeutists would be in a better position to test the qualities and medicinal properties of amorphous phosphorus. Very contradictory opinions had been expressed as to its physiological effects, and therefore it appeared very important that therapeutists should experiment with this powerful element in this particular form, and give the world the benefit of their experience. All experiments should be with red phosphorus containing no trace of ordinary phosphorus, or resulting observations would be valueless.

Mr. GREENISH said that some time ago a medical man, whose prescriptions he made up, was in the habit of prescribing amorphous phosphorus, but he had since then given it up entirely, and used the ordinary kind. Some time ago there had been an account in the *Pharmaceutical Journal* of a meeting of the Medical Society, at which a preparation, called syrup of phosphorus, was very highly spoken of, and said to contain about one-tenth of a grain of phosphorus in one drachm. It appeared to him that if this answered the name given to it, of an elegant preparation of phosphorus, it would be a desideratum, and he therefore got a small quantity, and asked his son to examine it, which he did very carefully, but out of one or two ounces he was unable to obtain any trace of free phosphorus. Not liking to trust entirely to this investigation, he asked Mr. Plowman to examine some of the same syrup, which he did; but he also was unable to find the smallest indication of the presence of free phosphorus, though it did contain a little hypophosphorus acid. It did, therefore, seem that they were as yet entirely without what might be called an elegant preparation of phosphorus in the fluid form.

Professor REDWOOD said the last remark induced him to say a word on this subject, because he differed entirely from Mr. Greenish. In his opinion, they had a most elegant preparation for the administration of phosphorus in the fluid form. It was one the formula for which he had already published on more than one occasion, being the same he advised about twelve months ago, when the subject came before the Society. It was a form for the convenient administration of the fluid preparation of phosphorus ordered in the Pharmacopœia. In the present Pharmacopœia there were two preparations of phosphorus, the Oleum phosphoratum and the phosphorus pill, and he had never heard any exception taken to the former of these, except that it did not very readily admit of administration in an agreeable and convenient form, and though exception had been taken to the pill, he did not think it was founded on any just ground, and considered both these preparations to be entirely unexceptionable. The solution of phosphorus in oil had been used for many years on the Continent, and when the oil was previously prepared as indicated in the Pharmacopœia it formed an excellent solvent. He had kept phosphorus in solution in oil of almonds for many months, and if not exposed to the light it kept perfectly well. It was luminous in the dark, it smelt strongly of phosphorus, and it had the ordinary disagreeable taste. A few drops formed a dose, and the only question was how it should be administered. The Pharmacopœia did not profess to indicate how medicines should be prescribed, but left that to the physician. He had endeavoured to answer the question, and the method he had indicated would be found in the Journal, and he had also published it elsewhere. He recommended it as an emulsion, and a most perfect, elegant, and agreeable emulsion it formed; a tablespoonful of it could be taken without disgust, it would keep for any reasonable length of time, and it perfectly fulfilled all the requirements of a medicine. It was made by taking a drachm of the phosphorated oil, two drachms of yolk of egg, six drachms of syrup of tolu, a drachm of Liquor potassæ, and sufficient chloroform water to make up to six ounces. There was no doubt a little art in mixing it, because if the yolk of egg and phosphorated oil were mixed together, and the Liquor potassæ put in, it formed a magma, to which the chloroform water and syrup could not be afterwards added with advantage; but if the phosphorated oil, the yolk of egg, the syrup of tolu, and the chloroform water were well rubbed up together, and then the Liquor potassæ added and well shaken up, a good emulsion would be produced which would keep for several months. It had an agreeable taste, the odour was nothing offensive, and no decomposition took place. Of course, if ordinary water were used, the yolk of egg would undergo decomposition and become offensive; but the chloroform water had the remarkable property of preventing such decomposition, and he did not think they yet knew half the extent of its applicability in pharmacy. He had kept an emulsion of this kind for three or four months in a vessel occasionally open, and it was as sweet and good at the end of the time as at the beginning. In fact, he considered chloroform water one of the best vehicles they had for many medicines, and the emulsion thus made with it was an elegant and not disagreeable form for the administration of phosphorus. Something might no doubt be done with the amorphous phosphorus, but they did not know much about it as yet, and therefore he thought it better to keep to the form in which it was known, and in which it might be very easily and effectually administered. The phosphorus pill of the Pharmacopœia had also been referred to, which consisted of a solution of phosphorus in balsam of tolu, hardened with a little wax. This form had been criticized by some gentlemen, simply because they had taken a superficial view of the subject. As with regard to phosphorated oil, they were not to suppose that everything ordered in the Pharmacopœia was just in the form in which it was to be taken. It was left to the physician to prescribe these things, and a hint was given that the pill might be softened with a few drops of spirit. Exception had been taken that it would remain undissolved in the stomach, and pass through the intestines the same as it went in, and he could not question the evidence of the very competent gentleman who had investigated its effects in that way. Still there was great difference in different individuals, and pills were not taken nowadays like the perpetual antimony pill used to be taken generation after generation, never being administered without being searched for again and used repeatedly. It was not intended that this pill should be so used. The form in which it was ordered in the Pharmacopœia was most suitable for its preservation, and it had the great advantage of being in a resin heavier than water, so that it might be readily kept from the air. The specimen on the table had been kept nearly twelve months, and was as good as when first made; but when it had to be administered it could be made easily miscible with the contents of the stomach by adding one grain of soap to three grains of the pill. There was a glass of water on the table in which a pill so prepared had been placed, when it became totally disintegrated and diffused through the water, just as it should do in the stomach. The only thing, therefore, to make this pill perfectly miscible was to add a little soap. It might perhaps be said why was not the soap ordered in the formula given in the Pharmacopœia; but it must be obvious that if it had been the pill-mass could not have been kept excluded from the air by its immersion in water, which was one of the characteristics of this preparation. From the beginning of the process for making the pill-mass to the time at which it was dispensed for administration, the phosphorus and the mass containing it was never exposed to the air, and the phosphorus was thus kept in an unoxidized state. A remark had been made that perhaps a better mode would be to dissolve the phosphorus in suet, and roll the mass out into pills and coat them with gelatine; but he should like to know what would become of the suet pills when put into melted gelatine. If phosphorus were to be administered in solution in tallow or fat (and he was by no means opposed to that mode of administering it, although he preferred the other), he would suggest a means by which the pills could be much more readily formed, and afterwards preserved, namely, by the addition of a little phosphate of lime. He had been accustomed in his lectures to recommend this method of making fatty bodies such as mercurial ointment into pills. If two drachms of mercurial ointment were mixed with one drachm, or a little more, of phosphate of lime, it acquired a perfectly good pilular consistence; and having mentioned this matter in a lecture in that room some twelve months ago, one of his pupils suggested that phosphorus might be dissolved in suet and made into pills in the same way, and a few days afterwards he brought him some so made, which were in every respect perfect. Such pills had also this great advantage, that, being heavier than water, they could be kept immersed in water for any length of time in a state ready for administration.

Mr. Martindale said one objection to the phosphorus pill mass as recommended by Professor Redwood was, that it would require eight grains to be taken for an ordinary dose, and as people did not generally like to take two pills three times a day, he thought it would be much better if the same quantity could be put into one pill.

Professor Redwood said the preparation might easily be made stronger, as the balsam would readily dissolve a larger proportion of phosphorus.

Mr. Martindale said another objection was, there were no means of knowing when the phosphorus was entirely dissolved in the tolu while making it. At the meeting of the Pharmaceutical Conference at Liverpool, he had given a formula—which was, phosphorus 1 per cent., dissolved in cocoa-butter, much in the same manner as the Oleum phosphoratum is directed to be prepared, and, after considerable experience in the administration of this element, he found this the best form in which it could be given. It certainly required a little dexterity in manipulation to roll them out, but this could be easily acquired by a skilful dispenser. He exhibited pills of it containing one-thirtieth of a grain of phosphorus in an unoxidized form; they were varnished, and they dissolved readily at a low melting point, much lower than that of suet. He remembered Mr. Gerrard's formula, but the objection to it was that there was greater chance of oxidation, and the pills could not be well coated.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' ASSOCIATION OF IRELAND.

The winter session of this Association commences on Monday, November 9. It is intended to form classes on chemistry, botany, and materia medica, and the Society is promised the co-operation of Professor Tichborne and Dr. Smith. The funds of the Society are in a very satisfactory condition, and altogether the coming session promises to be one of great success. It is expected that Government will introduce a Pharmacy Bill for Ireland early in the session.

Parliamentary and Law Proceedings.

Four Children Poisoned by "Teething Powders."

Considerable excitement has prevailed in Romford for the past few days, owing to the very painful circumstances under which four young children, ranging from ten months up to just over two years old, have died, after having had administered to them powders obtained from the shop of Mr. J. W. Lasham, pharmaceutical chemist, High Street. The names of the children were Reginald Copsey aged a year and seven months; Sarah Jane Keeble, between ten and eleven months old; Joseph Brazier, aged a year and three months; and Septimus Adams, aged two years and one month. In the case of each of the children the taking of the powders was followed by a stupor, succeeded by convulsions in two of the cases, death supervening in from 12 to 18 hours. Mr. Lasham was from home at the time the powders were procured.

On Thursday, October 29, Mr. H. S. Haynes, Deputy Coroner for the Liberty, opened an inquiry at the County Court. The following particulars were taken from full reports in the *Essex Times*, the *Essex Independent*, and the *Sussex Herald*.

The first case gone into was that of Reginald Copsey, and from the statement of the mother it appeared that on the previous Monday evening, as the child was suffering from its teeth, she sent her little girl to Mr. Lasham's for a teething powder, the deceased having previously received relief from the powders. The powder received was wrapped in pink paper, with directions to give it in jam. This was done, but the child was very sick, and immediately brought it up; a second powder was sent for and put into a feeding bottle with some milk and water, and given to the child, which appeared stupid, and noticed nothing. About two o'clock on Tuesday morning it was restless; but again fell into a stupor, and the mother thought it was asleep; about ten o'clock, however, Mr. Potter, surgeon, was sent for; he thought the child was suffering from croup, and said it would not live, and it died about two o'clock in the day. The child could not take anything, and had not had anything likely to disagree with it.

The second case investigated was that of Sarah Jane Keeble. Mrs. Keeble said the child, which was generally healthy, was on Monday suffering from teething, and she went to Mr. Lasham's for two teething powders (having used them with satisfactory results before), one for deceased and one for her little boy; but as Mr. Urpath, an assistant in the shop, said he did not think it would be strong enough for the boy, who was two years and ten months, she only took one for the deceased, a part only of which she administered in a little of her own milk about half-past nine on Tuesday morning. The deceased was put to bed about ten, and about half-past eleven the mother's attention was called to it by a peculiar noise in the throat. As the deceased did not rouse when she moved it, she let it lie until one o'clock, when she called in Mr. Wright, surgeon, who said he thought the child had croup, and at his direction a warm bath was provided and mustard plasters applied. Mr. Wright said she would not recover, but an hour or two afterwards he said he thought her better. The child, however, never regained consciousness, or moved from the time it was laid down, and died about nine the same evening.

In reply to questions from the jury, Mrs. Keeble said there was no vomiting. From what Mr. Wright said she afterwards asked Mr. Urpath for the prescription of the powders for Mr. Wright, and he said if Mr. Wright would call he would give it to him; the powder given her was one previously prepared.

In the case of the deceased, Joseph Brazier, the mother, Mrs. Ann Brazier, said the child was generally healthy, but as on Monday it was suffering from its teeth she sent to Mr. Lasham's for a teething powder, which she gave to the child about half-past seven, in some tea and sugar. Immediately afterwards the child got down from the chair, sat down before the fire, and seemed to go off in a drowsy state. About eight he was put to bed, but afterwards hearing him make a curious noise, and seeming to be in a fit, she took him to Mr. Davey, surgeon, whose assistant said he was in a convulsive fit, gave her some medicine and two powders, and ordered a warm bath. He managed to get one of the powders down, but it took no effect on the child. Later she managed to give him a little medicine, but with no result, and he did not move all night until nine the next morning, when he moved his eyes; at half-past twelve he moved a little, and died at one. There was no vomiting, but a little froth at the mouth.

In the case of Septimus Adams, Mrs. Adams said the child's health was very good, but on Wednesday, thinking he was suffering from his teeth, she sent to Mr. Lasham's for some teething powders, having had some before which had done the child good. About one o'clock her husband administered the powder in her presence, and about an hour afterwards the child frothed at the mouth; after a time he roused, but went off again about six o'clock. His lips turned black, and he lay in that state until about eleven o'clock.

Mr. Wright was sent for and attended, and was told that the child had had a powder from Mr. Lasham's. Mr. Wright advised a warm bath and mustard plasters, and asked to be informed as to the state of the child at nine o'clock. He was then advised that the child was in the same state, and he stated that he feared there had been some mistake, and that the child had taken morphia in the powder, and he had had other cases. He used the stomach pump, and administered some coffee, but said there was no hope for the child. Mr. Wright came again in the course of an hour, but the child remained in the same state of unconsciousness from six o'clock until it died about four on Thursday morning in strong convulsions. During the afternoon the child had one or two acidulated cough drops, but nothing else.

At this stage the inquiry was adjourned until Saturday afternoon, to allow of *post-mortem* examinations to be made.

On the resumption of the inquiry on Saturday afternoon last, before Mr. Haynes, Mr. W. R. Preston watched the inquiry in the interests of Mr. Lasham and his assistant, Mr. Lawrence, who were also present.

The Coroner, having read the evidence taken on Thursday, said he now proposed to take the medical evidence, when

Mr. Wright stated that he understood that Adams's child had an attack of convulsions before taking the powders.

The father, Mr. Adams, was called, and, in reply to the Coroner, said on Wednesday, about half an hour before he administered the powder, the child had an attack of convulsions, and he had had three or four children who had had the same kind of fits while teething.

The inquiry into the death of Reginald Copsey was then proceeded with, and

Mr. C. Potter, surgeon, said that about half-past eleven on the previous Tuesday he was called to see the child, and found it apparently dying. There was an accumulation of mucus about the throat, and a general lividity of the countenance. Being told that the child had been suffering from cold, he thought it might be suffering from croup or suppressed scarlatina. The pupils of the eyes were contracted, an undoubted sign of poisoning by opium, though he did not think there had been poisoning then, as there was so little life left that he could not say what the sinking proceeded from. On an examination of the stomach he found it empty, except about two teaspoonfuls of the kind of fluid generally found in the stomach; the stomach was healthy; there was slight congestion of both lungs, especially at the back part, in consequence of gravitation, and the right side of the heart full of blood; there was a little effusion of blood on the brain; the congestion of the lungs and the blood on the brain point to the death being caused by opium. The result of the *post-mortem* was doubtful, the appearances deviating so little from the general appearances that no one could say death resulted from opium. No one could say positively from the appearances that there had been any overdose. Examined by Mr. Preston, witness said the symptoms before death were consistent with croup; the appearances of the *post-mortem* were not inconsistent with croup.

Susan Price Copsey proved going to Mr. Lasham's and asking for a teething powder for a baby eighteen months old, and it was supplied to her by Mr. Lasham, sen., and afterwards she went to Mr. Lasham's for another, which was handed to her by Mr. Urpath.

Mr. Urpath, assistant to Mr. Lasham, who was cautioned that he need not answer questions unless he liked, admitted that the previous witness came on Monday evening for a teething powder, and he handed her one from a drawer where they were ordinarily kept. He did not know how long they had been made, nor who mixed them up; the composition of the powders was calomel, Dover's powder, and compound powder tragacanth. Witness here appeared to be in a fainting condition, and his examination was postponed until he had somewhat recovered, when he said there should be one grain of calomel in each five grains of powder, one and a half grains of Dover's powder, and one and a half grains of compound powder tragacanth.

By Mr. Seaward: I have not been in the habit of making the powders up of late, but they were made on the premises.

A Juror: Who makes them?

The Coroner: The witness says he does not know who made these particular powders.

Mr Potter, recalled, said he received a portion of the powder from Inspector Pepper, and handed it to Dr. Medlock for analysis.

Henry Medlock, analytical chemist, said he received a powder from Dr. Potter, with a request to analyze it. The powder was contained in a small paper; there was a trifle under a grain of it. He examined it chemically and microscopically, and found it contained calomel; he could not state the quantity—it was too small. He tested it specially for morphia with two distincts tests, viz., with nitric acid, which gives a brown colour, and with sulphuric acid and chromate of potash, which gives a greenish purple colour. With this second test he obtained a greenish purple colour, but not the brown colour with the first test, which failed to produce that result. The microscopic test was indefinite as far as regards the calomel; there were calomel and organic substances. He made no further test, the quantities were so small; and he could not swear positively that morphia or any constituent of opium was present, but the reaction obtained led him to infer the presence of opium.

Mr. Preston: Supposing there had been three grains of this stuff, would it have been possible to have killed anybody with it?

Witness: I won't say that.

Mr. Preston: Then I understand you won't venture to say that three grains of this stuff you have had handed to you would kill anybody?

Witness: I won't venture to say.

Mr. Preston: If one ingredient in this powder was calomel would another be Dover's powder?

Witness: I cannot say that it was Dover's powder, but I got indications of opium.

Mr. Preston: That would be Dover's powder?

Witness: It might be.

Mr. Preston: Was there any compound of tragacanth?

Witness: It would be impossible to detect it, because there is no chemical test for it.

Mr. Preston: What you found would not be inconsistent with it?

Witness: No, certainly not; but I found what I considered to be morphia.

Mr. Potter, in answer to Mr. Preston, thought that a grain of calomel, one grain of Dover's powder, and one grain of compound tragacanth powder would be an overdose for a child of that age, though he did not think it would prove fatal. There was too much Dover's powder, it containing one-tenth of opium.

In the case of the child Keeble, Mr. A. Wright, surgeon, said when called to it between one and two o'clock on Tuesday, it was supposed to be suffering from croup. It was unconscious, motionless, breathing irregularly, and the pupils were very much contracted, and the skin cold and clammy. From these appearances, he was led to think the child was under the influence of some narcotic poison, and knowing that teething powders contain a certain portion of opium, he was under the impression the child was suffering from an overdose. He made a *post-mortem* examination on Friday; found all the organs free from disease; the lungs congested, right side of the heart full of fluid blood, the vessels of the brain very distended with blood; the stomach contained about a teaspoonful of thickish fluid. He applied the nitric acid test for morphia, but did not find any. He preserved the stomach and remainder of contents of stomach. Judging from the symptoms during life and the negative evidence of the *post-mortem*, he thought death had been caused by an overdose of opium. The death, however, was consistent with convulsions or croup.

Mr. Preston: If a child had been suffering from convulsions or croup, would one of the powders be likely to have some effect on the brain when otherwise it would not have?—Yes; my impression at the time was that the child was in such a state as to make the brain particularly liable to the action of opium.

Do you think one of those powders would hurt a child of that age?—Not under ordinary circumstances.

Mr. Urpath deposed to supplying Mrs. Keeble with a powder from the drawer where they were ordinarily kept. The powders were of different degrees of strength, one class being for children from six to twelve months, and others from twelve to sixteen months; they were kept in the same drawer, but in different boxes. He could not say which class of powder it was he gave to Mrs. Keeble.

In the case of the deceased child Brazier, Mr. Jones, assistant to Mr. Davey, surgeon, was called. Mrs. Brazier brought the child to the surgery on Monday evening, and he found it to be suffering from convulsions. He supplied the mother with two powders and a bottle of medicine. He afterwards heard that the child was dead, and gave a certificate that it died from convulsions, though he did not see it at or after death.

The Coroner cautioned witness not to do so again.

Mr. Wright deposed to the result of the *post-mortem*, and said the internal organs were free from disease, but the lungs and brain were congested. Removed the stomach and part of intestines for analysis if necessary. As to the cause of death, appearances were compatible with opium; three half grains calomel would not produce congestion.

Mr. J. Lasham, sen., said he attended to the business while his son was away. He had no recollection of supplying anyone with teething powders while he was there, but might have done so.

In the case of the deceased child Adams, Mr. Wright said he first saw the child at 7.30 on Wednesday evening, and was told it had had convulsive fits; found it in a convulsive state; looked upon it as beyond hope; went to Lasham's from what the mother said, and returning to Adams's, and hearing it had had a teething powder, applied the stomach pump, but without avail. Next morning took a portion of contents of stomach to Mr. Lasham, who said it evidently contained morphia, and showed witness the test of it. He made a *post-mortem*. The lungs and brain were congested, and the lining membrane of stomach slightly inflamed. From the examination and symptoms preceding death, believed death was caused or accelerated by opium.

By Mr. Preston: Morphia would soon become absorbed in the system.

Mr. Lasham, jun., said he did not know who mixed the powders. Sometimes he did and sometimes the assistants. Could not say who made that particular batch of powders. The description of components of powder given was correct, and he had no reason whatever for supposing that the usual proportions of ingredients were departed from.

Arthur Lawrence, assistant to Mr. Lasham, after being cautioned by the Coroner, said he had been in the habit of making up powders. Description given of ingredients was correct. Could not say who made up that particular batch, nor when or who made up the last lot. Had no recollection of any of the parties calling, but they might have done so.

By Mr. Preston: I made up powders from time to time as required, but none specially.

This being the whole of the evidence the Coroner proceeded to sum up, and after reviewing the facts in each case, said they were nearly identical. One of the mothers had adopted the remedy of teething powders three times before, and with success. There was no evidence that the powders had been tampered with. Then, as to the effect of the powders, in each case they had evidence of narcotic poison. He referred to the symptoms of each child, and read portions of the evidence to show the immediate effect of the powders. Then came the question, Did the powders in each case cause the death of the children? There was no getting from the fact that each child took similar powders, and all were affected in the same way; but they must make exception in the case of Adams, as the child was suffering from convulsions, and had a convulsive fit before taking the teething powder. Thus, it was very difficult to say whether that child died from narcotic poison or a fit. The question was, first, whether the powders had anything to do with the cause of death; secondly, whether these powders were made up according to the ordinary formula, or whether anything crept into them at their composition of a poisonous nature. The evidence as to the making up and selling of the powders was not so complete as they could have wished. Neither Mr. Lasham nor his assistant knew at what time or by whom these powders were made up. If one person had been in the habit of making them up, it would have been an easy thing to have found it out. He then went into the question of what constituted manslaughter, and explained the law on the subject at some length. Negligence or rashness were criminal to that extent, but if a party acted to the best of his judgment in the discharge of a duty he could not be found guilty of manslaughter. They had no evidence of gross negligence, and must not run away from the facts. If from the medical evidence they were satisfied the children died from the effects of the powders, still they had no proof at what time or by whom such powders were made up. In conclusion, he earnestly begged of them to dismiss from their minds anything they might have heard out of the court respecting the cases, and to confine themselves to the questions whether the powders were the cause of death, or of how or in what manner they were sold or administered.

The jury retired for nearly half an hour, when they returned with the following verdict: "We find that Reginald Copsey, Sarah Jane Keeble, Joseph Brazier, and Septimus Adams died from the effects of a narcotic poison, such poison being contained in powders purchased at Mr. Lasham's establishment, but there is no evidence before us as to how or by whom such powders were prepared."

Suicide of a Chemist and Druggist's Apprentice.

The *Stamford Mercury* reports that on the 22nd October, the body of Samuel Goward Bailey, aged 19, apprentice to a chemist and druggist, was found lying on the terrace in the grounds of Nottingham Castle. A note was found in his pocket asking that his dead body might be sent to his uncle, who is also a chemist and druggist. At the inquest medical evidence was given that death had resulted from a dose of prussic acid. No satisfactory evidence was given as to the state of deceased's mind, and the jury therefore returned an open verdict.

Trade Mark Prosecution.—Apollinaris Water.

At the Lambeth Police-court, on Thursday, November 5, Mr. Eugene Fisher, mineral water manufacturer, of Park-road, Camberwell, appeared to an adjourned summons taken out against him by Mr. Stanley Power Wilkinson, secretary of the Apollinaris Company (Limited), for having, on the 8th day of September, with intend to defraud, unlawfully enclosed a certain article—to wit, mineral water—in certain bottles having thereon the trade mark of the Apollinaris Company.—Mr. George Lewis appeared for the prosecution, and Mr. Douglas Straight for the defendant. The particulars of this case have already been reported, but some further evidence was now given.—John Easton, a lad who was formerly in the defendant's employ, said he remembered washing bottles with a large label of the Apollinaris Company. The defendant ordered him to wash the bottles. Sometimes the labels came off, and then they were put on the rack to dry. When they were dried they were given to Donahugh to put on the bottles again. Had seen the same bottles filled and corked.—John George Cantrell said he was in defendant's employ about two years, and left on the 11th August last. He took proceedings for assault against defendant, and the latter afterwards indicted him for perjury. Witness was acquitted. It was after the charge of assault that he made a statement to the Apollinaris Company. Whilst in defendant's employ he saw a great number of empty Apollinaris bottles on the premises, and also saw a great number filled. Defendant gave instructions to wash the bottles, and if the labels were crumpled they were to be taken off and put on straight. He had seen the bottles filled from a machine on the premises, and sometimes by defendant himself. There was a solution put in the bottles. Some further evidence was given as to sales.—Mr. Lewis, replying to Mr. Straight, said if it was admitted that a certain water was put into the bottles which was not Apollinaris Water it would be sufficient for the case.—Mr. Straight said the water was supplied as Apollinaris Water, because Mr. Fisher in good faith believed it was so.—Mr. Ellison said, considering the late period of the day, the case would have to be adjourned. —Mr. Alfred E. Copp, solicitor, said he wished to state that he appeared to watch the case on behalf of E. Fisher and Company (Limited). The defendant, Mr. Fisher, was the managing director of that company, but the offence with which he was charged was anterior to the date of the incorporation of the company, and therefore before he was their servant.—*Standard.*

Obituary.

THOMAS ANDERSON, M.D., F.R.S.E., etc.

We regret to have to record the death, on Monday last, of Dr. Thomas Anderson, late Professor of Chemistry in the University of Glasgow. Dr. Anderson was born in 1819, and was educated at the University of Edinburgh. On leaving college he visited Stockholm, where he studied for some time under Berzelius, and afterwards went to Giessen and studied under Liebig. Returning to Edinburgh, he acquired considerable reputation by teaching chemistry in the Extra Academic Medical School at Edinburgh, and whilst so engaged received the appointment of Consulting Chemist to the Highland and Agricultural Society. In 1852 he succeeded Dr. Thomas Thomson as Professor of Chemistry in the University of Glasgow, and discharged the duties of the chair with great acceptance until 1869, when he was incapacitated for work by a paralytic seizure. Having had another attack of paralysis in May of the present year, Dr. Anderson, under medical advice to remove further south, went to reside at Chiswick, near London. He therefore resigned his professorship in July last, the class having been conducted in the meanwhile by Mr. Ferguson, who was one of his own pupils, and who received the appointment to succeed him. Dr. Anderson remained at Chiswick until his death. He leaves a widow and two sons.

Dr. Anderson was the author of several papers on the organic bases, especially those bases obtained from opium and coal tar and in the destructive distillation of animal substances. In a paper on the "Chemistry of Opium," read before the Chemical Society in 1862, he described a valuable method of extracting the alkaloids of opium, and determining their relative qualities.

EDWIN LANKESTER, M.D., F.R.S.

On Friday, October 30, Dr. Lankester, the Coroner for Central Middlesex, died from diabetes, at Margate. Dr. Lankester was well known as a writer on scientific subjects, and, in former years, upon medical reform. Born in 1814, at Melton, in Suffolk, he entered University College, London, as a medical student in 1834, and three years afterwards became a Member of the Royal College of Surgeons and a Licentiate of the Apothecaries Company. In 1839 he graduated at Heidelberg, and in 1845 was elected a Fellow of the Royal Society. Amongst the appointments Dr. Lankester held at different times were, Lecturer on Materia Medica at St. George's School of Medicine; Professor of Natural History in New College, London; and Examiner in Botany to the Science and Art Department at South Kensington. In 1859 he was President of the Microscopical Society, and for many years he acted as one of the Secretaries of the Biological Section of the British Association.

In 1842, Dr. Lankester delivered a lecture to the Pharmaceutical Society, on the Structure, Affinities, and Medical Properties of the Natural Order Ranunculaceæ, which was reported in the *Pharmaceutical Journal* of that date. In 1859, he lectured to the Liverpool Chemists, Association upon ozone, with experimental illustrations of its nature and properties.

BOOK RECEIVED.

The Worthies of Cumberland.—John Dalton, F.R.S., etc. By Henry Lonsdale, M.D. London: G. Routledge and Sons. 1874. From the Publishers.

Notes and Queries.

[416.] BREWERS' FININGS.—"A Correspondent" would feel obliged to any person for a correct form for making "Brewers' Liquid Finings," not objected to by the Inland Revenue.

[417.] GLYCERINE JELLY FOR MICROSCOPIC MOUNTING.—In the Journal, October 3rd, 1874, Mr. H. Pocklington mentions "Glycerine Jelly" for mounting, or for examining, microscopic objects. Can you inform me how the jelly is made?

[*** Soak any quantity of good clear gelatine in cold water for three or four hours. Pour off the superfluous water, and melt the gelatine at a gentle heat. When melted, filter through flannel, and to the filtrate add an equal quantity of Price's glycerine. The above forms a good firm jelly, requiring little trouble in securing the cover. Other forms of the jelly will be described in an article on the subject which will appear shortly.—ED. PHARM. JOURN.]

NEW APPLICATION OF THE MARSH MALLOW.—According to a statement in the *Garden*, gypsum, mixed with 4 per cent. of powdered marsh mallow root, will harden in about one hour, and can then be sawn or turned, and made into dominoes, dice, etc. With 8 per cent. of marsh mallow, the hardness of the mass is increased, and allows of it being rolled out into thin plates, and painted or polished.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PHARMACEUTICAL EDUCATION.

Sir,—I see by the Journal of October 31st, that Mr. B. S. Proctor thinks proper to assert that, "a man had better turn grocer than remain for life an Associate of the Pharmaceutic l Society." Now, as this assertion is made without any particular reason being assigned for it, I may perhaps be forgiven if I inquire why the Associates should abandon "an art and a science," and deal in provisions? I may also state that I consider Mr. Proctor's remarks to be a direct insult to a number of gentlemen, who, having obtained the qualification necessary to legally practise their calling, do so in a manner which, if not quite satisfactory to Mr. Proctor, is perfectly so to the public and the medical profession; and many of whom are doubtless as capable of advancing the science as the Professor of Pharmacy to the University of Durham College of Medicine; for, after carefully reading his communication, I have arrived at the conclusion that, far from elevating the pharmacist in the eyes of any person unconnected with the profession into whose hands it may fall, it will only tend to degrade him, and thus prevent the class of men which the increased stringency of the examinations leads us reasonably to expect from entering the profession.

I trust that some abler pen will lend assistance in removing the ill-effects of Mr. Proctor's remarks.

A. RIVERS WILLRON.

Sir,—Lest it should seem that "silence gives consent," I, as a humble member of the drug trade, would like, with your permission, to utter my earnest protest against some of the opinions expressed in Mr. Proctor's letter of the 22nd ult. This gentleman, who dates from a high northern latitude, bears an honourable name, and may be considered in some small degree a representative man. Moreover, unless I am misinformed, he has written a book, and therefore must only be approached with profound respect. But when he speaks of "that improved pecuniary position" which "can only be accomplished by diminishing the number of those entering the trade," I can only say that such "improved position" had better never be obtained at all than secured by means which may be thought dishonest and unjust.

The attempt to bring about a decrease by any indirect artificial restrictions, such as the manipulation of educational demands, with a view to benefit those who are now in the trade, or may hereafter be admitted to it, apart from the supposed interest of the public, is a nefarious policy, which most educated men of mature age and sound judgment would be ashamed to avow. If such be a fair object, on what ground can we condemn Sheffield rattening, compulsory limitation of apprentices, or the heroic efforts now being made by carpet-weaving men of Kidderminster to prevent the employment of women in their craft? What is there to be deprecated in these or other the hatefullest manifestations of trade-unionism? Is the driving away as many young men as possible from any given business a proper object to be aimed at, or even a consummation to be wished for? In this "renowned island" of Great Britain, with its limited area and ever-increasing population, our most pressing need is that more careers should be opened to industry, not that any of those now existing should be blocked up. Anything which tends in this latter direction should be branded as "contra bonos mores," and "contra salutem publicam." If Swift was right in calling him a benefactor to his race who made two blades of corn grow where only one had grown before, what are we to entitle him who would cut off multitudes of men from an accustomed mode of subsistence?

The "status" argument has been pursued until it has become a weariness; the word jars on the ear. Perhaps it will be found that every one of us gets precisely as much as he deserves—no less, no more. Let each one do his work; perform his daily duties (gratefully remembering there are more degrading occupations than selling "perfumery" and "pickles") with what integrity he may; reward will not be wanting in the way of "status," and otherwise. But all unmanly craving and whining after honour, symptomatic of unwholesome ambition and souls ill at ease, all forms of "which is the greatest" contention, had as well be resolutely avoided for the future; most necessary of all, "respice teipsum."

The comfort which Mr. Proctor administers to the employers who have a difficulty in getting assistants will be felt by those employers to be something worse than a mockery.

The paragraph on the "few hundred rejected students" is one that few readers will peruse without pain. The frame of mind which can enable any man to look with indifference, or, still more, with satisfaction, on the unhappiness and disappointment of his fellow-creatures, is not one to be either admired or envied.

SAMUEL FEAVER.

Truro, November 2, 1874.

"AND OTHER CHOICE CONDIMENTS."

Sir,—The origin of the quotation I have placed at the head of this letter will be easily recognized by the readers of the Journal, and the object of putting it there is to examine its merits. It is part of a statement or declaration by an eminent firm, who claim for it the acceptance of truth, and who have attempted to force its acceptance on the bench of justice. Let us see what is the basis on which this policy is founded. What are the condiments that are asserted to be used in the preparation of the article to which the declaration is attached? Are there any at all? Is turmeric a condiment? or can the addition of a few grains of colouring matter to an ounce of another substance be construed by any force of logic to be the addition of "Choice Condiments"? Let us write the sentence in its naked integrity, and see the difference in its significance:

"Take Notice.

"This preparation is an admixture of pure mustard, with farina and turmeric."

It is not my intention to impute any motive to the members of the firm whence this emanates, for they are all honourable men. But I do think members of Parliamentary Committees ought to be gifted with a keener logic, and a better perception of right and wrong. And, in conclusion, I would just ask whether the statement as it stands is not intended to mislead, or at least to veil over a hidden mystery?

F. M. Rimmington,

Public Analyst for the Borough of Bradford.

"*Spes.*"—(1) Either of the books mentioned are good for the purpose. (2) Any trace of phosphorus that might be dissolved or held in suspension would be oxidized very rapidly.

C. Sinimberghi.—We believe that a solution of peroxide of hydrogen is generally used for the purpose.

E. Bevan.—Apply to the Secretary for a copy of the pamphlet entitled "Hints to Students and Apprentices."

T. T.—We do not know.

J. Priestley.—See p. 379.

Aqua.—There will be no precipitate if the water used be free from earthy salts.

"*At Fault.*"—Such a solution cannot be converted into a dry powder.

W. T.—We cannot say to what the development of a fishy taste in such a mixture would be due. Are you sure that the change takes place, or are you trusting to a statement which might be based upon a patient's fancy?

G. A. Keyworth.—(1) The saline contents of sea-water consist chiefly of sodic, magnesic, potassic, and calcic chlorides and sulphates; also about ·3 gram per litre of bromine; very minute amounts of iodine, fluorine, and silica, phosphoric acid, and calcic and magnesic carbonates in small proportion (Watts, 'Dict. Chem.'), to which list must now be added, according to Sonstadt, gold. The gaseous contents are nitrogen, oxygen, and carbonic anhydride. (2) At the temperature of the oxy-hydrogen flame alumina melts into transparent globules, which assume a crystalline structure (Watts, 'Dict. Chem.') (3) Jourdan gives the following formulæ:—*Decoction*—Miseltoe of the oak, 30 to 60 grams; Water, 2 litres: boil till reduced to one half. *Aqueous Extract*—Miseltoe, 1 part; Water, 3 parts: boil, express, clarify with white of egg, and evaporate. *Vinous Extract*—Miseltoe, 1 part; White Wine, 5 to 6 parts. Digest during three days, boil the marc with a fresh quantity of wine, and evaporate the united liquors. Miseltoe appears, however, to have been more usually used in the form of powder, in conjunction with other substances. Gray (Supplement) says, "leaves anti-epileptic, in doses of ℈j to ʒj twice a day."

"*Guardian.*"—The question is one that should be submitted to a solicitor, as the answer would depend upon the exact terms of the indenture.

"*Nemo.*"—Squibs and crackers are not pharmaceutical preparations, and we have no practical knowledge of their manufacture.

"*Spes.*"—(1) The book you have is a very good one, and sufficient for the purpose; but it is not desirable to limit your study upon any subject to the observations of a single author. (2) The last edition of the book you inquire respecting was published before the 'Additions to the British Pharmacopœia.' (3) No books or notes are allowed, and the examination is confined to one day.

W. D. Williams.—Dynamite is a mixture of nitro-glycerine with silicious matter.

"*Theta.*"—The person mentioned in your communication is not on the Register of Pharmaceutical Chemists. Your letter has therefore been handed to the Registrar.

A Candidate.—Translation of Latin into English, Latin Grammar, English Grammar and Composition, the first four rules of Arithmetic, simple and compound, Vulgar Fractions and Decimals, and a thorough knowledge of the British and Metrical Systems of Weights and Measures.

G. H.—It would be impossible to give advice worth having without a better knowledge of your present acquirements and other circumstances. The "finishing your education for the Minor" ought to take rank as a primary necessity.

Godfrey's Laboratory.—We think our correspondent has mistaken the object of our notice, which was merely to call attention to a matter of antiquarian interest to pharmacists.

"*Pharmacist Major.*"—We cannot agree with you in regarding the prescription you have sent a copy of as being an extraordinary one, excepting so far as it constitutes one of those cases where communication with the prescriber is desirable.

J. McK.—The account you give is exceedingly vague; in fact, wanting in all essential particulars. If the case be one which admits of legal proceedings being taken, and if such action be desirable, we still think it is not a matter to be dealt with by the Pharmaceutical Society, but by a special organization for that purpose.

H. C. Druce.—(1) *Juncus supinus.* (2) *Aira præcox.* (3) *Festuca ovina*, var. *vivipara.* (4) *Cerastium glomeratum.*

The Benevolent Fund Election.—We have received a letter from Mr. H. J. Bellingham, requesting to be allowed to express his warmest thanks and heartfelt gratitude for the kind support which placed him at the head of the poll at the late election of annuitants upon the Benevolent Fund.

We have received from Mr. R. Huggins a specimen of his Ozone Paper.

"*Inquirer.*"—(1) If the salts are mixed and dissolved all together, there may sometimes be a slight separation of quinine, owing to the alkalinity of the potassium iodide. This separation will be less if they are dissolved separately and then mixed. (2) Dissolve the iodide and bicarbonate in about five ounces of the water, and add the quinine, slightly powdered and mixed with the remaining portion of water. The spirit to be poured in last; it will not keep long.

A. P. Metcalfe.—We will endeavour to obtain the information you ask for.

Senior.—Before you will be allowed to enter for the Minor examination you must pass the Preliminary examination of the Pharmaceutical Society, or produce a certificate of having passed at one of the Local examinations of the University of Oxford, Cambridge, or Durham, the examination of the College of Preceptors, or that of any legally constituted examining body previously approved by the Council, provided Latin and Arithmetic are included in the subjects of examination.

Vinum.—A stamp is required upon any box or bottle containing a "secret or occult preparation," or one which is stated to be prepared only by the person whose name it bears, or one which is recommended by label, handbill, or advertisement for the cure or relief of any disorder.

"*Apprentice.*"—Apply to the Secretary, 17, Bloomsbury Square, for a copy of the Regulations of the Board of Examiners.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

Communications, Letters, etc., have been received from Mr. Jackson, Mr. Brown, Mr. Anthony Smith, Mr. W. B. Hemsley, Mr. Mount, J. E. M., T. C. B. K., "Inquirer."

The following journals have been received:—The 'British Medical Journal,' Oct. 31; the 'Medical Times and Gazette,' Oct. 31; the 'Lancet,' Oct. 31; the 'London Medical Record,' Oct. 31; 'Medical Press and Circular,' Oct. 31; 'Nature,' Oct. 31; 'Chemical News,' Oct. 31; 'Gardeners' Chronicle,' Oct. 31; the 'Grocer,' Oct. 31; 'Journal of the Society of Arts,' Oct. 31; 'Grocery News,' Oct. 31; 'Produce Markets Review,' Oct. 31; 'Practical Magazine,' for November; 'Educational Times,' for November; 'British Journal of Dental Science,' for November; 'Journal of Applied Science,' for November; 'Canadian Pharmaceutical Journal,' for October; 'Tennessee Pharmacal Journal,' for October; 'Moniteur Scientifique,' for October; 'Pharmaceutische Zeitung,' for Oct. 28 and 31; 'Sanitary Record,' Oct. 31.

CALAMINE POWDER.

BY TILBURY FOX, M.D. LOND., F.R.C.P.,

Physician to the Department for Skin Diseases in University College Hospital.

I wish to offer a few remarks upon the use of calamine powder—a subject referred to in the columns of the *Pharmaceutical Journal* some little time since. In a review which appeared of the University College Hospital Pharmacopœia, the combination of calamine powder with ordinary oxide of zinc powder in lotions was noticed as a strange one. Several writers subsequently referred to the subject from a therapeutic point of view, and also to variations in the physical characters of calamine powders in general use in dispensaries. Now, as regards the first point—the combination of calamine powder with other zinc preparations—I will only say that its propriety is, of course, a matter for the prescriber to determine. Mr. Martindale sufficiently explained that there was a special reason for this combination, and I therefore say no more about this point, because I am anxious to deal particularly with the other matter, viz., the characters of calamine powders. I desire to define from the point of view of the prescriber what the qualities of the powder are which he regards as most desirable. I have a particular interest in this little matter, for I suppose I use calamine powder more largely than any one else, now that Mr. Startin is no longer with us. My object is to induce pharmaceutists to come to a common understanding to employ for the future, in all prescriptions, calamine powder of a certain colour, of special physical characters, and to discard once and for ever the old-fashioned dirty red, gritty powder of the shops.

I find that sometimes my patients get from the same prescription, made at different places, a pale-coloured and soft lotion, and sometimes a brick-dust coloured, gritty, and irritating lotion, the latter compound now and then doing harm.

The following should be the properties of the calamine powder of which I approve:—

1. Its colour should be very pale salmon, or pale flesh-coloured. This kind of calamine powder will vary somewhat in shade, but with care it can be prepared of the desired hue. This colour should not be artificially induced.

2. It should not be coarse, nor gritty, nor sandy feeling *in the least degree*, when rubbed between the fingers. I remember being shown a sample of calamine powder at one of the best pharmaceutical establishments in London, which had been prepared with great care and some expense, and I gave some offence on saying that it was not so fine as I liked it. But so it was.

3. It should be such a powder as will not leave behind in the mortar, on making up a lotion with it, any gritty particles.

Now, calamine powder possessing these characters must be real calamine powder, as I have before hinted. It must not be oxide of zinc, coloured with iron or bisulphuret of mercury. It can be prepared from the rougher, or common calamine powder, by repeated incinerations, levigations, and subsidences. It may take a long time to prepare, but I know it can be made.

I may just say, however, that in making up a lotion with calamine powder in it, it is important to rub up the powder with the other ingredients in a mortar carefully, so as to be quite sure no lumps or sandy particles get into the lotion.

Lastly, in regard to the character of the lotion when made up, it should be such as to leave behind, when dabbed on to the skin, a very fine, soft, powdery layer. If the lotion be not of this nature, then it will, in many cases, act as a positive irritant, in consequence of the action of the gritty particles upon the delicate and sensitive surface—mostly of an inflamed face—to which it is applied.

All this is quite well known to some pharmaceutists, but not to all, and those who know it will, I feel sure, be only too desirous to second the attempt to bring about a common understanding as to what is meant by calamine powder by the prescriber. There is a practice in vogue of naming particular pharmaceutists for this or that particular drug, for which I think little reason ought to exist. I hope pharmaceutists will take away every vestige of excuse for it, touching calamine powder, by adopting my suggestion to discard the ordinary red gritty powder, which is more fit for use as "ruddle," or the facial adornment of itinerant "fire-eaters," than anything else.

*** In reference to this subject see a note read by Mr. R. Reynolds at the British Pharmaceutical Conference in 1870 (*Pharm. Journ.* [3], vol. i., p. 434). It will there be noted that the defect pointed out by Dr. Fox arises more from the nature of the material used as calamine than from any imperfection in its preparation. If Mr. Martindale's explanation of the use of calamine be sufficient, probably the physician's object would be best attained by using an artificial carbonate of zinc, with just enough "red oxide of iron" to give it the correct tint.—ED. PH. JOURN.

WHAT ARE THE QUALIFICATIONS WHICH CONSTITUTE A GOOD DISPENSER?

BY A. F. HASELDEN, F.L.S.

This may at first seem a very simple question and easily answered, but a little consideration may probably show that the qualifications of a good dispenser, from a business point of view, are not so readily set down, or so easily acquired. My object is not to contest any opinion, but from my own experience to shadow forth the qualifications which should be possessed by a good practical pharmaceutical dispenser, and at the same time to advert to some of the difficulties he will have to contend with. I will not say that he must have passed his Minor Pharmaceutical Examination, for that alone will not stamp him a practical dispenser, although many justly attach considerable importance to the fact of having done so.

As soon as a prescription is placed in the hand of a pharmaceutist, whether it will be his duty to dispense it himself, or give it over to *the* dispenser of the establishment, a quick eye should readily scan it over and perceive whether it is for mixture, draught, liniment, lotion, ointment, suppositories, or pills. A ready reply should be forthcoming to the questions such as how long it will last, how long keep good, and how long take to prepare? for upon the replies frequently depend the quantity to be made up, whether it will be waited for, or whether it must be sent, and not less often, whether it is to be made up at all. In addition, it is not uncommon that the pharmaceutist is supposed to know for what complaint the prescription has been written, and if it is likely to be beneficial. With this as a dispenser he has really nothing to do; nevertheless, as a man of business, he must be able to reply without indifference, and at the same time without committing himself to a possible error. I may quote the advice given by a physician to myself upon this very point, "*Say enough, but in reality tell nothing*; but it would scarcely do in these enlightened times to reply to an inquiry concerning some drug, *that it came from foreign parts.*

Having disposed of any preliminary of this nature, he will place the prescription before him, read through the whole, even to the name of the patient, the date, and the initial, or name in full, as the case may be, of the prescriber, and this, for obvious reasons. Should there be draughts (though now few and far between), the direction of how often will imply how many; equally so with pills, should the number not be stated; also he will see if they are to be coated or silvered. If single-handed, he will then write the direction and copy the prescription. I have said he will read over the prescriber's name or initials, because, if conversant with his style of prescribing, he will the more readily know what he requires; whether, for instance, in mixtures the exact quantity of fluid menstruum ordered is to be put in (making sometimes an uneven measure), or made up to 4, 6, or 8 ounces, as the case may be. The same remarks apply to liniments and lotions, and sometimes whether they should be strained or filtered, or sent out thick, or with particles floating about. The next point he will observe, if he be practical as well as careful, is the order in which he intends to mix the several items in a compound. This is often very important, as experience teaches that the order of mixing ofttimes much influences the appearance. He will be particular in reading the labels of the bottles, etc., from which he takes the articles, not trusting to the bottle or jar being in a particular spot; and if there be any precaution of fastening or tying over, will attend to it before replacing the bottle or pot. He will not put preparations of ether, ammonia, hydrocyanic acid, and the like into the bottle before the other ingredients forming the mixture, lotion, or liniment. He will naturally count the pills before boxing them, to ascertain that he has divided the mass into the proper number, and has not dropped one or more upon the floor—such a thing has happened and may happen again. After reading and affixing the labels he will re-read the prescription, to be sure that all is correctly done. If there be anything of an unusually potent nature in the prescription he will bear the dose in mind. Should suppositories or pessaries form part or the whole of the prescription, he will know that, unless they are of a character kept in stock, they cannot be prepared in a quarter of an hour; that in summer weather it is necessary to have ice upon which to place the mould, in order to cool them, and that soft soap is the best thing to smear upon the mould to prevent them sticking. In addition to the care, etc., attending the preparation of the medicines, he will also have to arrange for sending them out as to time, and this is often no slight matter, if the distance be far and the time short. [Here let me say that porterage should in many instances be charged for, when we reflect that a commissionaire never moves under sixpence.] Where two or more assistants are employed it is an excellent arrangement that one should prepare the medicines and another write the directions, check the articles, and send them out, thus reducing the liability of error and relieving to some extent the anxiety of the compounder.

Thus far, supposing the medicines prescribed to be tenants of the B. P., it has been pretty plain sailing, which a careful, thoughtful, practical young man with a head upon his shoulders will have no difficulty in carrying out. Let us now turn to some of the difficulties he has to contend with. It frequently happens, and generally when most occupied, that some preparation forming part of the prescription is not in the B. P., nor in the late P. L., and without being a Pil. Philip., or the established preparation of some well-known firm, with, as is often the case, the name attached, it really hails from our neighbours across the Atlantic; as, for example, see the following:—

℞	Tinct. Guaiaci C.	ʒiij.
	Potas. Iodidi	℈j.
	Tinct. Gelsemini	ʒiij.
	Mucil. Acaciæ	ʒiij.
	Aquæ ad.	℥iij.

Sit dosis coch. j parv., ex aquæ cyatho.

Here in the Tinct. Gelsemini is an American preparation of the *Gelseminum sempervirens*, popularly known as yellow jessamine, wild jessamine, woodbine, etc., the part used being the bark of the root; an account of it will be found in the *Pharmaceutical Journal*, p. 998, vol. iv., present series. Now, supposing the dispenser reads as he should, and probably does, the notes upon new remedies and preparations, he can scarcely be expected to remember them all; but the good practical man will think, and in all probability search the 'Journal of the Pharmaceutical Society' (to which Society it is hoped he belongs), where he is more likely to find the required information than in any other book within his reach. Without multiplying examples of these preparations, which might readily be done, or enlarging upon unusual English prescriptions, many of which present great difficulty in dispensing, specimens of which may be found under the heading "Dispensing" plentifully scattered through the last three or four volumes of the Journal. The following, coming from foreign sources, may be put forward as explanatory of what also a dispenser may be expected to know:—

℞ Flor. Anthem. . . . . . . 2 decagrammes.
Aq. Ferventis . . . . . . 1 litre.
Macera donec frigid. sit tunc cola et adde
Magnes. Calcinat . . . . 4 grammes.
" Sulphat . . . . . 3 decagrs. M. & Sit.

Or thus—

Mistura :—
℞ Tinc. Chinæ Comp. . . . . ℥iv.
Capiat coch. min. 4^tis horis ex aquâ.

The translation or preparation of this is as follows:—

℞	Cort. Chinæ fusci	partes 6.
	" Fruct. Aurant	" 2.
	Rad. Gentian.	" 2.
	Cort. Cinnamomi Cassiæ	" 1.

E contusis et concisis
Spiritûs diluti. . . . . partes 50.

A tincture is now to be prepared by digestion, but if required quickly it may be made by percolation. Again:—

℞ Tinct. tonico-nervinæ Bestuscheffii . . . ℥iv.
Capiat guttas xv., ex aquâ 4^ter indies.

The meaning of this is an ethereal tincture of chloride of iron. There is no difficulty in these if it is known where to look for the information; but, on the other hand, highly inconvenient if it is not readily obtained. One word of advice upon this question. If there be a doubt which cannot be solved, say so to your customer; but never substitute one thing for another. Honesty in this as in other affairs is the best policy, and will endure the longest. Having so far expressed my views of the qualifications necessary and expected in a good dispenser, may I suggest one other question, and here 's the rub—how is a good dispenser made? Not by mere bookwork; not by three or four years' apprenticeship; but by time, diligence, instruction, opportunity, and practice; these will accomplish the end. One word for the young who are not yet practical dispensers. Let them be cautioned against the assumption that, because they did not fail at the examiner's dispensing counter, *ergo* they are good dispensers. Let them work carefully as juniors, and gradually take the higher place, remembering from day to day that there is always something to be learnt, and that now, as in the days of the Athenians of old, the cry is still "Something new! something new!"

ACTION OF SUNLIGHT UPON IODIDE OF POTASSIUM.*

BY M. VIDAU.

Early in the morning of the 14th August, the author, having to prepare for use in the pharmacy a ten per cent. solution of iodide of potassium, placed 50 grams of the iodide in a glass funnel plugged with cotton, and poured upon the salt about 500 grams of water taken from a cistern supplied by rain water. The liquid filtering through the cotton plug ran perfectly limpid into a flask placed by chance upon the ledge of an open window strongly lighted by the rays of an African sun. After a short time it was noticed that the liquid contained in the flask formed into two layers, very distinctly marked by the difference in their colour: the lower composed of a concentrated solution of iodide of potassium, and already perceptibly coloured yellow; the upper, occupying at least three-fourths of the total volume, consisting of a dilute saline solution, and quite colourless. When these layers were mixed by agitation a perfectly colourless liquor was obtained, which had no action upon starch mucilage.

The circumstances suggested that solar light might be the cause of this difference of colour, produced by the setting free of iodine through the decomposition of the iodide, and led to the following experiments:—

Two white 60-gram phials were filled with a ten per cent. solution of iodide of potassium (phials 1 and 2). Into a third phial was poured a solution of twenty grams of iodide in twenty grams of water. Both the solutions were very alkaline. Phials 1 and 3, carefully closed, were, at 8 a.m., placed in full sunlight near to a whitened wall facing the sea; phial 2 was wrapped in ordinary yellow paper, and placed in the shade. At 8·30 the contents of phial 3 had already become perceptibly yellow, but at 10·30 no change was apparent in phial 1. At 2 p.m. phial 1 was tinged very slightly yellow; 2 was quite colourless; 3 was of a yellow colour similar to that of almond oil. With recently prepared starch mucilage the liquid in No. 3 gave a violet colour, and formed almost immediately a very deep violet coloured precipitate. Seen under the microscope some starch grains were coloured deep violet with the contents of No. 3. With the contents of No. 1 starch mucilage showed no very appreciable change; with the contents of No. 2 it gave no coloration.

* Read before the Paris Société de Pharmacie. See the discussion reported on p. 393 of the present number.

The liquid in all three phials was then rendered slightly acid by the addition of a few drops of acetic acid (which caused an evolution of carbonic acid gas), and Nos. 1 and 3 were at 3 p.m. again exposed to the action of sunlight; No. 2 was enveloped in a double wrapper of blue and yellow papers, and placed in a kind of recess, but kept at the same temperature as the others. At 4 p.m. No. 3 had browned very perceptibly. No. 1 had acquired the colour which No. 3 had when the acid was added; No. 2 was unaltered. The next morning the yellow colour of No. 1 was very manifest, and the liquid gave immediately a violet precipitate with starch mucilage. The yellow colour in No. 2 was not very evident, but the commencement of decomposition was shown, though very slightly, by starch mucilage. No. 3 was of a deep brown colour, and the free iodine was detected with facility with starch mucilage or carbon bisulphide.

The action of sunlight upon the solution of iodide of potassium would appear to be thus placed beyond doubt. It seems evident that if atmospheric ozone alone caused the decomposition of the iodide there would be no reason why this action should not have occurred with equal intensity in the phial kept in the shade and that exposed to the sunlight. The action of the sunlight appears the more energetic in proportion as (1) the solution is more concentrated, and (2) the solution is less alkaline. It is advisable, in fact, in making these experiments to use a neutral solution, since any iodine set free by the action of sunlight in an alkaline solution enters afresh into combination with the excess of alkali, and so is not manifested by the colouring of the liquid or detected by the reagents. In a very concentrated solution, however (equal parts of iodide and water), the alkalinity does not prevent a partial decomposition.

Experiments with Paper saturated with Iodide of Potassium and Starch.

Experiment 1.—Three slips of white paper were steeped in a solution of neutral iodide of potassium, then in fresh starch mucilage; the slips were enclosed, while still damp and quite white, in three carefully-washed phials, which were then hermetically sealed.

Phial No. 1, white glass.—Exposed to the sun's rays during one hour, the paper took a rather dark violet colour.

Phial No. 2, white glass.—Enveloped in two papers, one white and the other blue, and kept in the shade; at the expiration of an hour there was no trace of coloration of the paper.

Phial No. 3, blue glass.—Placed in the same conditions as No. 2, and gave the same negative result.

Experiment 2.—A square of white paper, upon which had been spread a coat of iodide solution and a coat of starch mucilage, was put while still wet into a kind of photographic frame between two papers blackened on the outside. From the side exposed to the light, designs of a cross and a circle were cut. After a short exposure, the iodized paper presented the designs of the cross and the circle in violet, whilst the remainder of the paper remained white.

Experiment 3.—The iodized paper, instead of being exposed to the sun's rays, was placed where only a faint light reached it. In this case the iodide of potassium was decomposed much less energetically than in any of the other experiments.

Experiment 4.—White filtering paper was dipped in a dilute solution of tartaric acid, then dried, and afterwards made to absorb successively starch mucilage and solution of iodide of potassium. It was then again dried in a cupboard well closed from the sun's rays. The paper so prepared was extremely sensitive to the action of light. When dry, it was cut into slips and put dry into three phials, under conditions similar to those in the previous experiments. The result was nearly identical, except that the bands in Nos. 2 and 3 were no longer quite white at the conclusion of the experiment, but had acquired a slight violet tint, whilst the slip in No. 1, exposed to the light, became of a deep violet colour.

Experiment 5.—The dried bands impregnated with a solution of tartaric acid and starch mucilage were moistened by dipping them into a solution of iodide of potassium, and put wet, and quite colourless, into three phials. No. 1 was exposed to the light, Nos. 2 and 3 were covered and kept in the shade. In No. 1 the band became intensely coloured, in Nos. 2 and 3 the colouring was scarcely perceptible.

From these experiments the author concludes that iodide of potassium is rapidly affected by sunlight under the most diverse conditions. M. Cloez has already published results of experiments tending to show that in certain circumstances the change in the colour of paper saturated with iodide of potassium and starch ought not to be attributed to the action of ozone, but rather to that of sunlight. It would appear, therefore, that all testings for atmospheric ozone by the setting free of iodine from iodide of potassium,—indicated either by the colouring of a paper saturated with iodide of potassium and starch, or the alkaline reaction on litmus paper, showing the decomposition of the iodide,—are liable to be vitiated by grave causes of error, for in thus estimating the ozone contained in the air the operator at the same time measures the intensity of the sunlight in the medium surrounding the test papers, which are affected by both causes.

ORGANIC BASES.*

Although bodies having the properties of acids—as, for instance, tartaric, citric, and malic acids—had long been known to exist in certain vegetable and animal substances, it was reserved for our century to discover bodies of alkaline or basic properties in the organic world. A chemist, Sertürner by name, first succeeded in isolating morphine from opium, the long-known juice of the poppy, obtained by making incisions in the capsules, and afterwards drying the product in the air.

Little attention was at first paid to this discovery, because all the energies of chemists had been turned to the study of inorganic chemistry; it was out of the regular line of research at the time, and, therefore, remained isolated and unappreciated. When, however, several years later, Gay Lussac showed the importance of Sertürner's discovery, and proved himself, in a dissertation published in 1816, that morphine acted like an alkali in regard to vegetable colours and acids, his work became the incentive to a search for similar bodies in such plants as were known for their sanative or poisonous effects. In many cases their active principle was found to consist in an alkaline substance, combined with an organic acid, and hence called an alkaloid.

Pelletier and Caventou found alkaloids in Peruvian bark and in the Strychnaceæ, and in 1826 Unverdorben succeeded in artificially preparing several alkaloids or organic bases by the dry distillation of horn, bones, and other animal substances. These discoveries gained for organic bases a place among the most important and interesting bodies in chemistry, and many chemists devoted themselves exclusively to their study. Theoretical considerations concerning the nature of organic bases caused their more extended investigation. These theoretical considerations were founded upon the interesting fact of the similarity of all these bases to ammonia. In the natural alkaloids the similarity consists chiefly in the chemical equivalents, but in the artificial bases lately discovered it is also exhibited in their physical properties.

These facts have led to the supposition that there exists an intimate relation between the organic bases and ammonia. Berzelius, indeed, suggested the probability of the pre-existence of ammonia in all these bases; while Liebig, in the first volume of his 'Dictionary of Chemistry' ('Handwörterbuch der Chemie'), developed a theory concerning their constitution, which forms the basis of our present views as to this interesting branch of chemistry. He assumed that ammonia was the type of all organic bases, and that it was itself such a base, of the simplest composition. Ammonia consists of only two elements, containing one atom of nitrogen and three of hydrogen in one molecule. Liebig assumed that, in the organic bases, a part of the hydrogen was replaced by other radicals, composed of several elements; these bases might therefore be considered as made up of a compound radical and a combination of one atom of nitrogen with only two of hydrogen, the other atom of hydrogen being replaced by the new radical. The compound thus formed is called amid.* Such a base is called an amid base.†

Liebig developed this idea in the clear and ingenious manner peculiar to himself, and expressed his views concerning the probable nature of compounds which could be formed from amid and the alcohol radicals. Ten years later his ideas were verified by experiment. Ethylamine, and a whole series of similar bases, were produced by Würtz, in Paris, in 1849.

These discoveries of the celebrated French scientist justly excited unusual attention, which was still increased when A. W. Hofmann and Würtz demonstrated that not only one atom of hydrogen in ammonia could be replaced by an alcohol radical to form amid bases, but that compound radicals could be substituted for two, and even for all three, atoms of hydrogen. These bases might be designated as primary, secondary, and tertiary amid bases, according as one, two, or three atoms of hydrogen of the ammonia have been replaced by compound radicals. (In English treatises on chemistry they are usually designated as amid, imid, and nitril bases.—*The Translator.*) Their chemical formulæ are represented by the following table, in which A, B, C stand for the compound radicals:—

Ammonia base.	Amid base.	Imid base.	Nitril base.
$\left.\begin{matrix}H\\H\\H\end{matrix}\right\}N$	$\left.\begin{matrix}A\\H\\H\end{matrix}\right\}N$	$\left.\begin{matrix}A\\B\\H\end{matrix}\right\}N$	$\left.\begin{matrix}A\\B\\C\end{matrix}\right\}N$

As Hofmann has shown later that there is a series of compound radicals which may replace two atoms of hydrogen in the doubled formula of ammonia, producing a second extensive series of bases, whose composition is expressed in the following table, where A_1 B_1 and C_1 represent the compound radicals:—

$$\left.\begin{matrix}H_2\\H_2\\H_2\end{matrix}\right\}N_2 \qquad \left.\begin{matrix}A_1\\H_2\\H_2\end{matrix}\right\}N_2 \qquad \left.\begin{matrix}A_1\\B_1\\H_2\end{matrix}\right\}N_2 \qquad \left.\begin{matrix}A_1\\B_1\\C_1\end{matrix}\right\}N_2$$

If we suppose only 52 such compound radicals capable of replacing one atom, and 32 of replacing two atoms of hydrogen, we obtain 35,000 millions of possible compound organic bases.

This enormous number shows how impossible it is, in spite of the most persevering labours, to become acquainted with more than a very small proportion of these com-

* Lecture delivered by Professor A. Bauer before the Vienna Society for the Diffusion of Scientific Knowledge. From the Report of the Smithsonian Institution.

* The chemical formula of amid is therefore: H_2 N.

† The formula for an amidogen base is: $A+H_2N$, in which A stands for a compound radical.

pounds. This very number urges us to study only the prominent representatives of whole series, and to give to them our whole time and energies.

From what has been said in regard to the composition of organic bases, it was thought evident that nitrogen would appear to be the component on which their properties depend, for they all contain nitrogen. But we know now whole series of analogous bases containing, instead of nitrogen, some other element of similar properties. These also have the characteristics of ammonia. As early as 1846, Paul Thenard had made phosphorus bases, which were more thoroughly investigated in 1855 by Hofmann and Cahours. Analogous arsenic bases have been known much longer. In 1760 Cadet prepared one, the composition of which he could not, of course, explain. The investigations of Bunsen, from 1837 to 1843, shed more light on this remarkable class of organic bodies, and the constitution of the arsenic bases was finally completely made clear by the researches of Cahours, Kolbe, Riche, and especially Baeyer, in Berlin. In 1850 Löwig discovered antimony and bismuth bases, so that we now have four other elements capable of forming whole series of basic combinations like those of nitrogen. Compare these with the above-mentioned number of possible nitrogen bases, and we must be convinced that the chemist as well as the astronomer is able to astonish us with magnificent numbers, and to call up before the mind's eye endless series of possible combinations, all producing bodies having special qualities.

However much these researches have extended our knowledge, they have but slightly improved our acquaintance with the bases and alkaloids spontaneously formed in nature. The constitution and the relations of these natural alkaloids to the other bases and to other chemical compounds are much less understood than the foregoing statement would lead us to suppose. The causes of this are that the natural alkaloids are mostly very complex bodies, and that they suffer such complete changes in most reactions, that it is difficult to study them, or to form any conclusions as to the constitution they had before they were decomposed. It must be left to the future to shed more light on the nature of these bodies. Let us hope that it will be possible to make those alkaloids synthetically which have hitherto been found only in nature. We must not forget in this connection that most of the natural bases contain oxygen, which is not found in the ammonia bases. Although the discovery of the so-called ammonium bases, and Würtz's beautiful discovery of the behaviour of oxide of ethylene to ammonia, have indicated the way of preparing such oxygen bases artificially, there is nevertheless a difficulty, which seems almost insurmountable. It is the fact that most of the natural bases have optical properties, while we cannot succeed with the aid of the above processes in preparing compounds possessing similar properties from substances not originally possessing them. The discovery of methods for the artificial or synthetic preparation of the alkaloids would not only be of high scientific interest, but it would also greatly advance our material interests, for there is scarcely another group of bodies of such manifold uses as the organic bases.

Many of these alkaloids play an important part in the arts, others are known as the active principles of stimulating articles of food, while the great number of them are valuable as medicines. Many of them are extremely violent poisons, and have acquired an unenviable reputation from cases in which they have been employed.

Poisoning by means of vegetable bases is rendered doubly dangerous, because it is often difficult to prove with certainty the presence of the poison in the corpse or the secretions by chemical analysis, while the presence of mineral poisons can generally be detected with ready certainty. The reason of this is not difficult to understand. We are but imperfectly acquainted with the properties of the natural alkaloids. They resemble each other very much. In cases of poisoning, they are mixed up in the stomach or other parts of the body with many other organic substances, all containing carbon and having certain properties in common with them. These organic substances are of course more akin to the vegetable bases than to inorganic substances, such as the compounds of arsenic, which are not found in any part of the human body. Metals are present only in insignificant quantities, and those which are present are not at all similar to arsenic. Now, the organic bodies present all contain nitrogen, and may have basic properties, both characteristics of alkaloids. It is obvious that the detection and separation of very similar bodies are much more difficult than the separation of dissimilar ones, where the detection of a single property often suffices to prove their presence with certainty.

If we consider furthermore that the alkaloids are very easily decomposed, and that in legal chemical investigations the bodies in which they are to be sought for are generally in a state of putrefaction—*i.e.*, of continual active change—we shall understand how impossible it is frequently for chemists to separate the poisons in a state of purity from parts of the body, and to prove their presence with certainty. It is indeed sometimes possible to inject the substances which in cases of poisoning must contain the vegetable base, into the blood of living animals, or to mix it with their food, and then to judge, from the physiological effects on the animals, which poison was present. The changes produced by certain alkaloids on the beating of the heart, on the general action of the muscles, and on the nervous system are frequently so characteristic that we can judge of the presence of one or other alkaloid with as much certainty from these effects as from pure chemical reactions. Such proofs, however, have not the full force of evidence in court, for in such cases the separation of the pure poison must always be the chief aim of the chemist.

Dangerous as our organic bases may become in the hands of the murderer, they are highly salutary in the prescriptions of the physician, who employs them with great success in the treatment of severe and otherwise unyielding diseases. Peruvian bark owes its efficacy to the alkaloid *quinine* which it contains, together with *cinchonine* and *chinidine* in varying proportions. Formerly, before these facts were known, there was no standard by which the value of different specimens of Peruvian bark could be correctly judged. Sometimes a certain kind of bark, whose dose had been fixed by experience, acquired a much greater value than others whose efficacy far surpassed it. Now the value depends on the amount of bases contained in the bark, and not on the colour, shape, or other external signs. Not the smallest piece of the bark is now allowed to be lost on gathering it, because processes are known by which even the smallest quantity of quinine contained in it can be obtained.

The same is true of different kinds of opium. Their medicinal value depends on the amount of alkaloids they contain. These are *morphine*, *codeine*, and *narcotine*, three beautiful crystallizable bodies, the latter of which is distinguished by the peculiar property of furnishing another base, *trimethylamine*, when mixed with soda-lime and subjected to dry distillation. Chemists have proved the presence of trimethylamine in the pickle of herrings. It is the cause of their peculiar odour. Urine contains it also in small quantities, hence the smell of herrings when much of it is evaporated down. The *belladonna* and the *Datura strammonium* contain the alkaloid *atropine*, whose terribly poisonous properties are generally known, but which plays a very important part in treating diseases of the eye. Applied to the eye in a dilute state, or rubbed into the skin near the eye, it powerfully dilates the pupil, and greatly facilitates certain operations on that organ. From all parts of the hemlock a colourless, transparent oil, of penetrating odour, can be obtained, which is known under the name of *coniine*, and is one of the most poisonous alkaloids. Either this or *cicutine*, contained in the water-hemlock, was the cause of the tragical death of Socrates. In the St. Ignatius bean and the nux vomica, *strychnine* is found along with *brucine;* it forms a beautiful crystallizable alkaloid, distinguished by its extremely bitter taste, and by its producing tetanic spasms when injected into the blood.

To this class of organic bases belong also those poisons which savages use for steeping the points of their arrows. There are undoubtedly several such poisons. It seems that the one used by the savages of India and Africa is essentially different from that used by the natives in the northern part of South America. The former, called *antia*, immediately stops the beating of the heart, while the latter, called *curare*, first palsies the general muscular action, and then stops the heart. *Curare* is the better known of the two; it was first brought to Europe by Sir Walter Raleigh, in 1595. According to Humboldt, the preparation of this poison resembles our vintage feast. The savages collect poisonous vines in the forest, while the women prepare an intoxicating fermented liquor, of which they all partake. When all are intoxicated and lie in deep sleep, the master of the art prepares the poison by extracting the juice of the vines, and evaporating it down. Different travellers agree that they also add poisonous ants and fangs of snakes. It would seem, therefore, that *curarin*, the active principle of the arrow-poison, or curare, was a constituent of the juice of vines; but there is no certainty on this subject, since travellers do not agree in their accounts of the preparation of this interesting substance. Curare can be taken into the alimentary canal without the slightest danger, and even the meat of animals poisoned by it is innocuous, while it is certainly and often suddenly fatal when injected into the blood even in small quantity. When introduced into a wound, this poison occasions no pain whatever. The symptoms preceding death are very remarkable, as can be seen when a very small quantity is introduced into the blood of a large animal. There is an immediate relaxation of the muscles, all voluntary motion ceases, the animal sinks down powerless, but with its consciousness unimpaired, and finally the respiration ceases and death ensues, without the presence of any symptoms which would indicate excitement or a death-struggle. It is a progressive palsy, ending in the brain.

A whole series of organic bases is esteemed on account of the pleasant stimulating effect they exert on the body when in small quantities and diluted with other substances. They belong to the category of luxuries. Among them, *nicotine*, the active principle of tobacco, takes the foremost rank.

Pure nicotine is a liquid, which becomes brown in the light, has a tobacco-like smell, and possesses very poisonous properties. The amount of nicotine contained in different kinds of tobacco varies. Although it is not exactly in the inverse, it is by no means in direct proportion to the excellence of the tobacco. Fine brands, such as Havana and Maryland tobaccoes, contain but very little; the former not quite two and the latter from two to four per cent. Kentucky and Virginia brands contain as much as from six to seven per cent., and some of the domestic brands of Germany contain considerable quantities.

Besides nicotine, there are some other bitter principles contained in tobacco, which are the chief cause of nausea in young smokers. These are kept back by smoking pipes with long stems, which only allow the gaseous bodies to reach the mouth. Besides carbonic acid and carbonic oxide, tobacco smoke often contains as much as 3 per cent. of carbonate of ammonia (which causes the increased secretion of saliva), and also butyric acid, empyreumatic oils and resins, traces of sulphuretted hydrogen, and even prussic acid, but no *creosote*.

Pepper owes its pungent taste to *piperine*, a crystallizable alkaloid. Tea and coffee both contain the same organic base, theine or caffeine, which are easily obtained from them in silky needles. A solution of this alkaloid neither has the taste nor the pleasant stimulating effect of an infusion of tea or coffee. In these beverages, as in tobacco, the value of the article used depends on other substances which accompany the alkaloid.

Chocolate owes its value to *theobromine*, an alkaloid contained in cacao. It has been lately found that iodide of methyl digested with theobromine for some time in a sealed tube, at the temperature of boiling water, will convert it into theine.

The excellent effect of pure meat broth on the system is due to kreatine and kreatinine, two bases contained in meat. Broth, therefore, belongs to the same class as tea, coffee, and chocolate, and it certainly deserves the preference when the system of the sick person requires a stimulating and strengthening beverage.

Some organic bases have obtained a prominent place in the chemical arts. It is only necessary to mention *kyanole* or *aniline*, which is obtained in large quantities from coal-tar, and is used in the manufacture of the finest colours. Aniline red is the chloride or acetate of rosaniline, a colourless base obtained from aniline. Aniline violet must also be considered as an aniline base.

Two artificial bases, the amid bases of ethyl and methyl, which but lately had merely been preserved in chemical collections as interesting and rare substances, are now used instead of ammonia, in Carré's ice apparatus, in the artificial production of ice.

The description of the individual members of this extensive series of organic bases or alkaloids could be considerably extended.

As mentioned in the introduction, organic bases were a *terra incognita* to chemists half a century ago. As has probably been gleaned from these remarks, chemists have since diligently laboured to explore this region; but whenever they had succeeded in scaling a height, from which they hoped to obtain a general view of what they had investigated, new and ever greater fields opened to their astonished eyes—fields whose exploration will require the most diligent efforts of chemists for many years.

Just as in the discovery of a new country, the value of which the people realize only when the ploughshare has turned the new soil, and when its treasures have begun to circulate in the great commercial veins and arteries of the world, so it happens with our organic bases, which are generally appreciated only as far as they are useful to commerce, the arts, or medicine.

Let us not forget, however, that as the treasures of the mountains of California and the products of India would never have enriched our country if it had not been for indefatigable travellers, who wandered through unknown countries, impelled by a pure love of knowledge, so we also owe our acquaintance with the organic bases to purely unselfish and scientific investigations, which have taught us that nothing is useless in science—a truth written in conspicuous letters on every page of the book of nature, and which can only fail to be read by the grossest ignorance.

COMMON WILD FLOWERS CONSIDERED IN RELATION TO INSECTS.*

(*Concluded from p.* 348.)

Let us pass on to the genus Primula, which offers a most interesting case of dimorphism. The cowslip and primrose resemble one another in many respects, though the honey they secrete must be very different, for while the cowslip is habitually visited during the day by humble-bees, this is not the case with the primrose, which in Mr. Darwin's opinion is fertilised almost exclusively by moths. This, however, is a digression. If a number of specimens of primroses or of cowslips are examined, we shall find that about half of them have the stigma at the top of the tube and the stamens half way down, while the other half have,

* Abstract of an Address by Sir John Lubbock, Bart., F.R.S., at the Belfast meeting of the British Association.

on the contrary, the stamens at the top of the tube and the stigma half way down. Corresponding differences occur in the polyanthus and auricula, and had long been known to gardeners, and even to schoolchildren (by whom the two kinds of flowers are known as "pin-eyed" and "thrum-eyed"); but it was reserved for the genius and perseverance of Mr. Darwin to explain the significance of this curious phenomenon, and the important part it plays in the economy of the flower. Now that Mr. Darwin has pointed this out it is sufficiently obvious: an insect thrusting its proboscis down a primrose of the long-styled form would dust its proboscis at a part which, when it visited a short-styled flower, would come just opposite the head of the pistil, and could not fail to deposit some of the pollen on the stigma. Conversely, an insect visiting a short-styled plant would dust its proboscis at a part further from the tip, and which, when it subsequently visited a long-styled flower, would again come just opposite to the head of the pistil. Hence we see that by this beautiful arrangement insects will carry the pollen of the long-styled form to the short-styled, and *vice versa*. There are other points in which the two forms differ from one another—for instance, the stigma of the short-styled form is globular and rough, while that of the short-styled is smoother, and somewhat depressed. The pollen of the two forms is also dissimilar, that of the long-styled being considerably smaller than the other—7-7000ths of an inch in diameter, against 10-11-7000ths, or nearly in the proportion of three to two, a difference the importance of which is obvious, for each has to give rise to a tube which penetrates the whole length of the style, from the stigma to the base of the flower; and the tube in the long-styled form must, therefore, be nearly twice as long as in the other. Mr. Darwin has shown that much more seed is set if pollen from one form is placed on the pistil of the other than if the flower is fertilized by pollen of the same form, even if taken from a different plant. Nay, what is most remarkable, such unions in Primula are more sterile than crosses between distinct, though nearly allied, species of plants have in some cases been found to be. The majority of the species of the genus Primula appear to be dimorphic, but not all.

Let us now consider the manner in which the bees are adapted to the flowers. Although we may, in one respect, say that the general organization of the insect is modified with reference to these relations, still the parts which have been the most profoundly modified are the mouth and the legs. If we are asked why we assume that in this case the mouth part and legs have been modified, the answer is that they depart greatly from the type found in allied insects, and that between this type and these modified examples various gradations are to be found. The mouth of an insect is composed of:—1, an upper lip; 2, an under lip; 3, a pair of anterior jaws or mandibles; and 4, a pair of posterior jaws or maxillæ. These two pair of jaws work laterally, that is to say, from side to side, and not, as in man and other mammalia, from above to below. The lower lip and maxillæ are each provided with a pair of feelers, or palpi. In the different groups of insects these organs present, however, almost infinite variations. There are several flowers which are inaccessible to hive bees and to Bombus terristris, which has a shorter proboscis than some of the other species belonging to that genus. Hermann Müller mentions, for instance, that he has seen Bombus terristris endeavouring in vain to suck the flowers of the oxlip (*Primula elatior*). Having satisfied themselves that they were unable to do so, but not till then, they proceeded to cut a hole in the base of the tube, and thus arrived at the honey. This seems to show, he observes, that they act upon the results of experience, and not by what is called mere instinct. Indeed, any one who has watched bees in greenhouses will see that they are neither confined by original instinct to special flowers, nor do they visit all flowers indifferently. Müller mentions several cases in which he has seen honeyless flowers visited by insects; *Genista tinctoria*, for instance, is frequently visited by insects in search of honey, although it does not contain any. Certain insects, on the other hand, confine themselves to particular flowers.

It would also appear that individual bees differ somewhat in their mode of treating flowers. Some humble-bees suck the honey of the French bean and the scarlet runner in the legitimate manner, while others cut a hole in the tube, and thus reach it surreptitiously; and Dr. W. Ogle has observed that when he followed any particular bee she always proceeded in the same manner; some always entering by the mouth, others always cutting a hole. He particularly mentions that this was the case with bees of the same species, and infers, therefore, that they differ from one another in their degrees of intelligence, and his observations—though, of course, not conclusive—are interesting and suggestive. If, again, we examine the hind legs of bees we shall find similar gradations. In Prosopis they do not differ materially from those of genera which supply their young with animal food. Portions of the leg, indeed, bear stiff hairs, the original use of which probably was to clean these burrowing insects from particles of sand and earth, but which in Prosopis assist also in the collection of pollen. In some bees the pollen is collected on the body; and here also we find a remarkable gradation from Prosopis, which has only minute and simple hairs, like a wasp; through Specodes and Nomada, in which the longer hairs are still few, and generally simple, though some few are feathered, to Andrena and Halictus, where the hairs are much more developed; a change which is more marked in Sarapoda, Colletes, and Megachill; still more so in Osmia and Anthophore, until we come to the humble-bees, in which the whole body is covered with long, feathered hairs.

One other peculiarity of flowers is explained if we take this view of the relations of insects to flowers. Many flowers close their petals during rain, which is obviously an advantage, since it prevents the honey and pollen from being spoilt or washed away. Everybody, however, has observed that even in fine weather certain flowers close at particular hours. This habit of going to sleep is surely very curious. Why should flowers do so? In animals we can understand it; they are tired and require rest. But why should flowers sleep? Why should some flowers do so, and not others? Moreover, different flowers keep different hours. The daisy opens at sunrise and closes at sunset, whence its name "day's eye." The dandelion (*Leontodon taraxacum*) opens at seven and closes at five; *Arenaria rubra* is open from nine to three; *Nymphæa alba* from about seven to four; the common mouse-ear hawkweed (*Hieracium pilosella*) is said to wake at eight and go to sleep at two; the scarlet pimpernel (*Anagallis arvensis*) to wake at seven and close soon after two; while *Tragopogon pratensis* opens at four in the morning, and closes just before twelve, whence its English name, "John go to bed at noon." Farmers' boys in some parts are said to regulate their dinner-time by it. Other flowers, on the contrary, open in the evening.

Now, it is obvious that flowers which are fertilized by night-flying insects would derive no advantage from being open by day; and, on the other hand, that those which are fertilized by bees would gain nothing by being open at night. Nay, it would be a distinct disadvantage, because it would render them liable to be robbed of their honey and pollen by insects which are not capable of fertilizing them. It is probable, then, that the closing of flowers has reference to the habits of insects, and it may be observed also in support of this that wind-fertilized flowers never sleep; and that some of those flowers which attract insects by smell emit their scent at particular hours: thus, *Hesperis matronalis* and *Lychnis vespertina* give forth their odours in the evening, and *Orchis bifolia* is particularly sweet at night. Although flowers present us with all these beautiful and complex contrivances, whereby the transfer of pollen from flower to flower is provided for and waste is prevented, yet they are imperfect, or at least are not yet perfect, in their adaptations.

It is, of course, possible that these cases may be explained away; nevertheless, as both insects and flowers are continually altering in their structure and in their geographical distribution, we should necessarily expect to find such instances. Animals and plants constantly tend to adapt themselves to their conditions, just as water tends to find its own level. Many small insects obtain access to flowers, and rob them of their contents. *Malva rotundifolia* can be, and often is, sucked by bees from the outside, in which case the flower derives no advantage from the visit of the insect. In *Medicago sativa* also insects can suck the honey without effective fertilization, and the same flower continues to secrete honey after fertilization has taken place, and when apparently it can no longer be of any use. Fritz Müller has observed, that though *Posoqueria fragrans* is exclusively fertilized by night-flying insects, many of the flowers open in the day, and consequently remain sterile.

In couclusion, the lecturer said he had been good-humouredly accused of attacking the little busy bee because he had attempted to show that it does not possess all the high qualities which have been popularly and poetically ascribed to it. But if scientific observations do not altogether support this intellectual eminence which has been ascribed to bees, they have made known to us in the economy of the hive many curious peculiarities which no polt had ever dreamt of, and have shown that bees and other insects have an importance as regards flowers which had been previously unsuspected. To them we owe the beauties of our gardens, the sweetness of our fields. To them flowers are indebted for their scent and colour, nay, their very existence in its present form. Not only have the brilliant colours, the sweet scent, and the honey of flowers been gradually developed by the unconscious selection of insects, but the very arrangement of the colours, the circular bands and radiating lines, the form, size, and position of the petals, the arrangement of the stamens and pistil, are all ordered with reference to the visits of insects, and in such a manner as to ensure the grand object which renders these visits necessary. Thus, then, an attempt has been made to point out some of the relations which exist between insects and our common wild flowers; the entire subject is one, however, which will repay most careful attention, for, as Müller has truly said, there is no single species the whole history of which is yet by any means thoroughly known to us.

THE TRADE IN DRUGS, ETC., WITH TURKEY.

The trade records of the most important Turkish ports, made up to the latest period, give incidentally some information of interest to the readers of this Journal. Beginning with Aleppo, we find that, as regards the imports of drugs into that port, there has been very little change of late. Somewhat strange to say, however, the largest quantities have been received from Russian and French vessels, while the amount received from British ships is very small. The same remark also applies to the imports of cochineal, very little having been received from British ships: those from Egypt conveyed the largest quantity of the article. The imports of olive oil into Aleppo have not increased, neither have the exports. The exports of scammony roots in British vessels amounted to 465 cases for the year, while only two cases were exported in French ships. The exports of scammony extract were 18 cases in British vessels, and two in French, while the only exports of opium from Aleppo were five cases in Turkish vessels. The export of drugs was very inconsiderable. With regard to the imports of drugs into Aleppo, it is stated that this trade in 1872 felt the influence of a local rush to a new line of business, which appeared to be promising, and the market was soon overstocked. Only a sixth part of the quantity then imported was bought during the past year, and the sale of the articles has subsequently been slow and disadvantageous, over a thousand cases from England, France, and Germany, weighing 135,668 lbs., only fetching £1,080, and a good deal remaining unsold. With regard to olive oil, it is stated that the produce of the olive trees in the province of Aleppo is so badly refined that a small quantity of fine oil has been lately imported from France and Italy for the use of European residents, but it is hoped that the refining will be improved. The exports of castor oil seed from Aleppo remain about the same as usual, being chiefly sent to France, Italy, and Germany; but the trade does not appear to be a very profitable one. The price has fallen on account of the successful competition of the castor oil seed imported from Egypt. Scammony roots are exported from Aleppo exclusively to England, where resin is extracted, drawn from them without that adulteration which renders the exportation of the extract drawn on the spot so unsatisfactory to the consignees, and so unprofitable to the consigners. Little scammony, indeed, is now exported, in consequence of its mixture with other substances. The few shipments made have been sent to England. This line of business is reported to be greatly falling off, through the dishonesty and rapacity of those connected with it. The exportation of opium from the province of Aleppo has been tried, but it could not compete with that from Asia Minor, and its exportation will probably not be tried again.

The chief articles of exportation from the district of Rhodes are sponges, olive oil, sesame seed, storax oil, etc., in all to the value of about £245,000 annually. The exports to Great Britain, which may be estimated at about £90,000 a year, consist principally of sponges. It is stated that the sponge fishery has been rather abundant this year, and the prices paid have been from ten to fifteen per cent. higher than those of the previous year. All sponges sent now to England are packed in boxes, containing generally, it is said, the proportion of one pound of sponge to eight or ten pounds of sand. This system was formerly adopted in other markets of Europe, but experience has shown that it was preferable to forward sponges in their genuine state, viz., without sand, and thus avoid the expense of ten or twelve per cent., which arises out of the operation of sending them. The sponge fishery of late has been carried on very actively, and, in view of the quantity of yield, very successfully. The agricultural produce of the Island of Rhodes, with the exception of olives, is scanty. During the last few years a great number of olive trees have been planted, and they will certainly be, in a few years, a source of considerable wealth to the island. Opium is one of the most valuable productions in Asia Minor. Turkey opium contains a higher percentage of morphia than Indian or Persian, and consequently is in such great favour for medical purposes in Europe and America. In former years the crop of Asia Minor annually averaged from 2,000 to 3,000 baskets or cases of 150 lbs. each. A large quantity was consumed in England; America took a very small portion. The Dutch East India Company, also, for many years, have purchased a considerable quantity to send to the islands of Java, Batavia, and Sumatra. Of late years the consumption has largely increased, especially for North and South America and the West Indies. The crop now averages from 4,000 to 6,000 baskets or cases, and of this quantity the United States require about 2,000 cases. The price has much increased, averaging lately £1 per lb.; fifteen years ago, it averaged 15*s.* per lb. Owing to the late high prices, some persons at Smyrna have recently adulterated the pure drug by mixing it with spurious matter, but, as the fraud has been discovered, purchasers have been very careful from whom they obtain the drug.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 14, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W Envelopes indorsed "Pharm. Journ."*

EARLIER CLOSING.

THE well-worn topic of earlier closing is the subject of another letter which appears in our correspondence columns this week. Having so recently and so often advocated this movement, we should have felt disposed just now to content ourselves with an acknowledgment of the receipt of this letter had it not evidenced that the writer possesses a clearer perception than many of his fellow-assistants of the position they ought to take in the matter. Hitherto most of the complaining has come from one side, and all the performance from the other. There can be no doubt that the majority of employers crave for shorter hours of labour as much as their assistants do, and in illustration of this we may refer to the remarks of Mr. C. B. BELL in his recent address to the Hull Chemists' Association (see p. 392). But the greatest stumbling-block in the way of earlier closing among pharmacists has been the want of unanimity. We think, however, their hands may be considerably strengthened in exercising a gentle pressure upon the recalcitrant minority, by assistants taking up definite ground, and causing the question of hours of labour to enter into the terms of any fresh engagement. Such terms as those laid down in our correspondent's letter—namely, limitation of active duty to twelve hours daily—seem almost to err by not asking enough, and yet we have reason to believe that in many cases they would be a real boon.

On the whole, there has grown up during recent years a much more healthy tone of feeling amongst pharmacists as to the number of hours during which they are to be at the call of the public. It is true, as our correspondent says, that in some cases the movement has utterly failed. But there is a considerable residuum, scattered through the provinces, who now reap the benefit of earlier closing, and we are gratified to learn that several pharmacists in Bond Street, Piccadilly, Conduit Street, and Oxford Street, in the West End of London, as well as others in the City and elsewhere, are now closing their pharmacies earlier (that is, the window shutters at 7 o'clock, and the door shutters at 8 o'clock), thereby indicating their desire to induce the public to send earlier for their medicines. Provision, of course, must always be made for the dispensing of any medicine that may be required, and in making the necessary arrangements employers are entitled to, and will no doubt receive, the active co-operation of their assistants.

PHARMACEUTICAL INSTRUCTION IN FRANCE.

THE report presented to the National Assembly of France on the creation of new faculties of medicine and pharmacy has just been issued, and a very interesting report it is. Instruction in these subjects has hitherto been provided by twenty-one preparatory schools scattered over the provincial towns; by the two faculties of Paris and Montpellier, with which are connected superior schools of pharmacy; and by the mixed faculty of medicine and pharmacy founded in 1872 at Nancy, as a substitute for the faculty of medicine and the Superior School of Pharmacy at Strasbourg.

Diplomas of doctor, of sage-femme of the first class, and of pharmacist and herborist of the first class, can be granted only by the faculties and the superio schools—one qualifying body, that is to say, to th twelve million inhabitants; the faculty of Paris alone absorbing nine-tenths of the candidates. This disproportion between the student class and the qualifying bodies has been keenly felt, and a proposal has been submitted to the National Assembly for the creation of new faculties of medicine at Lyons, Bordeaux, Toulouse, Nantes, Lille, and Marseilles. The claims of these cities to form the seats of qualifying faculties were made the subject of a commission of which the report has been recently published; and after a careful estimate of them, those of Toulouse, Nantes, Lille, and Marseilles are disallowed, while those of Lyons and Bordeaux are admitted. At Lyons and Bordeaux, therefore, there will shortly be instituted mixed faculties of medicine and pharmacy, similar to that already in working at Nancy.

The grounds on which the commission has come to this decision are highly interesting, but are too lengthy and too exclusively French in their tenour to be discussed in our columns. Suffice it to say, that the multiplication of qualifying bodies at central points of the country will not only have the salutary effect of diffusing high-class education over a wider area, but it will lessen the inconvenience and expense hitherto felt by the provincial student in having to resort to distant towns to obtain his diploma; and it will have the further happy result of diminishing the pressure under which Paris has hitherto laboured. More than 5,000 pupils now throng the lecture-rooms and wards of the Parisian school, and of these many have to put up with difficulties in the way of observation and research which reduce the instruction from a system available for all to one in which "the surviva of the fittest," or at least the most pushing, is the dominant principle. What holds good of Paris holds good in a minor degree of Montpellier, the pressure on whose teaching apparatus will be relieved by the schools at Lyons and Bordeaux.

One feature of the new system is its extension of the principle inaugurated at Nancy—that of creating a mixed faculty of medicine and pharmacy. Up to a certain point, of course, the instruction of both is common, and the student of the one must inevitably profit by daily intercourse with the student of the other. It is possible that such a system may thus have the effect of promoting a more genial understanding between doctor and pharmacist, as well as of heightening the intellectual standard of their common vocation—the healing art. But it certainly has its disadvantages.

PUBLIC ANALYSTS AND PRIVATE CERTIFICATES.

A DISCUSSION which has recently taken place at a meeting of the City Commission of Sewers presents some interesting points in respect to the granting of certificates by public analysts. The discussion had its origin in the quotation by the *Times* of a paragraph from Messrs. SILLAR and Co.'s Tea Circular, stating that about 150 half-chests of re-dried tea, which had been under water in the Thames, had been publicly sold in Mincing Lane, and that the catalogues of sale declared that the "kiln-dried teas" had been analysed by Dr. W. S. SAUNDERS, the Public Analyst for the City of London, and pronounced by him fit for sale in the market. One of the members of the Commission having called attention to the paragraph, and produced a sample of "tea-dust" which was alleged to have been taken from the parcel so certified by the public analyst, the matter was investigated by the Sanitary Committee, who, after conferring with Dr. SAUNDERS and inspecting a sample of tea which he produced as a portion of that examined by him, reported that it was "serviceable and good," and had not the slightest resemblance to the sample produced before the Court. The Committee also expressed an opinion that the Medical Officer should be very careful in giving certificates in such cases unless the whole bulk was examined, and not merely a sample.

Dr. SAUNDERS, on his part, described to the Court the circumstances under which the certificate was given, saying that, having been requested by Messrs. HAWES and HERTZ, of Mincing Lane, to analyse some tea which had been accidentally wetted with Thames river water, and afterwards carefully re-dried in a kiln, and having ascertained that the firm was of respectable standing, he proceeded to analyse the tea, and found that it was perfectly sound and fit for human food—an opinion in which he was confirmed by Mr. WANKLYN; he therefore certified accordingly.

Had the matter dropped here, the mild reprimand for want of caution suggested by the Committee might have dispensed with further comment. But Dr. SAUNDERS went on to say further that he gave no authority to Messrs. HAWES and HERTZ to make any use of his certificate, and had no knowledge of their having done so until he saw the reference to it in the *Times*. This brought a retort from the brokers, which portrayed in rather coarse lines the consequences of what we believe to be a very objectionable practice. "Having paid a fee of three guineas "for this document," said they, "we naturally felt at "liberty to mention the favourable result of Dr. "SAUNDERS's analysis at the top of our sale catalogue. "Why Dr. SAUNDERS should be surprised at our "having made this use of an analysis which he had "signed, *even adding his official designation, 'Public "Analyst for the City of London,'* we are at a loss to "conceive."

Now, whilst fully admitting the claim of a Public Analyst to such advantages in fame and purse as the reputation of holding a public office may bring him, we entirely deny to him the right of giving a *quasi* official stamp to certificates issued in a private capacity, by attaching to them any designation or description suggestive of their being issued from a public office. The public are not always apt to discriminate between things that differ, and although nothing might be further from the intention of the analyst than to mislead by appending his title to his signature, it is evident that such an association would very often enter largely into the calculations of the person paying for the certificate, who would consider it a portion of the equivalent for his purchase-money.

MUNICIPAL HONOURS TO PHARMACISTS.

THE list of gentlemen who have this year been elected to municipal honours includes the names of several connected with pharmacy. Amongst them we have noticed those of Mr. SAMUEL RALPH ATKINS, Pharmaceutical Chemist and Local Secretary, elected Mayor of Salisbury; Mr. CHARLES TUCKER, Pharmaceutical Chemist and Local Secretary, re-elected Mayor of Bridport; Mr. JOHN CHING, Chemist and Druggist, elected Mayor of Launceston; Mr. Alderman W. MALTBY, Chemist and Druggist, elected Mayor of Lincoln; Mr. G. PORRETT, Chemist and Druggist, elected Mayor of Scarborough; and Mr. WILLIAM MOUNT, Pharmaceutical Chemist, Canterbury, a Town Councillor. In Glasgow, Mr. JAMES HAMILTON has been elected a Commissioner of the Kinning Park Burgh, by a large majority.

THE INDIA MUSEUM.

DR. BIRDWOOD, whose name will be familiar to our readers in connection with his valuable memoir on the Genus Boswellia, has been appointed by Lord SALISBURY Assistant Reporter on the Products of India and Curator of the India Museum. Dr. BIRDWOOD was for many years Professor of Botany in the Grant Medical College, Bombay. Mr. MOORE, Dr. COOKE, and Lieutenant BOYLE have received appointments as Assistant Curators in the Museum.

THE ROYAL SOCIETY MEDALS.

THE Copley Medal for the present year has been awarded by the Council of the Royal Society to Professor LOUIS PASTEUR, for his researches on Fermentation and on Pébrine. The Rumford Medal has been awarded to Mr. J. NORMAN LOCKYER, F.R.S., for his spectroscopic researches. One Royal Medal has been awarded to Professor WILLIAM CRAWFORD WILLIAMSON, F.R.S., for his contributions to zoology and palæontology, and another to Mr. HENRY CLIFTON SORBY, F.R.S., for his researches on slaty cleavage and on the minute structure of minerals and rocks, for the construction of the microspectroscope, and for his researches on colouring matters.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Tuesday evening, October 20, a lecture was delivered before the members of the above Association by F. T. Mott, Esq., F.R.G.S., on "Cryptogamic Botany." There were a large number of the members of the society present. The lecture was of an unusually interesting and instructive character, and was illustrated by some beautifully-executed diagrams. In introducing the subject of the lecture, Mr. Mott said that whether the study of the cryptogamic orders of plants was the first or the last which the student of botany undertook depended in a great measure on the system which was pursued, some botanists beginning with the lower orders of plants, and gradually ascending to the higher, while others began with the higher, and gradually descended to the lower. There were advantages connected with either method, but, perhaps, it was best for the student to obtain a knowledge of the principles of botany by studying those plants in which the organs were plainly developed, rather than those which, from the small size and indistinctness of their various parts, required much closer investigation. The lecturer went on to describe that the whole vegetable kingdom was divided into two great classes, the Phamerogamia, or flowering plants, and Cryptogamia, or flowerless plants, and said that in all probability there were upwards of 200,000 species of plants in these two classes: of these about two-thirds belonged to the class of Cryptogamia, which class was subdivided into ferns, mosses, lichens, and fungi. Mr. Mott then described the distinctive characteristics of these classes, and concluded by showing how these lower orders of plants play their part in the economy of nature, forming by their death and decay soil on which larger and more imposing plants might grow. He urged all his hearers to study some of the subjects he had brought before them, so that the lecture they had heard might prove the germ from which should spring a tree of knowledge. At the conclusion of the lecture, a hearty vote of thanks to Mr. Mott for his services brought the meeting to a close.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The second meeting of the session of this Society was held in Anderson's University, on Wednesday, October 28. There was a very large attendance of members, and the President, Mr. Currie, occupied the chair. The Secretary of the Assistants' Section (Mr. Foster) placed several volumes on the table which had been presented to the Society for the library, and proposed a hearty vote of thanks to the donor, which was seconded by Mr. Murdoch, and agreed to unanimously. Mr. Fairlie (Secretary) then announced the receipt of several donations in money, and proposed the election of several new members, which was also agreed to. The other preliminary business having been gone through, it was agreed that the annual festival should this session take the form of a supper and ball.

The Chairman afterwards introduced Mr. William Gilmour, Pharmaceutical Chemist, of Edinburgh (President of the North British Branch Pharmaceutical Society), who delivered an admirable lecture on "Chromatic Phenomena of Crystallization." The lecture was rendered most interesting and instructive by a large number of diagrams and illustrations, shown by the aid of the oxyhydrogen light. Mr. Gilmour was frequently applauded in the course of his lecture, and at the close was awarded a hearty vote of thanks.

Some arrangements were then made for the Tutorial and Practical Pharmaceutical Chemistry Classes. The meeting having been prolonged to a late hour, some other matters of business were postponed.

HULL CHEMISTS' ASSOCIATION.

The Committee of the above Association has arranged that a sixth winter course of twenty lectures, comprising elementary chemistry, materia medica, pharmacy, etc., shall be delivered by Mr. H. J. Parson, in the Society's room, at the Church Institute, Albion-street, on Thurday evenings, at 8.15. Fee for the course, £1 1s., due in advance. The course of instruction will have special reference to the requirements of the Minor examination of the Pharmaceutical Society, which it is now incumbent on all chemists and druggists to pass before commencing or taking charge of a business. Each lecture will be fully illustrated by experiments. At the close of the session it is intended to offer four prizes for competition, viz., Senior and Junior, materia medica and pharmacy; and Senior and Junior, chemistry.

Intending students are requested to send in their names as early as convenient to the Honorary Secretary, Mr. Charles B. Bell.

The commencement of the session was held on Tuesday, October 29, when the Honorary Secretary, Mr. Chas. B. Bell, delivered the following.

Address.

"It is a pleasant custom, and one which is, or ought to be, productive of kindly relations between the students of this and similar institutions, and those under whose direction they are to pursue their course of instruction; that they should meet face to face at the beginning of each session, on the broad ground of a common fellowship, dictated by a common interest. Were any other relation than this implied, I could not have appeared before you this evening in the character of mentor; but yielding to no man in affectionate regard to my younger brethren entering a laborious and ill-paid trade (or, as some designate it, a profession), I could not lightly decline to accept the duty laid upon me by my colleagues, though I might secretly doubt the fitness of the selection.

"If I have any claim upon your attention beyond that which an abiding sympathy confers, I must lay it to the fact that I have endeavoured, ever since the Society was established, to advance the cause of provincial pharmaceutical education, and I sincerely hope that my endeavours have not been in vain. I hope all of you will embrace the study of pharmacy in its highest sense, and intend setting to work with brave, earnest, and honest hearts. The knowledge you will thus have acquired will last you all your lives, and never evaporate like the temporary makeshift of the 'crammer;' and let me most earnestly implore of you to give 'cram' a very wide berth; but work honestly and earnestly, with the determination of being master of all you have undertaken. Let me for a moment call your attention to the inaugural address recently delivered at Bloomsbury Square by Mr. Giles, and notice what he says about 'cram.' 'I express my deliberate conviction that a compulsory curriculum must sooner or later be adopted, and the sooner the better.' And I would advise my young friends to carefully read and digest the earnest and thoughtful expressions therein contained.

"Above all, be true each one to himself in this respect, that he feels and acts as if he knew that it is necessary to keep up the stock of knowledge already gained by the maintenance, more or less, of habits of investigation and study; for at the present time it is impossible for anyone to take his true position as an educated pharmacist unless he diligently keeps himself well posted in all that pertains to chemistry. I know that in many cases the opportunities for self-improvement are few, and the means for cultivating the scientific department of our business so meagre, that it is almost impossible to gain more than a little smattering of it.

"I cannot, therefore, impress too strongly upon all of you the great importance of a just appreciation of the value of time; every person is apt to waste or mis-spend time, and we know, if once lost, it can never be regained;

we can measure its flight, but cannot for a moment arrest its onward progress.

"Much has been said and written, and a very strong feeling exists in the youthful mind, in regard to a subject which I will just mention—viz., early closing. I have always been, and still am, an advocate for this, where it can be accomplished. There is no denying the fact that late hours in our business are in many instances the result of bad habits, and we know how difficult they are to eradicate. One great cause for this in my opinion is that so many people have been brought into the trade who were not sufficiently educated, and from shortness of capital were of necessity compelled to be in their shops from early morn till near upon midnight. The aspect of many things has changed of late years, and as education increases that evil may be lessened more than it is at the present time. In some towns and districts the general public have become educated to a change in this bad custom, and therefore many dispensing chemists now close at a much earlier hour than formerly, although there may be, and are, many exceptions. Still, I hope that with the chemist and druggist the Iron Age of late hours and slavish attention to business is rapidly passing, and that we are gradually approaching the Golden Age. I would, however, say to all my hearers that there may be particular districts and special reasons for some places of business keeping open till a late hour in the evening; and where, from a calm and dispassionate view of these circumstances, it is found to be a necessity, there should not be the expressions of disappointment, irritation, and vexation which I know are now and then forcibly expressed; but rather let there be an attempt made by constitutional means to bring about, if possible, a better state of things.

"I suppose that all of you are anxiously looking forward to the time when, in after life, you will realize the results of the present teaching and training.

"Everything in this life, if neglected, will naturally retrograde and decline into sterility. God has given us minds, and intrusted them to our care, and if we do not cultivate them, and thereby widen the sphere of thought, we most assuredly neglect a solemn duty, and prove ourselves unworthy of the gift:

"'A little learning is a dangerous thing;
Drink deep, or taste not the Pierian spring;
For shallow draughts intoxicate the brain,
But drinking largely sobers us again.'

"And now, gentlemen, in conclusion, we must approach the more serious part of the subject for which you have entered yourselves, viz., that of preparing yourselves for passing those examinations which are necessary ere you can take the responsible and very important position of a chemist and druggist. You have now placed within easy reach for those who are intended for the trade facilities for instruction and study which twenty years ago were almost, if not utterly, unknown in the provinces; London alone had better facilities. At that period very little time indeed was allowed for study, the time being entirely occupied by work 'from early morn till dewy eve.'

"Let me advise you to take for your motto, 'Labor omnia vincit;' let it be your watchword; and when you have passed through your Minor examination, let me as a friend advise you still to persevere, prosecute your studies with renewed vigour, and rest not satisfied till you pass the Major with honours. The expenses incurred in these examinations I feel certain you will never regret, for when you come to take your position as a pharmaceutical chemist, your learning and intelligence will make you superior to the class of men who now are chemists and druggists. If any of you are so unfortunate as to be unsuccessful in passing, forget not that Englishmen have a character for never knowing when they are beaten, but go up again before the examiners, smiling.

"In Mr. Parson I firmly believe you have a gentleman who is fully qualified for giving you the necessary instruction: the Committee have every confidence in him. Let me therefore beg of you to be attentive and respectful to your lecturer, and assiduous in your studies; leave the pleasures of the world for a time, so that you may be the better able to compete for the prizes which are so liberally offered for competition; use every spare five minutes; you will never know till you try what a large amount of work can be performed in a few odd moments. Do not think because you cannot have a couple of hours at a time that you are debarred from study. 'Where there is a will there is always a way.'"

The Committee earnestly requests members of the trade in Hull to use every effort to induce those in their employ to attend these lectures, and suggests to students the great advantages that will accrue to them by so doing.

CHEMISTS AND DRUGGISTS' SOCIETY OF IRELAND.

The first meeting of this Society for the session 1874-5 was held on Monday evening, the 9th inst., at 44, Molesworth Street. Mr. E. M. Hodgeson, President, in the chair. The attendance was very large. In opening the proceedings the President said the first business of the meeting was the election of office bearers for the ensuing year, which was then proceeded with. The President, Vice-President, Secretary, and Treasurer were re-elected unanimously, and each of whom in suitable words acknowledged the compliment. The meeting then proceeded to elect by ballot the committee, when the following gentlemen were declared elected:—Messrs. J. T. Holmes, Robert Simpson, Stanley Oldham, W. Ledger Erson, John O'Brien, and Wm. Allen. The following gentlemen were admitted to membership:—Mr. R. Watson, Mr. Thos. Gillespie, Banbridge; Mr. English, Cahirciveen; Mr. M. J. O'Sullivan, Kingstown. The President then proceeded to state that the most important business to be promoted was the formation of classes, a step he strongly urged in view of pending legislation. A long discussion ensued, and eventually it was decided that classes be at once formed. Professor Tichborne has undertaken the classes in chemistry and practical pharmacy. It is not yet decided who is to be the professor in botany and materia medica. The fee fixed is extremely moderate, viz., £2 2*s.* for two evenings per week for six months. Several, both employers and assistants, at once joined the classes.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The following scheme of prizes for the session 1874-5 offered for competition among the Associates of the above Association, has been issued by the Council:—

Chemistry.

Inorganic,—

A prize (value one guinea) to the student who passes the best examination in the *Elementary Grade.*

A prize (value one guinea) to the student who passes the best examination in the *Advanced Grade.*

Organic,—

A prize (value one guinea) to the student who passes the best examination in the *Elementary Grade.*

A prize (value one guinea) to the student who passes the best examination in the *Advanced Grade.*

Botany.

Elementary and Systematic,—

A prize (value one guinea) to the student who passes the best examination in the *Elementary Grade.*

A prize (value one guinea) to the student who passes the best examination in the *Advanced Grade.*

The examinations in Chemistry and Botany will be those of the Science and Art Department, ordinarily held in May, and only those students who obtain a *first class* in their respective grades will be eligible for the above prizes.

Hills' Prize Fund.

The Council have determined to apply a portion of this fund in the following manner. They offer three prizes, viz.:—

1st prize . . . Value two and a half guineas.
2nd „ . . . „ one and a half guineas.
3rd „ . . . „ one guinea.

To be competed for at an examination on the Chemistry, Botany, Materia Medica, and Pharmacy of the Pharmacopœia; and on the reading and comprehension of prescriptions.

This examination will be held, under the auspices of the Council, in the month of September of next year, and will be open to all Associates who have not passed the Minor or Modified examination of the Pharmaceutical Society.

The Council hope by this scheme to encourage young men to make diligent use of the opportunities which the ordinary routine of shop duties may be made to afford. Consequently, they intend that the examination shall be a thoroughly practical one, based on the syllabus of the Minor examination, for which it should prove a valuable preparatory training. Intending competitors may procure a copy of the said syllabus, with any further information they may require, on application to the Honorary Secretary.

The Council reserve to themselves the right of withholding either or all of the above prizes in the event of the candidates failing to reach the examiners' standard of proficiency.

The prizes will be presented at the first monthly evening meeting in October, 1875, and will consist of books, apparatus, or instruments, at the option of the successful candidates.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, Nov. 4, 1874.—Professor Odling, President, in the chair. After the ordinary business of the Society had been transacted the following papers were read:—1. "On Methylhexyl Carbinol," by Dr. C. Schorlemmer. 2. "On the Action of Organic Acids and their Anhydrides on the Natural Alkaloids," Part I., by Dr. C. R. A. Wright. 3. "Action of Bromine in the Presence of Water on Bromopyrogallol and Bromopyrocatechin," by Dr. J. Stenhouse. 4. "Action of Baryta on Oil of Cloves," by Professor A. H. Church. 5. "Observations on the Use of Permanganate of Potash in Volumetric Analysis, and on the Estimation of Iron in Iron Ores," by Mr. E. A. Parnell. 6. "Further Researches on Bilirubin and its Compounds," by Dr. J. L. W. Thudicum.

The meeting was finally adjourned until Thursday, 20th November, when the following papers will be read:—1. "Action of Organic Acids and their Anhydrides on the Natural Alkaloids," Part II., by G. H. Beckett and C. R. A. Wright, D.Sc. 2. "On the general Equations of Chemical Reaction," by W. K. Clifford, F.R.S. 3. "On Propionic Coumarin and some of its Derivatives," by W. H. Perkin, F.R.S. 4. "Action of Bromine on Pyrocatechnic Acid, Gallic Acid, and Tannin," by Dr. Stenhouse.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of this Society was held on Wednesday, October 7, under the presidency of M. Regnauld.

A note from M. Stanislas Martin was read, accompanying a specimen of leaves of the *Jacarandi bresiliana*, Persoon. These leaves are employed in Brazil as a stimulant, and are popularly called "caroba."

A letter from M. Clanet, jun., a wax manufacturer, residing at Lavelanet (Ariége), was read, asking for information respecting the blue colour which is developed upon the contact of oleic acid with colophony.

M. Poggiale presented a memoir by M. Gault, of Nancy, upon the preparation of "monobromide of camphor," the use of which compound in medicine he said was extending. [A translation of this memoir has appeared on p. 321 of this Journal.] M. Bourgoin remarked that the expression "monobromide of camphor," employed by M. Gault, is incorrect, and that the substance should be called "monobromated camphor." He added that the first fine crystals were obtained, in France, at any rate, by M. Clin

Action of Solar Light upon Iodide of Potassium.

M. Poggiale also presented a memoir by M. Vidau, Pharmacien-Major in Africa, entitled, "The Action of Solar Light upon Iodide of Potassium." [A translation of this paper at p. 383 of the present number of this Journal.] The author reports that he has found that a ten per cent. solution of iodide of potassium acquires a yellow colour under the influence of sunlight, in consequence of the decomposition of the salt. M. Poggiale, after giving a *résumé* of the paper, said that the result would appear to have an important bearing upon the estimation of ozone by means of paper saturated with iodide of potassium and starch.

M. Buignet asked whether the iodide of potassium used in the experiment was chemically neutral, or whether, like most commercial iodide of potassium, it contained more or less carbonate of potassium, as the presence of the foreign salt might affect the stability of the iodide.

M. Méhu thought the coloration might in a certain measure be attributed to the action of chloride of lime remaining from the bleaching process in the cotton used for filtering.

M. Poggiale said this could not be the case, as several of the experiments were made without the use of cotton.

M. Guichard referred to former experiments in which paper saturated with iodide of potassium and starch, placed in a tube and exposed to the sun, acquired a blue colour.

M. Poggiale said that in several of M. Vidau's experiments the iodide of potassium was not mixed with starch mucilage.

M. Latour asked whether the author had made any experiments on solutions sheltered from contact with air, for he had himself noticed, while investigating the conditions of the transformation of nitrates into nitrites, in an acidulated solution containing starch mucilage and iodide of potassium, an indication that the presence of air was indispensable to the production of the characteristic blue colouring of the starch. He would also ask whether the iodide employed was not alkaline, because when it contained no more than one per cent. of carbonate the salt would become yellow spontaneously, and it required an addition of three per cent. of alkaline salt to keep well.

M. Poggiale thought that the objections raised would not affect the validity of the conclusions of M. Vidau, who had experimented comparatively in sunlight and darkness, and with solutions not containing starch.

M. Bourgoin presented to the Society two products, one liquid, perbromide of acetylene; the other solid, which the author designated the hydride of tetrabromated ethylene. He said that a close investigation had shown that these two bodies are isomeric.

Reaction of Acetic Acid on Oil of Peppermint.

M. Roucher exhibited to the Society a coloured liquid presenting a very marked dichroism, obtained by adding to acetic acid (sp. gr. about 1·070) one-twentieth of its weight of oil of peppermint, and agitating the mixture. After about half an hour a faint blue colour appears, which augments gradually in intensity. In proportion as the colour is dark the dichroism is more marked, the liquid appearing of a pure blue colour by transmitted light, and of a fine cinnabar red colour by reflection. The appearance is similar to that of certain aniline compounds in alcoholic solution. The colour is not stable, but passes gradually to green and then to yellow, under the influence of light. Water throws down a very pale blue precipitate from the acetic liquor, and upon filtration there remains upon the paper a portion of the blue colouring matter, which rapidly turns red, and is decolorized in the air. Potash decolorizes the liquid instantaneously.

In order to ascertain whether this reaction was due to the solid or crystallizable portion (menthol) of oil of peppermint, or to the liquid hydrocarbon associated with it, the author dissolved some menthol in acetic acid, but no coloration was produced. Neither oil of turpentine, camphor, nor oil of citron gives with acetic acid a reaction similar to that observed with oil of peppermint.

M. Méhu read a note by M. Patrouillard upon a specimen of white ginger, adulterated with a grey ginger of less value, whitened with starch and carbonate of lime. [Mr. Garside recently called attention to this practice in this Journal, vol. iv., p. 831.]

The President inquired of M. Méhu, the delegate from the Society to the late International Congress at St. Petersburg, whether he was prepared to present his report. M. Méhu replied, that not having yet received some necessary documents, he wished to defer his report until the November meeting.

SOCIETY OF ARTS.

Carbon and certain Compounds of Carbon.*

BY PROFESSOR BARFF.

(*Continued from page* 356.)

Lectures II. and III.

Carbon has the power of combining very readily with oxygen gas. It will combine with it directly, and also indirectly. It is advisable to use this term indirectly, because, only under very peculiar circumstances, hydrogen combines directly with carbon. Carbon combines directly with oxygen, sometimes at the ordinary temperature of the air, and sometimes above the ordinary temperature of the air.

Although it is doubtful whether carbon has ever been vaporized, as soon as carbon comes in contact with oxygen, under suitable conditions, it forms one of two transparent and colourless gases.

If some leaves or sawdust be put into a bottle, and the bottle stoppered up and kept for a time, that bottle will become filled with carbonic acid, whereas it was first filled with air, showing that carbonic acid is formed by oxidation of the carbon in the substance at the ordinary temperature of this air. The temperature in the tube would not be the same as that outside, because chemical action goes on, and there is a slow burning. Therefore the temperature inside the tube would be greater than the temperature outside. If a stack of hay be put up green the chances are that the haystack will take fire, because its carbon, the hay being moist, will unite with the oxygen in the air, heat will be evolved, and at last the temperature will rise so high that it will set fire to the grass or hay. Here by the oxidation of the carbon there is evolution of heat. For the same reason there is evolution of heat when fuel is lighted in a grate, because the carbon in the fuel, as the carbon in the grass, is oxidized by the oxygen of the air.

Our own bodies have a certain animal heat, below which if the temperature of our bodies fall we die. It is not simply, but in great part, owing to the burning or combustion of the carbon and of the hydrogen of the food which we eat, and the products of combustion in all instances are the same.

Underneath the surface of the earth there is much more carbonic acid than above its surface. Four parts in 10,000 is the proportion in the air in a city, or over the great Atlantic, for the proportion varies very little indeed when the air is taken from different places. But underneath the surface of the earth there is a very large amount of carbonic acid. The influence of this carbonic acid there is very interesting. The mineralogist will see that the consideration of it is very important. The botanist will see that it will, in fact, be to him of far greater importance even than to the mineralogist, for it is a very striking thing, that only four parts in 10,000 of the carbonic acid is the quantity in the air, and yet all vegetation takes its carbon from carbonic acid. But there is a much larger quantity of carbonic acid under the earth, and therefore in the water that impregnates the earth. Now, it is not difficult to understand that there is an accumulation of carbonic acid which goes to support the plant, and to enable the plant to build up its structure, and to afford those products which are useful for the support of animal life. This point is not irrelevant, because it is from this source that we get our fuels, and it is of importance and of great interest to know how it is that plants get the material which builds up their structures, and where they get it from.

Carbon and oxygen unite together directly at high temperatures or at low temperatures. In the presence of moisture, carbonic acid gas is the product in almost all cases, because the air is in excess of the carbon acted upon at the time. But another product of oxidation is formed, in which the carbon is in excess of the oxygen. By oxidizing common black lead—plumbago—by means of chlorate of potash and nitric acid, a substance is formed which has properties different from the graphite from which it was formed. This substance was discovered by Sir Benjamin Brodie. From it may be got graphitic acid. It contains oxygen, hydrogen, and carbon. If it be heated it will swell, and if thrown into a flame it will readily burn. Now, the graphite will not burn, so that the graphite has been converted into a form of ordinary charcoal. Let us now connect this with the diamond. If a diamond be heated by the electric current in a vessel from which air has been excluded, first of all it increases in size, and instead of being transparent it becomes opaque; if, at this stage, the specific gravity be taken it will be found that it is much less than the specific gravity of the diamond. Continue heating the diamond, and it turns out a black mass, which is identical with graphite.

Another physical property of this carbonic acid gas is of considerable importance. It can be condensed to a liquid, but under a considerable pressure. This gas extinguishes a light; substances will not burn in it, neither will animals live in it.

Carbonic acid gas has been used as the material in the fire-extinguisher. Carbonic acid gas under pressure is used there. If carbonic acid gas were condensed to a liquid, as a liquid it would occupy a much less space than the gas occupies, so that a very large quantity of carbonic acid gas could be condensed into the liquid state and held in a small vessel. At all fire-escape houses bottles containing this liquid carbonic acid gas should be kept. Of course, they must be of iron, and strong enough to bear a heavy pressure, for the pressure is about 40 times 15lb. to the square inch. In order that the gas might escape readily when thrown into the burning building, these vessels should be made of a cylindrical form, drilled with holes, and those holes filled in with a fusible metal. Then directly the apparatus was thrown into the fire the fusible metal would melt, and the liquid carbonic acid would escape and become gaseous, and of course its volume would increase far beyond the volume it had while condensed; and probably in some of those unmanageable fires, where human beings are not in the burning houses, these vessels thrown into the fire would extinguish the fire almost immediately. The experiment has never been tried in

* Abstract of a course of Cantor Lectures, delivered before the Society of Arts.

this form, but it is one in which it is perfectly reasonable to expect would produce the result.

If a small piece of potassium be heated in a tube in a current of dry carbonic acid gas, the potassium will catch fire and burn, for the potassium acts violently upon the carbonic acid gas, takes away the oxygen from it, and causes a deposition of carbon.

If carbonic acid gas be passed over charcoal heated to redness in an iron tube, it will take up some more carbon, and we get CO and CO. When carbonic acid has taken up this extra weight of carbon, it has lost many of the properties which it possessed as carbonic acid. As carbonic acid it would not burn, but when the carbonic acid takes up these 12 parts by weight more carbon, and becomes carbonic oxide gas, then we have a gas which will burn with a pale blue flame. Suppose CO_2, 44 parts by weight of carbonic acid gas, occupies a definite volume, and suppose CO occupies a volume equal to it, then it is quite manifest that twice CO will be double the original volume, and the consequence is that when CO_2, 44 parts by weight of carbonic acid gas, are passed over carbon, they take up 12 parts by weight of carbon, and form double the volume of carbonic oxide gas. This is a thing also of importance to be remembered.

In what respect does carbonic acid differ from carbonic oxide? It differs in density, for carbonic acid is 22 times as heavy as hydrogen. Carbonic oxide is 14 times as heavy as hydrogen, therefore it differs in density. If 14 times as heavy as hydrogen, it is a little lighter than atmospheric air; if, then, it is formed in any process that goes on in fireplaces, the tendency of carbonic oxide to rush up the chimney will be greater than that of carbonic acid.

Thoroughly to understand how to be able to economize heat, it is necessary to consider the action which goes on in the burning of an ordinary fire, or the burning of an ordinary gas flame. When a fire is lighted a draught is created. The paper is lighted first, because it burns at a lower temperature than wood. The wood is lighted next, because it burns more easily than coal; it is so because the carbon in these are in such a condition that they will more readily unite with the oxygen of the air at the temperature to which they are exposed. The heat evolved by the burning of the paper and the wood in a well-constructed chimney causes a draught. The air gets rarified, and the cold air rushes in to take its place. If air is in excess when it comes in contact with red-hot coal or red-hot wood or paper, the gas formed will be that which contains the largest amount of oxygen. That is to say, carbonic acid will be formed. Now, as the coal gets hot, this carbonic acid gas passes through the heated coal, and takes up twelve parts by weight more carbon. It becomes then carbonic oxide gas, and the carbonic oxide gas comes up to the top of the fire to the upper part of it, and if it is hot enough it unites with the oxygen of the air and forms carbonic acid gas again. On a clear winter's night, when the fire has burnt to a bright glow, a pale blue flame flickers over its surface: that blue flame is caused by the combustion of the carbonic oxide into carbonic acid. The same thing takes place in a gas flame, and will be considered in treating on illuminating substances. What is necessary to notice now is this, that in order that this carbonic oxide gas may be burnt it must be heated. See what happens, then, if too much coal be put upon the fire. The carbonic oxide is formed by the carbonic acid passing over red-hot coal beneath; but the coal on the top of the fire is not hot, and the gas being light, lighter than the air, the tendency is to go up the chimney, and so a large amount of the heating power of the coal is lost. An enormous amount of the heating power of coal is lost in this way, and probably with $\frac{1}{2}$, or $\frac{1}{3}$, or $\frac{1}{4}$ of the quantity of coal we now daily use, we might be able effectually to produce all the benefits now produced by this enormous consumption. This is a scientific reason why fires should not be built up with a large quantity of coal.

Carbonic acid gas contains exactly the same volume of oxygen that the carbonic acid itself measures; whilst carbonic oxide gas contains only half the measure of oxygen which the carbonic oxide itself measures. These are very important facts, when we consider what takes place in the burning of fires. For example, carbonic acid gas is formed in the bottom of the fire; while it passes through the fire the carbonic acid becomes converted into carbonic oxide. Here the volume is doubled, so that in the middle of the fire there is double the volume of gas formed of carbon and oxygen that there was at the commencement. Then, again, when it burns at the top, the carbonic acid is formed again, and double the volume there was at the bottom, because carbonic oxide is burned into carbonic acid.

Now, suppose we take C to be 12 grammes by weight of carbon, then O_2 will mean 32 grammes by weight of oxygen, and the whole of them together will make 44 grammes by weight of carbonic acid gas. At what is termed the normal temperature and pressure—that is, at a temperature of zero Centigrade, and under a pressure of 30 inches of mercury, or 760 millimetres of mercury—that weight of carbonic acid gas will occupy a definite measure; as nearly as possible it is that of twice 11·2 litres.

The 28 grammes of carbonic oxide, under the same conditions of temperature and pressure, will occupy the same volume, viz., twice 11·2 litres. This is true of all the compound gases.

Marsh gas is represented by CH_4. If we add 12 and 4 together we get 16. If we take 16 grammes of this marsh gas, they will occupy the same measure as 44 grammes of carbonic acid, or 28 grammes of carbonic oxide, under the same conditions of temperature and pressure. Compared with the other gases, these two are the principal gases of coal gas, and they are set free whenever coal burns. They are most important substances themselves to consider in a course of lectures like the present, and the changes they undergo in burning are of immense importance to the understanding of the subject, and to the formation of suitable and useful apparatus for our fires and gas for the illumination and warming of our rooms. Marsh gas is also called carburetted hydrogen, because it contains carbon and hydrogen. The other, olefiant gas, is also called carburetted hydrogen, and we distinguish between the two by calling the marsh gas light carburetted hydrogen, and the olefiant gas heavy carburetted hydrogen. Because, although they occupy exactly the same volume, the one contains 12 parts by weight of carbon, whilst the other contains twice that quantity by weight. This marsh gas has also acquired another name, from its extremely dangerous properties, and from the explosions it gives rise to, producing loss of life, in coal mines. It is known by miners as fire-damp, from an old word *damp*, meaning gas or air. It is produced in marshes by the decomposition of vegetable matter, and all vegetable matter that occurs in marshes contains carbon and hydrogen. When this vegetable matter decomposes, certain other things besides marsh gas are formed; but marsh gas is formed by some of the carbon and some of the hydrogen of the vegetable matter. Marsh gas burns with a pale blue flame, probably showing a slightly yellow tint. The flame is not luminous, very little more so than the flame of hydrogen gas. Marsh gas is always set free when substances containing carbon and hydrogen are decomposed slowly or rapidly. Therefore, when coal is decomposed slowly or rapidly marsh gas is set free. When a quantity of this gas gets into a coal mine an explosion takes place, but there are limits as to the quantity of marsh gas and atmospheric air which will produce an explosion. In order that it may burn perfectly there must be sufficient oxygen to form carbonic acid with its carbon and water and with its hydrogen. The carbon in CH_4, or 16 grammes of marsh gas, will require twice 16 grammes of oxygen, or twice 11·2 litres of that gas for their complete combustion; and 4 grammes of hydrogen H_4 will require the same quantity of oxygen, because H_2 requires O or 16 parts by weight of oxygen to form water with them; therefore H_4 will want 32 parts by weight of oxygen, or twice (11·2) litres for their perfect combustion. Now, the product in the first case will be 44 grammes of carbonic acid, which will measure twice (11·2) litres, and in the second four times (11·2) litres, or 36 grammes of water vapour or gas; this action is represented by equation, as follows:—

$$CH_4 + 2\ O_2 = CO_2 + 2\ (H_2O).$$

But inasmuch as in mines we have not to do with pure oxygen, we want to know how much air must be used to burn marsh gas. Now, inasmuch as in one volume of air there is about ⅕ its volume of oxygen, it is quite clear that five volumes of atmospheric air are required to yield one volume of oxygen, and therefore we shall want ten volumes of atmospheric air to yield two of oxygen, and if we want to burn a volume of marsh gas we must have two volumes of oxygen, or ten of atmospheric air. Therefore, when marsh gas is mixed with ten times its own volume of air it makes the most explosive mixture. If it is mixed with only three times its own volume of atmospheric air it will explode, and if it is united with eighteen times it will not explode, but will go on burning quietly. A knowledge of these facts has made possible the construction of a lamp that can be used in otherwise unworkable mines. The principle of Sir Humphrey Davy's safety lamp is this—the iron wire gauze, which is a good conductor of heat, provided it be perfect (and there are about 800 wires in the square inch), and provided it be not oxidized or broken, will conduct away the heat, and the lamp may be put lighted into an explosive mixture of marsh gas and air, and yet the mixture will not explode. The marsh gas and air that are inside will burn inside, but they will not ignite the mixture that is outside the lamp, simply because the iron wire conducts away the heat, and it does not rise to a sufficiently high temperature to explode the mixture of marsh gas and oxygen, or marsh gas and air, which require a very high temperature for their ignition. Of course when the miner sees the flame burning inside the lamp, he ought to withdraw from the workings, because there may be some imperfection in his lamp, and if there were any, even minute ones, when the mixture is in these proportions, if the temperature be high enough, an explosion will take place.

Olefiant gas consists, as has been already said, of a much larger quantity of carbon; in fact, twice 11·2 litres contains 12 grammes more carbon, and the effect of this increased quantity of carbon is, that it makes the gas give more light, it makes it more luminous. When speaking upon coal gas and its impurities and its purification, it will be shown that olefiant gas, which exists largely in coal gas, and is one of those gases which give it its illuminating properties, is an extremely interesting body. It burns with a very different kind of flame from marsh gas, and deposits black soot upon the white porcelain held in the flame, showing that it contains a very considerable quantity of carbon. This deposit of carbon may be utilized to increase the illuminating power of petroleum oils, hydrocarbon oils, and coal-gas. When olefiant gas is passed through a red-hot porcelain tube it deposits half its carbon, and marsh gas is formed; thus it is represented in symbols—

$$C_2H_4 = C + CH_4.$$

The volume of the marsh gas is the same as that of the olefiant gas, for C_2 and H_4 occupy each 2 volumes; but if the marsh gas be passed through a white hot porcelain tube all its carbon is deposited, and hydrogen passes on thus—

$$CH = C + H_4,$$

but H_4 occupies 4 volumes, and CH_4 only 2 volumes; therefore the hydrogen is double the volume of the olefiant or marsh gas, from which it is obtained. The decomposition of these gases takes place in the burning of an ordinary gas flame, and they take place in the burning of a fire, and a knowledge of this decomposition of the gases and the change of volume in the decomposition is a subject of considerable importance.

(*To be continued.*)

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act.

Adulteration of Mustard.

At the Greenwich Police Court, on Tuesday, Mr. H. Parr, grocer, of the Trafalgar Road, Greenwich, appeared to an adjourned summons at the instance of the Greenwich District Board of Works, charging him with selling mustard adulterated with starch. Mr. Spencer attended in support of the summons, and Mr. J. B. Smith, solicitor, of Greenwich, for the defence. The case was originally heard on the 8th of October (see before, p. 316), when a certificate, signed by Mr. G. W. Wigner, the District Medical Officer, was produced, setting forth that the sample of mustard, bought at the defendant's shop and submitted for analysis, contained 30 per cent. of starch. At the time this sample was purchased it was averred that the manager, hearing it was purchased for public analysis, took another packet out of the same drawer, which had been submitted to Dr. Tidy, who certified that no starch was to be found in the sample submitted, and upon this difference of opinion it was agreed on both sides that an independent analysis of a portion of that analysed by the district analyst should be made by Dr. Heisch, of Middlesex Hospital. The certificate of Dr. Heisch was now produced, stating that the analysis proved a great admixture of oatmeal, and more than one-third of starch, a greater adulteration than that certified by the district analyst. In answer to questions, Mr. Wigner said the seed of mustard did not contain starch, only something analogous. As a condiment, mustard containing such an admixture of starch would not be injurious to health, but if used as a drug, such as for making a mustard plaster, it would be ineffective. Mr. Smith, for the defence, said that the mustard was considered as pure, and was sold as received in bulk. Mr. Patterson imposed a fine of 10*s.* and £5 8*s.* costs, the latter including £5 5*s.* fee to Dr. Heisch, which were paid.—*Times.*

Alleged Adulteration of Butter.

At Marlborough Street, Brown Webb and Horatio Webb, 69, Great Titchfield Street, cheesemongers and butter merchants, were on Wednesday summoned before Mr. Newton, at the instance of the authorities of the parish of Marylebone, for selling adulterated butter. Mr. Greenwell, Vestry Clerk of Marylebone, prosecuted; Mr. Straight defended. Dr. John Whitmore, public analyst of Marylebone, received a portion of butter from the Inspector of Nuisances for analysis. He found the constituents were 15 per cent. of water, 4·9 of salt, and 8·5 per cent. of casein. In his opinion the article he received did not properly constitute "butter," which meant the "fat of milk." In his opinion the butter was adulterated with water. In the manufacture of cheap butter, cheese matter, or casein, was ordinarily used. Replying to Mr. Straight, witness said the price of butter charged by West End dealers varied. Best butter was charged 22d. or 2s. He considered that more than 10 per cent. of water in butter constituted adulteration. He had analysed many samples of genuine butter, and had always found less than 10 per cent. of water. He was not aware that the quantity of water varied according to the nature of the feed. A different quality of butter was got from the best feeding counties from that obtained from other feeding counties. In the samples of butter obtained from the defendants there was nothing injurious to health. The microscopic test was a very good test, and was used by the most experienced analysts. He had found not more than 1 per cent. of casein in English fresh butter. Mr. Newton asked Dr. Whitmore if the caseine in the sample had been put in or was left in. Dr. Whitmore said the butter when made was washed, in order to wash out the casein. The more completely it was washed the less casein there would be. Mr. Newton said that after this it appeared the butter had not been sufficiently washed, and therefore the casein was left in. Dr. Whitmore said possibly that was so. Mr. Greenwell would remind the magistrate that Dr. Whitmore stated there was 15 per cent. of water in the butter. Mr. Newton asked if Dr. Whitmore would swear that the water was added. Dr. Whitmore would not, but his impression was that the water must have been added after manufacture on account of the quantity. Mr. Straight said the butter was purchased at 1*s*. 2*d*. and 1*s*. 4*d*. per lb. It could not be expected that everyone was able to buy best butter at 22*d*. and 2*s*. per lb. His instructions were that the butter in question was a fair and wholesome butter, and though yielding water and some amount of casein, it was unadulterated. Mr. Greenwell said he did not impute fraud to the defendants. His argument was that butter containing water and casein was not pure butter. The public who bought butter did not expect to find it mixed with water and cheese matter. Mr. Straight said if all the casein was washed out and all the water squeezed out a higher price must be asked for the butter. How then could butter be brought within the reach of the working public? Mr. Greenwell said the question was a most important one. If ingredients were left in butter after it was supposed to be made pure, the Act would be rendered to some extent nugatory. He contended that not to take out the water and the casein was, in fact, an adulteration. If this were not so, then imposition of a dangerous character, such as in drugs, might be practised with impunity. Mr. Newton said that in such state of things a door would be opened to fraud. Mr. Straight read several decisions of the Judges, and quoted the opinions of analysts of eminence to show that there were differences of opinion as to the amount of water and casein to be found in the best butter. Mr. Newton asked Mr. Greenwell if he was inclined to ask for a case. Mr. Greenwell said no. He would be satisfied with the decision of the Court. Mr. Newton said had the evidence of Dr. Whitmore been one tittle stronger he should have convicted; as it was, he would dismiss the summons, with this advice, that the defendants should continue to conduct their business so as to maintain a high character. Mr. Webb wished to know if he was to understand the magistrate to say he was not to sell butter with more than 10 per cent. of water in it. Mr. Newton would give no opinion on that point; all he said was that he must not sell manufactured butter.—*Times*.

An Infatuation for Laudanum.

On Tuesday, Annie Payne, 19, a strange-looking female, was charged on remand, at the Lambeth Police Court, with stealing from inside the shop No. 6, Bird Street, a small bottle containing one ounce of laudanum, the property of John Middleton, chemist. Prisoner on Monday week went to prosecutor's shop and asked for one ounce of laudanum. He declined at first to serve her, but ultimately put the quantity into a bottle and placed it on the counter. She then asked for another article, and while his back was turned ran out of the shop with the laudanum. She was followed and given into custody. Another chemist, carrying on business in Blackfriars Road, stated that about a fortnight back the prisoner asked for sixpennyworth of laudanum, and he served her. Whilst his back was turned for a moment she ran out of the shop with it. Dr. Charles Corbett Blades, of Kennington Park Road, examined her, and gave his opinion she was an habitual laudanum drinker. She told the doctor that she would sooner have laudanum than her dinner. The prisoner now denied intending to steal the laudanum, and Mr. Chance fully committed her for trial.—*Standard*.

Robbery of Drugs.

At Lambeth, on Wednesday, George Charles Wittey and Benjamin Besford, both 16, were charged with breaking and entering a warehouse in York-street, Walworth, and stealing various articles to the value of £10 10*s*., the property of Messrs. Bush, wholesale druggists. On the 28th ult. the prisoners were seen by a police-constable loitering about. Wittey was carrying a brown paper parcel, and on being stopped and questioned he said it contained "scented hair oil." He threw down the parcel and ran away, but was captured. Several bottles were found on him. The other prisoner, when apprehended, denied all knowledge of Wittey, but he afterwards said he had gone with him to Mr. Bush's premises, York-street, Walworth, made an entry, and taken several articles. On Besford was found a large chisel. Mr. W. Bush, the prosecutor, said he was a manufacturing chemist. He identified the articles produced as his property. He found the premises had been forcibly entered, and an attempt made to open an iron safe. Detective Sergeant Ranger said Besford told him that Wittey asked him to do some work for him at 4 o'clock in the morning; he met him, and they went to Mr. Bush's premises. Wittey returned with a number of articles and asked him to carry them, but he refused. The prosecutor said it was the third time his premises had been broken into and plundered. Wittey reserved his defence, and Besford protested his innocence. Mr. Chance committed both prisoners for trial.

Review.

Pharmacographia: a History of the Principal Drugs of Vegetable Origin met with in Great Britain and British India. By Friedrich A. Flückiger, Phil.Dr., Professor in the University of Strasburg, and Daniel Hanbury, F.R.S., Fellow of the Linnean and Chemical Societies of London. London: Macmillan and Co. 1874. (8vo, pp. 704.)

We must preface our notice by at once saying that the book before us is one of the highest character, and fully answers the great expectations which had been formed when it was announced. The authors are so eminently distinguished in the special researches connected with the origin, composition, and characters of drugs, and their observations have already in so many cases conspicuously helped forward our knowledge of these substances, that one is prepared to find in the work upon which they have for several years been closely engaged a masterly treatment of the subject, appreciative reference to the writings of others, and much original matter.

Perhaps, in endeavouring to give an account of this treatise—which may be fitly characterized as an Encyclopœdia—we cannot do better than quote the authors' estimate of their book, as given in the preface. They describe it as "a record of personal researches on the principal drugs derived from the vegetable kingdom, together with such results of an important character as have been obtained by the numerous workers on materia medica in Europe and America," and this well describes its character. The book is not a treatise on medical botany or chemistry, on pharmacy or therapeutics, but is a history and description of the vegetable drugs commonly used by pharmacists in this country. The scope does not seem a large one, and, in the hands of writers of less knowledge, perseverance, and literary ability than the authors, the subject would probably prove of but little interest. Treated, however, in the pages of 'Pharmacographia,' each substance is made the centre of a crowd of facts of interest. The history and traditions of ancient or barbarous nations and of our own land are elucidated, and curious points in geography, medicine, and natural science have been culled from a thousand sources. State papers and ancient MSS., Chinese herbals written long before the Chistian era, Spanish accounts of the wonders of the New World, the classical literature of Greece and Rome, the Arabic writings of the Middle Ages, modern scientific papers, trade returns of the colonies, books of travels, floras and herbaria, all give help, and no source of information seems to have been too recondite or too trivial to find an appropriate place.

The 228 substances included in the volume are arranged under the Natural Orders to which the plants that have been ascertained or are suspected to yield them respectively belong. The Orders follow the sequence usually adopted in England, as represented in the 'Genera Plantarum' of Bentham and Hooker, so far as that comprehensive work has yet gone, and in other publications of the same botanists. Besides the drugs of the British Pharmacopœia a considerable number of those contained in the Pharmacopœia of India are included, as well as several of a chiefly historical interest. We think it would have been desirable to have clearly distinguished the substances which are official in Britain from the others. The materia medica of the United States is not included, not even the plants of the "Primary List" of the United States Pharmacopœia. *Cortex Pruni serotinæ* is one of the very few specially American drugs noticed. Care has been taken in designating the drugs to give an accurate indication of the exact plant-organ of which they consist, a proceeding which, though desirable in itself, has resulted in a few changes of old-established and familiar names. Food-substances, as such, unless also drugs, find no place in the work. Selected synonyms follow the name, and the French and German appellations of the substance. Notes on the origin of some of the names are not infrequently given; Castor Oil takes its name from a strange confusion of *Ricinus* with *Agnus Castus* in Jamaica, and Matico is said to be so called after a Spanish soldier who accidentally discovered its styptic properties.

Under the head *Botanical Origin* much valuable information is given, usually in a few lines. From the known acquirements of one of the authors in this department of botany the determinations here given possess exceptional weight. It will therefore be well to allude to some of importance. In accordance with the views of Miquel and Baillon, the Japanese *Illicium religiosum*, Sieb. is not considered distinct from the Chinese tree (*I. anisatum*, Lour.), yielding star-anise fruits. The sources of Calumba, *Jateorhiza palmata*, Miers (*J. Miersii*, Oliv.), and *J. Calumba*, Miers, are no doubt wisely combined (under the name *J. palmata*). The origin of the drug which has so long done duty for Pareira brava in the shops, and was regarded as derived from *Cissampelos Pareira*, L., remains still unknown. True Pareira brava, as conclusively shown by Mr. Hanbury in this Journal recently, is the woody root of *Chondrodendron** *tomentosum*, Ruiz & Pav., whilst *Cissampelos Pareira* seems to have never been an object of export to Europe. The source of Savanilla rhatany is determined to be *Krameria tomentosa*, St. Hil., and the Lignum Vitæ of the Bahamas is furnished by *Guaiacum sanctum*, L. *Boswellia Frereana*, lately described and figured by Birdwood as one of the olibanum-producing trees of the Somali country, is here considered to be the source of the Oriental or African elemi of the old writers; the exudation differs essentially from olibanum in containing no gum. The source of the elemi of the British Pharmacopœia remains still uncertain; it is the produce of a tree growing in the Philippines, but the statements referring to the plant on pp. 130, 131 of the book under notice seem to be somewhat contradictory. Eight species of *Astragalus* are enumerated as known to yield gum tragacanth to a large extent in Asia Minor, Persia, and Luristan, and the product is known to be obtained in less quantity from others. The authors are not inclined to restore Linnæus' genus *Toluifera* for *Myroxylon*, on the ground of the inconvenience of the change, a plea of no great weight in this instance where so few species are involved; neither can they follow Baillon in combining *M. Toluifera* and *M. Pereiræ* into a single species; indeed, they give distinguishing characters derived from the pod and the inflorescence. A list of four species of *Copaifera* is given as furnishing copaiba balsam; *C. multijuga* is discarded, there being no sufficient evidence to show even the genus to which it belongs. *Acacia Verek* has been shown by the celebrated traveller Schweinfurth to be the exclusive source of the best African gum arabic. True catechu is a product of *Acacia Suma*, Kurz, in India, as well as of *A. Catechu*, Willd.; and Gambier, or pale catechu, of *Uncaria acida*, Roxb., as well as of *U. Gambier*, Roxb. The puzzles of materia medica are still found in the Umbelliferæ; the true origin of Galbanum, Sagapenum, and Opoponax is stated to be still unknown, whilst, in spite of all the study devoted to the two "asafœtida" plants, *Narthex Asa-fœtida*, Falc. and *Scorodosma fœtidum*, Bunge, the authors consider that it is still unproved that either yields the drug, or is certainly the same as Kaempfer's *Asa-fœtida disgunensis*.* A useful table of the species of *Cinchona*, with references to figures, native country, and products, is given at p. 318. The origin of Santonica is shown to be *Artemisia maritima*, var. *α. Stechmanniana*, Besser (*A. Lercheana*, Kar. & Kir.), found near the Don and Lower Volga, and the Kirghiz steppes of Turkistan: *A. Cina*, Willk., does not quite correspond with this. The long pepper of commerce is chiefly obtained from *Piper officinarum*, Cas. DC. (*Chavica officinarum*, Miq.), of Java. *Maranta arundinacea*, L. and *M. indica*, Tuss., both of which yield arrowroot, are combined into a single species; but the species of *Canna* whence Tous-les-Mois starch is extracted, has not been determined. The species of *Smilax* affording the Sarsaparillas of commerce are *S. officinalis*, H.B.K., which yields Jamaica, and *S. medica*, Schl. and Cham., which gives Vera Cruz Sarsaparilla: the sources of the other kinds are doubtful. Grass oils are the products of three Indian species of *Andropogon*; *A. Nardus*, L., affords citronella oil, *A. citratus*, DC., lemon grass oil or oil of verbena, and *A. Schœnanthus*, L. rusa oil, oil of ginger grass or oil of geranium. *A. Calamus-aromaticus*, of Royle, is referred by Gen. Munro to the last species.

The native countries are very carefully determined, a matter often of great difficulty in the case of plants so extensively cultivated as are many of these. Botanical descriptions were not within the scheme of the authors, but we think a more systematic quotation of the books where such can be found and of published figures would have been very useful.

The *history* of the substance follows. It would be rash indeed to attempt any criticism of this portion of the book. In few words, only possible to writers who are complete masters of their subject, the intricate collection of scattered information is reduced into an orderly and interesting narrative, the copious references at the foot of the pages to books, papers, and MSS., many obscure, rare, and difficult of access, in every department of literature, giving us an indication of the immense amount of work which must have been necessary before the short account could have been penned. These references are very full (dates are always given), and show a thoroughness and determination to get to the very fountain-head of information, which is certainly admirable. The articles, for example, on rhubarb, pepper, cinnamon, camphor, and attar of rose, may be cited as showing a wealth of information and knowledge on recondite branches of research, and a power of putting the important facts forward in a terse narrative which is not often met with.

Under the head of *Collection*, *Preparation*, or *Manufacture*, we have information about the mode in which the product is obtained. Most of this is from the accounts of travellers, ancient and modern, and some has not been before published. At p. 450 is an interesting account of

* Mr. Hanbury prefers to spell it *Chondodendron*, as found in Ruiz and Pavon's 'Prodromus'; but it seems probable that the omission of the *r* was an accidental misprint.

* The *Ferula Assafœtida* of Linnæus, not of Hope.

the preparation of English rhubarb near Banbury, where *Rheum Rhaponticum* has been in cultivation since 1777; and at p. 642 Mr. Spruce, the Brazilian traveller, describes the collection of sarsaparilla.

After this comes a full and careful *description* of the drug, pointing out its salient characters and the minute marks of distinction. Great care has evidently been bestowed here, and as scientific descriptions of materia medica they are models. A section on *Microscopic Structure* follows, which is not very full; indeed, as the authors state, and as we are convinced is the case, long descriptions, without figures, of microscopic structure leave but little definite impression upon the mind of the reader.

The *Chemical Composition* is treated more fully, yet with great brevity. The researches of very numerous chemists are shortly alluded to, but scarcely ever detailed. All the important constituents are mentioned, and references are given to the original sources of information in many cases, though not in all; the date, however, is usually afforded. Descriptions of the chemical processes and products were no part of the authors' plan.

The section on *Commerce* gives trade information, and consists of statistics of the values and quantities imported in recent years into this country, or exported from foreign countries or the colonies, and often similar information with regard to other lands. A brief indication of the medicinal *uses* follows, and concludes the plan upon which each substance is treated. Appended, however, to many is a section headed *Adulteration* or *Substitutes*, in which is given information about other products which are found under the same name in the trade, or are accidentally or intentionally substituted. Here the authors have trusted to actual observation, and have not swollen their book by information taken second-hand. Under some drugs, elemi, kino, manna, camphor, etc., there is much additional matter in this section, including the history and description of products of almost equal interest with the main subject of the article.

Such is the scope and substance of this remarkable book, which, so far as we know, is unlike any other existing, and must be held to fix the period of a distinct advance in the subject to which it is devoted. Doubtless there will be some who regret the omission of certain substances, and of course the list might have been almost indefinitely extended. In nearly the earliest English* work of at all a similar kind, the 'Pharmacologia' of Samuel Dale, the friend and neighbour of the great Ray, printed so long ago as 1693, a list of as many as 519 substances, animal, vegetable, and mineral, commonly on sale by the druggists of London, is given, and a supplement was published in 1705, containing very many more. But what is gained in the way of an extensive list is small compared with the loss of other information, and little indeed is told us by Dale of the substances so fully treated by the authors.

The 'Pharmacographia' is not, and never can be, a text-book; it is essentially a reference-book. Its influence on the progress of our knowledge of the materia medica can therefore never be estimated by the number of its readers. The persons to whom it will be useful at first hand must be few, but to those few it will be indispensable. The trustworthy and authentic matter it contains will, however, in due course, percolate through to the general mass of students, and, embodied in lectures and text-books, become the property of all, and thus the science of Pharmacology will be helped forward in no slight degree.

A word in commendation of the get-up of the volume. Clear and well-arranged type, very few typographical faults, and a neat, handsome binding are good points, and the single copious index a practical convenience not to be underrated.

* The book is written in Latin, in accordance with universal practice at the period.

BOOKS RECEIVED.

TINNITUS AURUM; or, NOISES IN THE EARS. By LAURENCE TURNBULL, M.D., etc. Philadelphia. Lippincott and Co. 1874.

ON DEAF-MUTISM, and the Means of Educating the Deaf and Dumb. By LAURENCE TURNBULL, M.D. Philadelphia. 1874.

Notes and Queries.

AN EXPLOSIVE MIXTURE.—A mixture of chromic acid and glycerine having been recommended in the United States for affections of the mouth, scrofula, etc., Dr. Mascarel takes occasion to warn dispensers that if these substances be rubbed vigorously the result will be an explosion, an accident that may be averted by adding the glycerine drop by drop and rubbing slowly.

MOSQUITO BITES.—Mr. D. De Berdt Hovell states (*Brit. Med. Journ.*, Oct. 31) a mixture of carbolic acid and olive oil, in the proportion of one fluid drachm of the acid to an ounce or an ounce and a half of the oil, applied to mosquito bites, relieves the irritation and promotes the healing; moreover, it will effectually keep off other mosquitoes. He has also found a weak solution of carbolic acid (1 in 100), applied to the face and neck, efficacious in preventing gnat bites.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PHARMACEUTICAL EDUCATION.

Sir,—I have read with considerable pleasure Mr. Giles's inaugural address, and I hardly know which to admire most, his philippic against "cram" or the judicious and carefully considered letter from Mr. Barnard Proctor, in your last number.

The subject of pharmaceutical education is one which in Ireland causes us considerable uneasiness and anxious thought. In fact, outside its general bearing it is a subject of vital importance to the chemist and druggist at present in business in Ireland, who hopes to maintain his position as advanced guard against the inroad of any forthcoming army of pharmaceutical students.

There was a movement made last year to extend the action of the Pharmaceutical Society to this country, and there can be little doubt that had the Council shown a greater desire to promote the "object of the Pharmaceutical Society" (*vide* Charter of Incorporation), the movement would have been received with much more favour.

The attitude of the Society on that occasion was antagonistic to pharmaceutical education. It meant commercial death to the existing chemists and druggists in Ireland, utter sterility as regards the production of students, and stagnation to the development of the art generally. Of all the contending interests at stake it only presented a possible advantage to the Society itself by an extension of its sphere of action.

I sincerely hope the Council will see fit to practically endorse Mr. Giles's condemnation of "cram;" firstly, by the institution of compulsory education. As a public teacher in a medical school where attendance upon lectures is the order of the day, I can bear testimony to the satisfactory way in which it bears fruit. If the said school is not numerically the strongest, it is second to none in turning out the men who are the workers in their profession. Secondly, the Council can do a great deal by the development of the practical examinations which they seem to have adopted. Dependence upon examination papers may facilitate the examination of a large number of students, but will also as certainly play into the hands of the man who works to pass, but not to know.

C. R. C. Tichborne.

40, *Mary Street, Dublin, November* 4, 1874.

[*** Our esteemed correspondent seems to labour under some misconception as to the attitude of the Pharmaceutical Society in relation to the movement he speaks of for extending the action of the Society to Ireland. It is with amazement we note his opinion that the attitude of the Society was antagonistic to education, and that the extension of the Society's sphere of action presented even a possible advantage to the Society. Of course we do not affect to dispute the proposition that there should be in Ireland the same kind of provision for ensuring the qualification of all who practise pharmacy, nor do we attempt to deny that the Pharmaceutical Society would view with entire sympathy the adoption in Ireland of any measures calculated to bring about so desirable an object. It is with this feeling we believe that the movement lately instituted in Ireland has been regarded by the Council, and if that movement has, so far, miscarried, this result must be attributed, not to the antagonism of the Pharmaceutical Society, but to the bewildering multiplicity of the projects by which the good of Irish Pharmacy was to be provided for, and the determined energy with which the projectors seemed to seek the fate of certain cats of their own country.—Ed. Ph. Journ.]

Earlier Closing.

Sir,—Speaking for myself and my fellow-assistants, I think I may say one of the greatest grievances we have to complain of is the long day behind the counter, leaving us so little time for study, and none at all for outdoor recreation, which is so necessary for physical health, unless our studies are neglected.

Many letters have appeared in the Journal, lamenting the state of affairs, but the writers are slow in proposing a remedy. The general impression seems to be that when the pharmacist becomes a better educated man there will be a corresponding improvement in his position. To hang our hopes on that seems very much like setting the cart to draw the horse. It is evident that only the assistants of the present can become the pharmacists of the future, and whilst no opportunities are afforded them of accumulating useful knowledge, it is equally evident that the next race will not be much in advance of the present.

Much has also been written about raising the status of the British pharmacist to a level with that enjoyed by his continental compeer. Great things usually have small beginnings; therefore, I would suggest that he be first raised on a level with his neighbours—I mean the draper, ironmonger, etc. When the latter point is reached, we may with confidence aspire to the former.

The remedy I have to propose is simple, and I believe practicable. 1st. Let every assistant be determined not to take a situation where the time of active duty exceeds twelve hours daily. 2nd. Let him stipulate with his employer that he shall be allowed to study works on pharmacy and the allied sciences during business hours, when he would be otherwise unemployed.

Employers in many towns have attempted to unite in adopting the early (?) closing system, but in most cases have completely failed. Let the assistants unite, and, if necessary, form a society, which would doubtless be successful in bringing about a reformation, and by so doing they would deserve the thanks of their employers, if they did not receive them.

Just a word respecting the Bank holidays. In some towns it is the good fortune of the favoured chemists residing there to close their establishments; in such cases it is usually necessary for the assistant to be indoors half the day, and in some instances hard at work, whilst the better paid assistant at the hatter's opposite is at liberty to go wheresoever he will. Now, what is there to prevent the chemist giving his assistant a half holiday the next day, to compensate for the necessary denial on the first? But if an assistant made such an unusual request he would be considered a most unreasonable man, and more fit for a lunatic asylum than to undertake the responsible duties of a dispenser of medicine.

An Examined Assistant.

Therapeutic Use of Amorphous Phosphorus.

Sir,—In reference to the discussion on the therapeutic uses of the preparations of phosphorus, it may be of interest to some to know that in 1853 the amorphous phosphorus was administered to animals by Dr. R. M. Glover, and his experiments led him to the conclusion that this substance was without either the deleterious or the active physiological properties of ordinary phosphorus. *Vide Lancet*, 1853, p. 34.

I have myself frequently prescribed phosphorus with great advantage, and have been perfectly satisfied with the gelatine capsules of the phosphorated oil, each one of which contains one-thirtieth of a grain of phosphorus.

In many cases of neuralgia, and of nervous exhaustion with sleeplessness, the effect of one capsule three times a day is most successful.

John C. Thorowgood, M.D., F.R.C.P.

61, *Welbeck Street, W., November* 10, 1874.

Sir,—The lateness of the hour at the conclusion of the last evening meeting prevented me from replying to two or three observations elicited in the discussion on my paper on amorphous phosphorus. Professor Redwood asked with regard to the recommendation to prepare phosphorus pills by dissolving phosphorus in suet, and coating pills from it with gelatine, what would become of the suet pills when put into melted gelatine? I answer, provided the solution of gelatine was *not* used hot, and the pills were taken out again and allowed to harden, it would be found that they were coated with a material which would dissolve again very rapidly when taken into the stomach.

Mr. Greenish observed that some time ago a medical man of his acquaintance was in the habit of prescribing amorphous phosphorus, but that he gave it up. Will Mr. Greenish favour me and your readers with the information as to what dose was ordered, how frequently, and for what length of time it was given, also in what form? My object in asking these questions is simply to bring out all the information I can relative to this form of the element, and then leave it to therapeutists to decide whether or not it has value in medicine.

Mr. Mackay instanced one ounce being given to a dog without any injurious result. This, however, was not the best method of eliciting truth. Had the experimentalist who gave one ounce to a dog, and then looked for injurious results, given only a few grains twice or three times a day, for a month, probably the brilliancy and luminosity of his dog's coat would have been such as to cause Ethiop's mineral for ever to sink into obscurity, when compared with the efficacy of amorphous or allotropic phosphorus.

Arthur Wm. Postans.

35, *Baker Street, W., November* 10, 1874.

J. E. M.—We believe the name is intended to represent an extract of the herb *Galium Aparine*.

"*Pilulæ.*"—The formula for varnishing pills was given by Mr. Haselden in the *Pharm. Journal* for Dec. 9, 1871, p. 467.

"*Minor.*"—Formulæ for cod-liver oil emulsions were given a few months since in vol. iv., pp. 466 and 581.

"*Alpha.*"—Probably the books used by you in preparing for the Minor examination would suffice for the Major. We believe the purchase of second-hand scientific books is, as a rule, false economy, and frequently leads the student to attribute undue importance to obsolete theories. It is best to obtain the latest editions, and these are seldom found on second-hand bookstalls.

J. J. H.—If you refer to p. 368 of our last number you will perceive that your wish has been anticipated.

D. D. D.—No.

"*One who has passed the Major.*"—(1) We do not think it advisable to revive the discussion by the publication of your letter. (2) The word which puzzles you probably represents a customer's peculiar way of pronouncing "unguentum."

W. Wilson.—We are not aware that magenta crystals would be poisonous unless they contained arsenic.

Communications, Letters, etc., have been received from Messrs. Steele and Marsh, Mr. Rimmington.

THE MICROSCOPICAL USE OF GLYCERINE JELLY.

BY HENRY POCKLINGTON.

Various attempts have been made at different times to devise a "medium" which shall possess the enormous advantage of glycerine as a mounting medium, and also the "setting" properties of such a substance as Canada balsam, and various formulæ for the preparation of such media have been published at different times during the past twenty years. The earliest of these were, I think, published by the late lamented Mr. Deane — whose gelatine medium is peculiarly adapted for certain classes of objects, but is not, to my mind, in any way an efficient substitute for glycerine —and Mr. Farrants, whose "medium" appears to have nearly fallen out of use, having been quite superseded by one form or other of glycerine jelly. The first formula for this with which I became acquainted was that published by Mr. Lawrence, in the *Quarterly Journal of Microscopical Science*, in 1859.* It is a very good formula, as I can testify from personal experience, having objects in my cabinet that were mounted in the medium in 1862, without the use of any cement for securing the cover, and now nearly as good as when first mounted. The formula is this:— "Take any quantity of Nelson's gelatine, and let it soak for two or three hours in cold water; pour off the superfluous water, and heat the soaked gelatine until melted. To each fluid ounce of the gelatine add one drachm of alcohol and mix well, then add a fluid drachm of the white of an egg. Mix well while the gelatine is fluid, but cool. Now boil until the albumen coagulates and the gelatine is quite clear. Filter through fine flannel, and to each fluid ounce of the clarified gelatine add six fluid drachms of Price's pure glycerine, and mix well." Mr. Lawrence also suggests the substitution of a mixture of two parts of glycerine and four parts of camphor water for the glycerine. Two other formulæ, used by myself for some years, differ from the above in omitting the alcohol, and in the quantity of glycerine employed. For dense tissues or objects requiring a somewhat unusually "strong" medium to counteract their elasticity, I use a medium containing about half a drachm less glycerine than that devised by Mr. Lawrence, the alcohol being entirely omitted. The jelly usually used by me for wood sections, and the coarser preparations generally, is made as follows:—I take an ounce of the soaked gelatine before described, using the French clear gelatine in preference to Nelson's—which requires extra care in filtration on account of its "opaque" element—and add to it an equal quantity of the best glycerine, Price's by preference, in which I have dissolved a few grains of arsenic (or added a few drops of carbolic acid solution), filtering and clarifying the whole as before.† A very good jelly for fine tissues is made with double this quantity of glycerine. For very fine tissues, where it is of great importance to secure as little change as possible, a greater proportion of glycerine still may be used, either with or without the addition of gum arabic.

Mounting in glycerine jelly is not without its difficulties. I have had, in "another place," many inquiries on this point, and complaints that in the best of mounts air bubbles appear after the lapse of a short time, and gradually extend, so as to utterly spoil the preparation. These, however, are not air bubbles but vacuoles, and are caused either by the elasticity of the specimen, which when released from the pressure of the mounting clip slightly raises the cover, forming little vacuolor spaces in the gelatine medium, or by the absorption of some of the glycerine from the jelly by the object. This latter is, I think, a very frequent source of trouble, and can be obviated in either of two ways. What these are may best be shown by describing the two methods somewhat in detail.

The first plan is the older plan. The objects are soaked for some time in glycerine until thoroughly permeated with it, and all air bubbles removed. If the tissue be of that class which includes many air spaces, such as sections of herbaceous stems, it will be found desirable to place it in alcohol for several hours before transferring it to glycerine. When the tissue has been in the glycerine sufficiently long, it is removed to a glass slip, and all superfluous glycerine removed. A little melted jelly is dropped upon it, the slide and cover having been previously warmed, and any air bubbles that may appear removed by the point of a needle. The cover is now to be slightly moistened by being breathed upon and carefully lowered into the fluid jelly on the slide, and a little gentle pressure applied until the jelly sets, when all waste jelly should be removed, and any ornamental varnish desired may be applied to the edge of the cover. This method of mounting is specially adapted for very delicate tissues, as it enables us to transfer the tissue gradually from one fluid to another, and so obviate changes in the arrangement of cell contents by endosmose or osmose, such as certainly will occur if a delicate tissue be transferred from a fluid such as water to dense glycerine or glycerine jelly, and it alone is applicable to starches when these are mounted in jelly, and to the spores of certain minute fungi. But it is a very tedious method in the case of wood sections and dense tissues generally. For these I adopt a method I devised originally for mounting these tissues in dammar and balsam, and which was published by me in 1871 or 1872. The section, if of unusually dense tissues, should be placed on the slide in a drop of glycerine, covered with a thin glass held down by a small spring clip,* and boiled for a few seconds over a spirit lamp, great care being taken to allow ebullition to occur for only a fraction of a second at a time. As much of the superfluous glycerine as possible should be removed from under the cover, not moving it if the object be fragile, and the jelly applied in a drop at the edge of the cover opposite to that by which the glycerine is removed. When the jelly has replaced the glycerine the slide is to be carefully heated until the jelly boils under the cover (still held down by the clip), when the slide should be removed from the lamp, the clip slightly raised, to allow bubbles to escape from under the cover, and replaced, and the slide re-heated till the jelly *nearly* boils. The whole is now to be set aside to cool. When the jelly has set the slide may be cleaned and the cover cemented down. This method, carefully applied, is adapted for a much greater range of objects than would be at first supposed, and even

* Carpenter, "The Microscope," 3rd Ed., 775.

† Since this went to press my friend, Mr. James Abbott, has informed me that he follows with advantage a formula published in *Science Gossip*, for March, 1874, by Messrs. Underhill and Allen, in which chloride of barium is substituted for arsenic. I regret not having seen this article before, for it is of great value.

* Spring clips which answer this purpose exceedingly well may be bought of Fields, of Birmingham, W[illegible]pear, of Hull, and other opticians.

such delicate preparations as sections of growing tissues, or embryos of phanerogams, may be treated by it with slight distortion of their outline, and no disarrangement of the tissues. It has the great advantage to busy men of permitting the whole preparation and mounting of wood sections from green wood to be done in a very few minutes, the natural colours of the endochrome being nearly always retained for a considerable time; and, furthermore, objects thus prepared seldom, if ever, become disfigured by the appearance of the so-called air bubbles.*

ALKALOIDAL COMPOUNDS WITH IODINE.†

BY HARRY S. BAUER.

Of the chemical constitution of the majority of the alkaloids little more than their elementary composition is yet known. Berzelius, upon the ground of their evident similarity to ammonia, put forward the theory that they contained ammonia, combined with various atom groups, which in some cases were hydrocarbons, but in most consisted of carbon, hydrogen, and oxygen, and were generally associated with nitrogen. From another point of view it was asserted that one portion of the nitrogen is in closer combination with the oxygen, and it has also been suggested that it exists as cyanogen. Liebig has expressed the opinion that the organic bases are amido-compounds, *i.e.*, ammonia, in which an atom of hydrogen is represented by an organic radical.

According to the latest experiments of A. W. Hofmann and Wurtz, which have made known numerous artificial organic bases, it is put beyond doubt that every alkaloid may be considered as a partially or wholly substituted ammonia (amine, or amidamine).

The alkaloid forming plants belong with few exceptions to the dicotyledonous class. Of the monocotyledons only the colchicum family is known with certainty to produce vegetable alkaloids. Many families of plants are free from alkaloids, as the Labiatæ and Compositæ. Several families contain an alkaloid that is common to others, as berberine, in the Anonaceæ, Berberidaceæ, Menispermaceæ, Papaveraceæ, Rutaceæ, and Ranunculaceæ. Others contain two or three alkaloids, as the Cinchonaceæ and the Solonaceæ.

Nearly all the alkaloids are stable at ordinary temperatures; the greater part are not volatile, and are soluble in water with difficulty. Alcohol dissolves all, and ether many of them; chloroform, benzol, and carbon bisulphide are occasionally also good solvents. Phosphomolybdic acid, nitropicric acid, tannic acid, and metawolframic acid form with nearly all the alkaloids salts that are difficultly soluble in water and acids.

The author considered it would be specially interesting to investigate the action of iodine in solution of iodide of potassium upon the different alkaloids. Serullas, Pelletier, and others had already investigated their iodic salts. The following are the compounds of alkaloids with iodine which are described by the author. Full details of the experiments upon which the formulae are based are given in the original paper.

Compounds of Quinine with Iodine.

Iodoquinine.—$4 (C_{20}H_{24}N_2O_2) 3 I_2$.—The vapour of iodine acting upon quinine colours it superficially yellow. Pelletier stated that by triturating together one part of iodine and two parts of iodine, with the addition of alcohol, at first iodoquinine is formed, and afterwards hydroiodoquinine, in spongy crystals, and that if this latter were removed by hot water the iodoquinine would remain as a saffron-yellow friable mass, softening at 25° C., and melting at 80° C. In one hundred parts he found 69·69 quinine, and 30·31 iodine, from which data Gerhardt constructed the formula—$2 C_{20}H_{24}N_2O_2, I_2$. This statement by Pelletier the author is unable to confirm. He rubbed together the proportions of iodine and quinine stated, then poured the alcohol upon the mass, of which but very little was dissolved. The mass was of a uniform red brown colour; nothing was removed either by hot or cold water. The small portion that was soluble in alcohol was thrown down upon the further dilution of the alcoholic solution with water. After the precipitate had been dried it lost the property of dissolving in alcohol; it was, however, easily soluble in solution of iodide of potassium. The compound had evidently undergone some change, and in order to ascertain whether it had lost either iodine or quinine, the filtrate was tested with delicate tests for iodine, but none was discovered. Upon the addition of caustic soda, however, quinine was immediately precipitated. The substance precipitated from the alcoholic solution was amorphous, and of a deep yellow. Analysis indicated the formula, $4 (C_{20}H_{24}N_2O_2) 3 I_2$. The estimation of the iodine was made by precipitating with nitrate of silver, with which the reaction very readily takes place.

Very accurate results were obtained in estimating the alkaloid (after the removal of the iodine) with iodohydrargyrate of potassium. This reagent was suggested for the qualitative detection of alkaloids by Winkler in 1820, and recommended by Planta-Reichenau in 1846; F. F. Mayer employed it for quantitative analysis. The solution contains 13·456 grams of chloride of mercury, and 49·8 grams of iodide of potassium to the litre. The method is a very delicate one, in many cases excelling even the phosphomolybdic acid test. Distinct evidence is obtained with a solution containing 1 part in 2,500 of morphia, 1 in 2,500 of nicotine, 1 in 7,000 of atropine, 1 in 8,000 of coniine, 1 in 15,000 of strychnine, 1 in 5,000 of narcotine, 1 in 50,000 of brucine, 1 in 50,000 of quinine, 1 in 75,000 of cinchonine, or 1 in 125,000 of quinine.

Iodoquinine.—$4 (C_{20}H_{24}N_2O_2) 5 I$.—The residue which was not dissolved by alcohol in the preparation of the above iodoquinine was of a deep brown colour, and nearly resinous consistence, and contained isolated dark brown acicular crystals. Analysis showed it had the composition $4 (C_{20}H_{24}N_2O_2) 5 I$.

Quinine Hydriodate.—$C_{20}H_{24}N_2O_2,HI$.—Obtained from the acid and the base. It is necessary, however, that no excess of hydriodic acid should be used, otherwise an acid hydriodate of quinine will result.

The hydriodate of quinine crystallizes in slender, brilliant yellow needles, hardly soluble in cold water, readily soluble in alcohol and ether. Winkler also

* In the face of the numerous recipes that have been published for the preparation of jelly, and published methods for mounting in the same, I do not claim priority for anything written here. A very good preparation of glycerine jelly is prepared by Mr. Rimmington, of Bradford, and by Mr. White, of Letcham, Norwich; the latter puts it up in a very convenient form.

† Abstract of a Paper in the *Archiv der Pharmacie*, for October.

has described this compound, but he says that it is not crystalline. He prepared it by mixing 240 parts of hydrochlorate of quinine with 460 parts of iodide of potassium in aqueous solution. After it had cooled a colourless turpentiny mass subsided, which in a water bath melted like a resin.

Acid Quinine Hydriodate.—$C_{20}H_{24}N_2O_2$, $2\ HI+5H_2O$.—Prepared by dissolving quinine in an excess of hydriodic acid. It crystallizes in golden yellow flakes. This salt has already been described by Hesse.

Quinine and Cinchonine Iodide.—$(C_{20}H_{24}N_2O_2)\ (C_{20}H_{24}N_2O)\ 2\ I_2$.—Equal parts of quinine, cinchonine, and iodine were rubbed together. The mass was uniformly coloured red-brown, the iodine reacting energetically. Treated with alcohol, only a trace of iodine, together with quinine and cinchonine, was dissolved. The residue not dissolved by the alcohol was insoluble in water also, slightly soluble in ether, and soluble in alkalies and acids. Under the microscope this double iodide of quinine and cinchonine showed a crystalline structure. The compound was readily decomposed by nitrate of silver, by the aid of which reaction the above formula was constructed.

Quinine Biniodide.—$C_{20}H_{24}N_2O_2HI_2$.—If solution of iodine in iodide of potassium be added to acid sulphate of quinine a voluminous kermes brown precipitate is produced, having the above composition. It is decomposed by long washing with water. Biniodide of quinine is soluble in alcohol and in iodide of potassium solution; also in ether, chloroform, and carbon bisulphide. It is especially soluble in boiling benzol. If it be dissolved in hot alcohol, and the alcohol be left to cool spontaneously, crystals are deposited, having a pretty bronze lustre. When dissolved in nitric acid the solution at first has a red colour, but afterwards becomes colourless. Is this due to an oxidation of iodine to iodic acid?

By a slight variation of the process the author obtained a body which in appearance was identical with the above quinine biniodide, but in relation to its solubility was essentially different. In this case the quinine salt was dissolved in alcohol, and to it was added an alcoholic solution of iodine. No precipitate was produced at first, but after long standing it threw down a flaky crystalline body, having a bronzy lustre. In form of the crystals, colour, and proportion of iodine it resembled the biniodide. On the other hand, it was slightly soluble in water, alcohol, ether, and carbon bisulphide; insoluble in benzol; difficultly soluble in chloroform. The alcoholic solution, heated for some time to 112° C., acquired an acid reaction. (Decomposition into hydriodic acid and some compound containing less iodine.)

Quinine Pentiodide.—The quinine biniodide was dissolved in alcohol, and thrown into an excess of alcoholic solution of iodine. After several days there was a non-homogeneous crystalline formation. Red-brown, almost black, prisms were surrounded by dark-coloured substances of almost pitchy consistence, from which, as far as possible, the crystals were separated mechanically; but attempts to separate the two bodies by different solvents entirely failed, both being soluble in alcohol, ether, and chloroform. The crystalline body exhibited interesting properties in polarized light.

The colour of quinine pentiodide in alcoholic solution is entirely changed by carbon bisulphide and potassium cyanide. Analysis indicated the formula $C_{20}H_{24}N_2O_2,HI_5$ (or 66 per cent. of iodine). The author, however, was unable in any way to prevent the formation of the pitchy product, and therefore looks upon the foregoing estimation, obtained by precipitation with silver nitrate as very imperfect, the crystals always retaining some portion of the impurity. But he considers there is proof that quinine can form a compound containing a large proportion of iodine, and he suggests that the constitution of this compound may be—

$$\overset{+}{Q}-I\begin{array}{l}\diagup I-I\\ \quad\ |\quad\ \ \|\\ \diagdown I-I\end{array}$$

Compounds of Cinchonine with Iodine.

Cinchonine Hydriodate.—$C_{20}H_{24}N_2O,\ HI+H_2O$.—Two parts of cinchonine were triturated with one part of iodine. The mass was coloured red-brown, the iodine reacting violently. Treated with 93 per cent. alcohol a portion was dissolved. Evaporation of the alcohol gave pale yellow crystalline needles, which were soluble in water, alcohol, and ether; traces were soluble in benzol and in chloroform. Analysis showed that the body so obtained was the hydriodate of cinchonine, already described by Von Regnault, v. Planta, Winkler, and Hesse.

Cinchonine Biniodide.—$C_{20}H_{24}N_2O,\ HI_2+2H_2O$.—When the mass formed by rubbing together two parts of cinchonine and one of iodine yields nothing further to alcohol, there remains a saffron-yellow body, crystallizing in scales, which is slightly soluble in absolute alcohol, ether, and chloroform, insoluble in water, cold and boiling benzol, and yields only traces to carbon bisulphide. The solution in absolute alcohol upon dilution with water throws down the body unchanged. From these properties the author considers this compound identical with Pelletier's cinchonine iodide.

Cinchonine Tri-iodide.—$C_{20}H_{24}N_2O,\ HI_3$.—Sulphate of cinchonine was mixed with solution of iodide of potassium containing iodine; it immediately yielded a voluminous red-brown precipitate. To this as much alcohol was added as was necessary to dissolve the precipitate. Upon evaporation the solution deposited red-brown crystalline prisms, which by exposure to light became brown-red. Cinchonine tri-iodide is insoluble in cold or hot water, very slightly soluble in ether, insoluble in cold and slightly soluble in hot benzol, insoluble in absolute alcohol and chloroform, and only yields traces to carbon bisulphide. It dissolves in sulphuric and nitric acids, with a red coloration. It is readily and entirely decomposed in the cold by nitrate of silver, the products being iodide of silver and nitrate of cinchonine; this reaction was used in calculating its formula.

(To be continued.)

THE DISPENSING OF MONOBROMATED CAMPHOR.

In an article in the *Practitioner* for the present month, entitled "Camphor and its Monobromide," Dr. Robert Lawson, of the West Riding Asylum, remarks upon the want of convenient forms of administering this compound. He says:—

"To begin with, it must be observed that the very limited solubility which characterises camphor is present to even a more marked extent in its monobromide. Not only so, but the high diffusive power which in camphor appears to compensate, in some measure, for its meagre solubility, seems to be much less characteristic of the monobromide. In sufficient quantities for the production of any marked result, camphor cannot be dissolved so as to remain in solution and be at the same time sufficiently bland for administration in anything but milk, and milk is a most inconvenient dispensing medium. In pills it is so bulky that scarcely more than two grains can be given in each, so that eight or ten pills require to be administered in a dose before much physiological effect can be looked for. Though an enthusiastic experimentalist might find no difficulty in overcoming the nausea which physic, quite as much in the abstract as the concrete, generally creates, and in swallowing ten large pills in succession, the performance would not recommend itself to a patient with a diminished appetite and a fastidious palate. Again: in mucilage, or in oils and fats, the drug would become most uninviting, and would most probably be rejected either before or after an attempt at deglutition. The same objections apply equally to the monobromide of camphor. In fact, it appears to me that in the case of the new drug they are intensified. The solubility of the monobromide in spirit is much less than that of the pure camphor; and as the monobromide is at once precipitated in an artificial gastric juice, there is every reason to believe that in any mode of administration it assumes the undissolved form in the stomach. Consequently, it must produce all those bad effects upon the mucous membranes which have been ascribed to camphor. With a candour which shows his desire to reach the truth, Dr. Bourneville admits that it does so when he concludes that 'the monobromide of camphor brings on in guinea-pigs and in cats a loss of flesh which, when the experimentation is carried on, soon occasions, in turn, a fatal termination.'

"Also with regard to hypodermic injection, it must be observed, as an important matter when determining the practical utility of the drug, that the marked insolubility of the monobromide of camphor renders it necessary to use so pungent an injection, and to make so many punctures, that unless some new bland solvent can be discovered for it, its use in medical practice must be deferred. Though I have not seen a single sign of suppurative or erysipelatous inflammation from the use of the injection prepared according to Dr. Bourneville's formula (and I have made fifteen consecutive hypodermic injections into one animal), yet it would be impracticable to use a hypodermic injection of a pungent character, of which several and perhaps numerous consecutive new insertions would be demanded before any beneficial result could be hopefully expected."

Dr. Lawson concludes the article by expressing a doubt whether either camphor or its monobromide will ever be favourite medicines, owing to their limited solubility, unless some means should be devised of introducing them into the stomach in a manner calculated to lessen their tendency to produce gastric irritation. *Dragées*, such as Dr. Bourneville refers to, are elegant preparations, but he thinks, as far as the tendency to irritation is concerned, they have no advantage over pills, and he is afraid that for hypodermic injection a more concentrated and more bland solution will require to be devised before the monobromide can come into general use. Still, the preparation is one which, in his opinion, possesses a value that will reward any reasonable amount of ingenuity expended in determining convenient methods of administering it.

THE PHYLLOXERA AND A NEW INSECT POWDER.*

M. Dumas has made a communication on this subject to the Paris Academy of Sciences, announcing the scientific solution of the question, and the approaching practical method of destroying this terrible insect.

In the meantime the pest continues its progress towards the north. M. Maurice Girard has reported to the Academy its ravages in the two departments of the Charentes; it is found everywhere in the environs of Cognac. Libourne is attacked in the most serious manner, and the pest has reached Châteauneuf and Angoulême. The progress of the creature is, however, capricious; one district of vineyards is attacked, while another, where the soil and kinds of vines cultivated are the same, escapes entirely. The insect is also reported to have appeared in Champagne, in Lower Austria, and in the environs of Geneva.

M. Dumas, noticing the unusual development of the winged phylloxera, remarks that it coincided with the holding of the insect exhibition in Paris, and complains that it was a very injudicious act to bring vines infected with the insects to Paris, and that it may cause the pest to appear in the vineyards around Paris and in the great grape-growing establishments in the Forest of Fontainebleau. Up to the present time, he says, the annual flight of the creatures has not exceeded 12 or 15 miles. They took two years to reach Burgundy, and much longer to arrive in Champagne. If Paris were infested by them, Burgundy would be placed, as it were, between two fires, Champagne would be seriously menaced, and all the grand *crus* of France would be compromised.

M. Lichtenstein believes that the vine phylloxera attacks and flourishes on the kermes-bearing oak, but M. Balbiani considers the oak insect a different one. Four varieties indeed are mentioned—those found respectively on the pedunculated oak, the white oak, the kermes oak, and the vine, but all but the last are considered harmless.

The period of hibernation of the phylloxera differs in hot and cold countries. M. Girard has observed near Cognac the influence of temperature on the insect. In the early days of October, when the weather was rainy at intervals, and rather cold, with white frost in the mornings, no eggs were to be found, but the warmer weather which followed caused their reappearance. In this they resemble other insects. It seems probable that the slower progress in northern vineyards may be due solely to a more prolonged hibernation, but without warranting the assumption that the cold will kill them completely.

The sulphocarbonates suggested by M. Dumas for the destruction of the insects are said to give certain results. He made experiments in his laboratory, first on the plants, and, secondly, on the insects themselves, and found that plants did not in any way suffer from being syringed with weak solutions of these salts, while the insects which were placed near the substances impregnated with the solution invariably perished.

M. Girard made experiments at Cognac with sulphocarbonate of potassium, prepared by the old costly method, and found that when some of this salt was placed at the bottom of a jar, and the insects introduced into the air in the upper part of the vessel, they soon died. As an insect powder he considers this salt as at least as effective as cyanide of potassium.

The next step was to procure it by a less costly method; and M. Dumas found that without the use of alcohol, hitherto believed to be necessary, the sulphide of potassium, dissolved in water, and the sulphide of carbon would mix when certain pains were taken. A wholesale manufacture of the salt was undertaken on this principle by M. Dorvault, and the necessary cheap materials procured for further experiment.

M. Monillefert undertook the experiments at Cognac. Vines in pot bore for a long time the effect of the solution without any injury, and, where phylloxera were present, they were all dead in a few days. The experiments were then extended to the open air, and it was found that plants of very different kinds were entirely unaffected by the solution. In the vineyards the effects were the same, or rather they were *nil*; and in the cases of infested vines the destruction of the insects was so complete and so rapid that M. Monillefert, who is well acquainted with all known insect-destroying substances, declares this solution to be the most powerful he has ever met with. It remained to be ascertained how deeply the solution would penetrate the ground; whether aged vines would support its application as well as those in full vigour; and, lastly, to find out the best method of applying the solu-

* From the *Gardeners' Chronicle*.

tion. It was found that from 30 to 40 grammes (1 oz. to 1¼ oz.) of dry sulphocarbonate of potassium, dissolved in water and poured into holes around the stem of the vine, destroyed the insects in the case of vines more than a century old without harming them in the least.

Another series of experiments had been made by M. Petit de Nismes, and others—namely, the application of coal tar, and with various results, when M. Balbiani took up the subject, and arrived at the conclusion that the tar which he used, obtained from the coal of Bességes, was a perfect destroyer of the insects. M. Dumas promises shortly a chemical and physiological analysis of this special coal tar; and M. Balbiani is now engaged in experiments with other sorts. It is not with respect to the phylloxera alone that careful experiments and investigations of this kind are valuable.

BOLDO.

Several notices which have appeared during the last few months in the medical and other journals have directed considerable attention to a new Monimiaceous medicinal plant, popularly called Boldo. It is an alpine shrub, met with frequently in the Chilian Andes, where the sweet mesocarp of its fruit is eaten; the bark is used in tanning, and the wood is esteemed for charcoal making. It has at various times been described by botanists under the names *Peumus fragrans*, Pers., *Ruizia fragrans*, R. et P., *Boldoa fragrans*, C. Gay, *Boldea fragrans*, Tul. But as it was described so far back as 1782 by Molina as *Peumus boldus*, Baillon considers this latter name has the right of priority. The properties attributed to the plant are that it acts as a stimulant to digestion, and has a marked influence on the liver. The discovery of these alleged virtues is said to have been due to the beneficial effects which followed the shutting up of a flock of sheep suffering from liver disease within an enclosure which had been recently repaired with boldo twigs. The sheep are reported to have eaten the leaves and shoots and recovered speedily. The leaves are the portion of the plant used in medicine, for the sake of an aromatic oil they contain; but up to the present time only a very small quantity, if any, has been received in this country. In France, however, the plant has been the subject of physiological and therapeutic experiments by Dr. Dujardin-Beaumetz, and of an elaborate investigation by M. Claude Verne, who has recorded his results in a thesis* presented upon his applying for the title of Pharmacien de la première classe in January last. To this thesis we are indebted for the details which follow.

Materia Medica.—The boldo tree, which formerly was met with only in the mountains, grows now upon the cultivated districts, and embellishes them with its green foliage and flowers of a yellowish white colour. It is never met with in a forest, but always grows isolated; in good soil its development is rapid. It is indigenous to the New World, and has a very restricted area, not having been met with outside Chili. This tree has a height of from five to six metres, and is an evergreen, having cylindrical branches bearing cylindrical opposite branchlets. The thin bark is adherent to the wood, corrugated longitudinally, of a clear brown colour, and very aromatic; the wood, on the contrary, is only slightly aromatic. The leaves, green when fresh, change in drying to a reddish brown. They are coriaceous, with prominent midrib, veins alternate, sometimes opposite, and covered on their surface with small glands. The leaves are opposite, entire, and oval, and when chewed leave a fresh aromatic taste; their odour recalls that of the Lauraceæ and Labiatæ. The flowers are diœcious, in racemes placed at the end of the branchlets, of a pale colour, and contrast well with the shining green leaves. The yellowish green fruit, which must not be confounded with that of the *Peumo*, or Boldu, of the Lauraceæ, sold in the markets of the country, has an aromatic, succulent, sweetish mesocarp, which is eaten, and the very hard kernels are made into necklaces by the Chilians. The first specimen of boldo leaves was sent into France, for experimenting in diseases of the liver, by the house of Fabian, of Chili.

In South America the plant is well known as an aromatic, and infusions prepared from it are prescribed as digestives, carminatives, tonics, and diaphoretics. It is also a popular remedy against syphilis and diseases of the liver. The dried leaf, reduced to powder, is used as a sternutatory.

In the small family of Monimiaceæ there are two other new plants, which are said to possess properties analogous to those of boldo, viz., *Atherosperma moschata*, Labil. and *Nenuraron Vieillardi*. The bark of the first in decoction is considered to be a powerful tonic and antiscorbutic. As a weak infusion, either alone or with milk, it is used instead of tea, and in that form has an aperient action. The bark of the second has a strong camphoraceous odour and intensely hot taste, and is chewed by the Kanacques as a digestive and powerful stomachic.

Histology.—The essential oil of boldo is contained in special cells, which are met with in nearly every part of the plant. The author had the opportunity of studying histologically portions taken from a tree growing in the botanical garden of the Ecole de Médecine, Paris. A transverse section of the limb of the leaf showed the following characters:—

The upper epiderm has one, two, or sometimes three rows of cells, especially in the neighbourhood of the insertion of some hairs which originate in the second row. These hairs are simple, rarely bifid, in form like birds' claws, conical, arched, and lie parallel to the surface of the leaves. The inferior epiderm, pierced all over with stomata, has but a single row of cells, and its stellate hairs, of the same form as the preceding, sometimes penetrate beyond the epidermic tissue into the parenchyma. The parenchyma is divided into two zones, one having oval-oblong cells, gorged with chlorophyll, the principal axis of which is perpendicular to the surface of the upper epiderm; the other having polyhedric cells, less green than the others, containing in the interior thinly scattered grains of chlorophyll. Both zones are furrowed by the fibro-vascular tissue proceeding from the nerves of the limina, and in the second moderately large lacunæ frequently occur. The vessels containing the essential oil are found principally in the latter zone; rarely they occur in the former.

The oil vessels differ in shape from the neighbouring cells, being perfectly spherical and of a greater diameter, and this form remains the same in whatever part they are found. There is no trace of chlorophyll in the interior, but sometimes the thick enveloping membrane retains small green granulations, and the rest of the cavity is filled with a refracting liquid. In places where this membrane has been cut by the razor its texture appears close, firm, and transparent, and the liquid may be seen protruding beyond the envelope. This liquid is white, and transparent in the green leaf; in the dried leaf it has a yellowish green tint, and does not fill all the cavity, being divided into little drops, imprisoned at the bottom of the organ.

Chemical Examination of the Plant.—Some leaves mixed with portions of the stem, coarsely powdered, were placed in a displacement apparatus, and treated successively with ether, alcohol, and distilled water. Treated with ether they yielded an essential oil (2 per cent.), alkaloid (trace), citric acid, and a considerable quantity of aromatic substances. To the alcohol they yielded a small quantity of essential oil, alkaloid (abundantly precipitated by double iodide of mercury and potassium), citric acid, sugar, and aromatic matters. To the distilled water they yielded sugar, gum, lime, citric acid, and tannin.

The most abundant product yielded by the plant is the

* Etude sur le Boldo. Thèse présentée et soutenue à l'Ecole Supérieure de Pharmacie de Paris, par Claude Verne. Paris, 1874.

essential oil, as much as two per cent. having been obtained in repeated operations. This proportion, however, is small, when compared with the amount of thick black aromatic matter which is left at the bottom of the retort, and is probably due to oxidation of the oil. In distillation, a certain quantity of oil, having an odour resembling that of the plant, passes over at 185° C.; the thermometer then rises gradually to 230° C., and after remaining stationary a few moments, rises to 300° C. The products of distillation collected at 230° C., and between 230° C. and 300° C., compared with the first product, have a greater density and a stronger odour, but the odour is always that of the whole plant. This shows that the volatile oil of boldo, like most vegetable aromatics, is a mixture of several bodies. It is worthy of note that the authors failed to obtain more than a trace of the oil by distilling fresh leaves and stems taken from a plant grown in Paris.

The essential oil has no reaction upon litmus paper. It is very slightly soluble in water, to which it communicates its flavour, and gives a slightly acid reaction. It is very soluble in rectified spirit, and the mixture will burn with a bright flame; alone it burns with a fuliginous flame. The crude oil is at first strongly coloured, but after rectification it loses its colour and becomes a clear yellow, and has a fresher odour. It does not form a solid compound with bisulphite of soda (no aldehyde). It is coloured hyacinth red by sulphuric acid, violet by nitric acid, red by potash, and is decolorized by hydrochloric acid. The addition of iodine causes at first a sharp effervescence; then the iodine disappears in the mass, which is coloured and considerably thickened.

The fact of the author, in conjunction with M. Bourgoin, having discovered in this plant an alkaloid—which they have named "boldine,"—and the method by which they obtained it have been already published in this Journal. See vol. iii., p. 323.

Pharmacy.—The following forms are suggested by the authors as suitable for the administration of the active principles of this plant:—

Alcoholic Extract.—100 grams of leaves coarsely powdered are exhausted in a displacement apparatus by 400 c.c. of 60° alcohol. The alcohol acquires a warm taste, and is reddish-black in colour. Evaporated, it gives twenty grams of dry extract, dark red, with a greenish tinge, and having a hot, sweetish-bitter taste.

Aqueous Extract.—100 grams of contused leaves are macerated during twenty-four hours, in a water-bath, with sufficient distilled water to leave 1,000 grams at the end of the operation. The macerate filtered has a reddish colour, a slightly sweetish-bitter taste, and gives upon evaporation in a water-bath 15 grams of extract.

Essential Oil.—As in other essential oils, the strong odour and burning taste render this oil difficult of administration. The author has prepared it in the form of *perles* containing each eleven centigrams of oil. He has also introduced an ethereal tincture into *perles*.

Tincture.—100 grams of contused leaves are macerated during eight days, with occasional stirring, in 500 grams of 60° alcohol, and filtered. The product is deep red, with a slightly green tinge.

Wine.—30 grams of contused leaves are macerated during twenty-four hours in 60 grams of 60° alcohol, and 1,000 grams of Madeira wine added. After eight days' further maceration, with occasional stirring, the marc is pressed and the product filtered. The wine possesses in a high degree the aromatic properties of the plant.

Syrup.—100 grams of contused leaves are infused during six hours in 1,000 grams of water in a covered vessel; they are then strained and pressed, and 950 grams of sugar added to the liquor, in which it is dissolved by the aid of a covered water-bath. This syrup is very aromatic, and appears to be easy of administration because of its agreeable taste.

Elixir.—200 grams of contused leaves are treated by displacement with 1,500 grams of 60° alcohol. The entire quantity of alcohol is recovered by the addition of a small quantity of water, the amount of which is noted. Afterwards the quantity of water is increased to 600 grams, with which a weak decoction is prepared from the exhausted leaves. With the decoction and 600 grams of sugar a syrup is made, which is mixed with the alcoholic tincture. After twenty-four hours the product is filtered through paper.

In the above preparations the leaves deprived of their stems, and the bunches of stems, sometimes bearing the flower, are employed. The young wood is also aromatic, and more bitter than the leaves.

These preparations are said to have been administered with success in the Hôtel Dieu and Hôtel Beaujon in cases of atony of various organs when the patients have been unable to tolerate quinine. Care, however, is required in their administration, as vomiting is provoked by large doses. Dr. Beaumetz commences with fifty centigrams of alcoholic tincture in a julep, and this dose may be increased to two grams daily. The dose of the more dilute and more agreeable wine is a spoonful to a wine-glassful once or twice daily.

PATENT BUTTER.

The following extract is taken from a letter of the Paris correspondent of the *Daily News*:—"Passing some days since along the Rue du Pont Neuf, I was pushed, by a crowd staring into the windows of what appeared to me a great butter-shop, from the foot pavement to the carriage road. I noticed on the shop front various inscriptions, such as 'More wholesome than butter,' 'Less than half the price,' 'Goes twice as far.' My curiosity to know what this wonderful product might be was very transient. I supposed the flaring announcements to be some kind of ingenious charlatanism, and thought no more about them. But subsequently I have read, not only in flaming advertisements, but in those much more highly-paid invitations to the public to spend money, elegantly written articles called *réclames*, an announcement that a discovery had been made of a substance which had not only all the good qualities of butter, but is devoid of the bad ones. It is never rancid or indigestible; and instead of keeping good for only a few days will last sweet for a twelvemonth. Had I only seen the shop I should never have gone into it, and had I only seen the advertisement I should not have been a customer of the shop. But chance having called my attention to both, I went, notwithstanding a deeply-rooted prejudice against scientific substitutes for staple articles of food, to No. 25, rue du Pont Neuf, and invested a franc and a quarter in the purchase of a pound of butter which is warranted not butter. There was still in front of the shop a crowd such as I had before noticed, but there were no customers inside. A comely damsel, who certainly did not suspect that I came as a suspicious critic, served me with what I asked for, and at the same time thrust into my hand a prospectus showing that the patented and mysterious substance, though hitherto it has made little noise in the world, has obtained medals at universal exhibitions. Why, since the invention is protected by a patent, should not the patentees tell the world what their product is made of? I can only suggest that if people knew what it was perhaps nobody would eat it. I have eaten of it, sparingly, cautiously, and I can certify that it is not bad. In colour and appearance it is precisely like butter. The taste has not that 'high celestial flavour' of the best butter I have known; but it is better than the average of what one gets. Nobody, not told, would suspect it not to be butter when spread upon a slice of bread. Whether the puff asserting it to be 'more wholesome than butter' be true, I cannot say, because, distrustfully, I have only taken very little, and I think of the Italian proverb, *Ve ne accorgerete domani.* But the stuff, whatever it may be, is too good to be wasted in a household, and is worthy of scientific investigation. The Octroi of Paris requires the patentee, who, it seems, has 400 workmen somewhere in the country, to pay the same duty upon his grease as is exacted for butter. There is a splendid opportunity now for servants addicted to *anse de panier*, as nine out of ten French servants are, to cheat their mistresses. They may safely put down butter in the housekeeping books at 3f. the pound, and get the wonderful counterfeit at 1f. 25c. I remember that some years ago a shop was opened in the Rue Cadet, which sold as better than wine an artificial product in which it was admitted there was not a drop of the juice of the grape. Notwithstanding this frank avowal the police shut up the establishment, as being calculated to deceive the public. The artificial butter has not hitherto been molested, and I do not see why it should be. Let it make its way by its own merits, of which I only speak tentatively."

PROFESSOR TYNDALL AND HIS CRITICS ON TYPHOID FEVER.

The consideration of a treatise by Dr. Budd on typhoid fever, in the light of the recent outbreak at Over Darwen, has induced Professor Tyndall to contribute to the *Times* a long letter, which purports to discuss the question —Can typhoid fever be generated anew? Is it produced by the decomposition and putrefaction of animal and vegetable substances, or must the matter producing it have had previous contact with an infected body? In other words, for every new case of typhoid fever may we with certainty infer a pre-existing case, of which the new one is merely the propagation or continuation, or are we entitled to conclude that organic matter, which has never been in contact with a typhoid patient, is, in virtue of its own decomposition, capable of starting the fever anew?

On the ground that this is a "question which is sure to occupy the attention of statesmen, as well as physicians," Professor Tyndall thinks it desirable that it should be stated in the clearest untechnical manner. This he seeks to do by summarizing some of the statements in Dr. Budd's book in the following manner :—

"Dr. Budd takes his reader to the village of North Tawton, where he was himself born and brought up, and every inhabitant of which was personally known to him. In the village there was no general system of sewers. Round the cottages of those who earned their bread with their hands, and who formed the great bulk of the population, collected various offensive matters. Each cottage, or group of three or four cottages, had a common privy, to which a simple excavation in the ground served as a cesspool. In many cases hard by the cottage door there was not only an open privy, but a dungheap, where pigs rooted and revelled. For a long period there was much offensive to the nose, but no fever. An inquiry, conducted with the most scrupulous care, showed that for fifteen years there had been no severe outbreak of the disorder, and that for nearly ten years there had been only a single case. 'For the development of this fever,' adds Dr. Budd, 'a more specific element was needed than the swine, the dung-heaps, or the privies were able to furnish.'

"That element at length came, and formed a starting-point from which its further progress might be securely followed. On the 11th of July, 1839, a case of typhoid fever, doubtless imported from without, occurred in a poor and crowded dwelling, and before the end of November eighty of the inhabitants had suffered from it, a proportion about the same as that now suffering at Over Darwen. The reader will, I trust, bear strictly in mind that the question now before us is, whether typhoid fever is contagious, and he is asked to weigh the answer which facts return to this question. Two sawyers living near the stricken house at North Tawton fell ill, and quitted the village for their own homes at Morchard, where no previous case of typhoid fever had been. In two days one of these men took to his bed, and at the end of five weeks he died. Ten days after his death his two children were laid up with the fever. The other sawyer also took to his bed, and when at the worst a friend from a distance came to see him, and assisted to raise him in bed. On the tenth day after this friend was seized with the fever. Before he became convalescent two of his children were struck down, and his brother, who lived at a distance, but who came to see him, also fell a victim. Was this series of events the result of chance, or was it the work of contagion? Let us pursue the inquiry further. On the 20th of August a Mrs. Lee began to droop at North Tawton, and, not knowing what was impending, she visited her brother at Chaffcombe, seven miles off. She was smitten with the fever, and before she became convalescent her sister-in-law, Mrs. Snell, who had nursed her, was attacked, and died subsequently. Then came Mr. Snell, then one of the farm apprentices, then a day labourer, then a Miss S., who had come to take charge of the house after Mrs. Snell's death; and, finally, a group consisting of a servant man, a servant girl, and another young person who had acted as nurse.

"The case here submitted to the reader is not one of medical practice but of common evidence, which does not even require a trained scientific mind to weigh it. Let us proceed. A boy who had been smitten at Chaffcombe went to his mother's cottage, between Bow and North Tawton. Before he recovered, his mother, who had nursed him, sickened, and afterwards died. Two children of the family next door were next attacked, then the sister of the boy who had carried the infection from Chaffcombe. She, in her turn, removed to another place, and became a new focus for the propagation of the disease. Again, to lighten the list of invalids a girl named Mary Gibbings was sent from Chaffcombe to her home at Loosebeare, four miles off. Here she lay ill for several weeks. Before she recovered her father was seized. A farmer who lived across the road, and who visited Gibbings, was next struck down. His case was followed by others under the same roof; and the fever, spreading from this to other houses, became the centre of an epidemic which gradually extended to the whole hamlet.

"At the same time, scattered over the country side, were some twenty or thirty other hamlets, in each of which were the usual manure yard, the inevitable pigsty, and the same primitive accommodation for human needs. 'The same sun shone upon all alike, through month after month of the same fine, dry, autumnal weather. From the soil of all these hamlets human and other exuviæ exhaled into the air the same putrescent compounds in about equal abundance. In some of them, indeed, to speak the exact truth, these compounds, if the nose might be trusted—and in this matter there is no better witness—were much more rife. And yet, while at Loosebeare a large proportion of the inhabitants were lying prostrate with fever, in not one of the 20 or 30 similar hamlets was there a single case.' There is no confusion of data here; no blur or indistinctness in the observer's vision, no flaw, as far as I can see, in his reasoning. He follows the morbific agent from place to place, sees it planted, developed, shedding its seeds, producing new crops; growing up where it is sown, and there only. Ashpits fail to develop it; putrescence fails to develop it; stench fails to develop it; even the open privy is powerless as long as it is kept free from the discharges of those already attacked."

After this evidence, Professor Tyndall thinks it impossible for any intelligent reader, and especially any man trained to scientific reasoning, to doubt that the "human body is the soil in which the specific poison of typhoid fever breeds and multiplies."

In conclusion, Professor Tyndall says :—

"On the 9th of June, 1871, I ventured to express myself thus :—'With their respective viruses you may plant typhoid fever, scarlatina, or small pox. What are the crops that arise from this husbandry? As surely as a thistle rises from a thistle-seed, as surely as the fig comes from the fig, the grape from the grape, and the thorn from the thorn, so surely does the typhoid virus increase and multiply into typhoid fever, the scarlatina virus into scarlatina, the small-pox virus into small-pox. What is the conclusion that suggests itself here? It is this, that the thing which we vaguely call a virus is to all intents and purposes a *seed*; that, excluding the notion of vitality, in the whole range of chemical science you cannot point to an action which illustrates this perfect parallelism with the phenomena of life—this demonstrated power of self-multiplication and reproduction.' It was the clear and powerful writings of William Budd, joined to those of the celebrated Pasteur, that won me to these views. It is partly with a view of stamping at a receptive moment salutary truths upon the public mind, but partly also through the desire of rendering justice to a noble intellect, which has been literally sacrificed to the public good, that I draw attention, not only to the masterly combination of observation and inference exhibited from beginning to end of Dr. Budd's volume, but also to the crowning fact already published in the medical journals, and to which my attention was first drawn by my eminent friend Mr. Simon, that Dr. Klein has recently discovered the very organism which lies at the root of all the mischief, and to the destruction of which medical and sanitary skill will henceforth be directed."

Professor Tyndall's intended contribution to the popularity of biological science has been most unfavourably received by the medical press, all the journals agreeing that he has failed to show that he is able to estimate at its proper value the evidence on the subject. The *British Medical Journal* says:—"It is not a little remarkable that a philosopher who maintains that even the human race has, by a process of evolution, in the course of countless ages, sprung from something lower in the scale of organization even than organisms, which he compares to 'drops of oil suspended in a mixture of alcohol and water,' and who seems to agree with Lucretius in affirming that 'nature is seen to do all things spontaneously of herself, without the meddling of the gods,' should yet maintain that the poison of typhoid fever can never arise except from a previous case of typhoid fever, and must therefore have existed from all eternity, before even man himself existed. Dr. Tyndall submits that the question at issue involves no knowledge of medical practice, but simply a capacity to weigh evidence. It seems scarcely credible, however, that Professor Tyndall can have carefully weighed the evidence on both sides, when he comes forward and asserts positively in the public press that typhoid fever is a most contagious disease, like small-pox, and can arise in no other way than by contagion. It may be hereafter shown that such is the case; but the statement is far from having been proved; and there are certainly strong facts on the other side, which demand that judgment in the matter shall be deferred, and which have an important bearing upon medical practice. If the excretions of typhoid fever be so eminently contagious as Dr. Tyndall asserts, it is difficult to account for the remarkable exemption from the disease of the attendants on the sick referred to by all medical writers."

Further, the *British Medical Journal* refers to the experience in the London Fever Hospital, as quoted by Dr. Murchison:—"During nine years 3,555 cases of enteric fever were treated in the same wards with 5,144 patients not suffering from any specific fever. Not one of the latter contracted enteric fever, although it was not an uncommon practice for them to sit over the evacuations of enteric patients, and the use of disinfectants was quite exceptional."

Respecting Professor Tyndall's "crowning fact," it is remarked "that it is surprising that a man of Dr. Tyndall's scientific position, an adept in weighing evidence, should exhibit such a want of philosophic caution as to crown his argument by the astounding announcement that 'Dr. Klein has recently discovered the very organism which lies at the root of all the mischief, and to the destruction of which medical and sanitary skill will henceforth be directed.' Dr. Klein's researches are still in embryo, and he himself would be the last, we believe, to make any such statement."

The *Lancet* designates Professor Tyndall's letter as "two-edged," and takes exception to a question which the Professor appends to an account of the cessation of an epidemic of fever after vigorous measures of disinfection, in which he asks:—"Can it be doubted that with sound medical advisers, backed by an intelligent population, an equally rapid destruction of the foe might be accomplished at Over Darwen?" The *Lancet* remarks, "If Professor Tyndall had communicated with Mr. Simon, or had read his memorandum on 'Disinfection' before giving publicity to this sentence, he would have learned that not only could it be doubted, but that an overwhelming amount of evidence exists that no such confidence can be reposed in the effect of disinfectants in arresting the spread of typhoid fever as he supposes. Disinfection is of value simply as ancillary to other more fundamental measures of prevention. In whatever manner practised, under conditions like those existing at Over Darwen, it is a sham, and nothing more. The whole teaching of sanitary experience during the last ten years, and in the full light of Dr. Budd's observations, has been to the effect that the spread of typhoid fever can alone be surely limited by the removal of those states of excremental pollution of soil, air, and water which admit of dissemination of the disease. Professor Tyndall's observation furnishes the sanitary authority of Over Darwen with another excuse for postponing the much-needed sanitary amelioration of the place."

The tone of the opinion expressed in an article in the *Medical Times and Gazette* may be inferred from the last sentence, which runs as follows:—"'Let the shoemaker stick to his last,'—let Professor Tyndall attend to his beams of light, and those phenomena about which he can at least speak intelligibly, and leave biological inquiries to those who have been trained to pursue them."

The discussion has, of course, not been confined to the medical profession. Amongst others, "A Promising and Potential Molecule" thus wittily "chaffs" the Professor in the *Times*, anent the ground he took in the Belfast address:—

"I consider I am receiving very unfair treatment at the hands of Professor Tyndall. Only the other day he recognized in me 'the promise and potency of all forms of life,' and introduced me to the notice of the British Association in particular, and society in general, as sufficient to account for all the vitality and intelligence to be found in the universe. And now in this discussion he is raising about typhoid fever, which he appears to regard as the product of an 'organism,' he gives me the cold shoulder, holds that he cannot fairly be asked how this organism began, and, adopting the language of Sir Thomas Watson, denies that 'filth, foul air, and the gaseous products of animal and vegetable decomposition ever produce a contagious fever,' or, in other words, the organisms which give rise to such fevers. I submit, after having so recently been the means of extending far and wide the fame of Professor Tyndall, that it is not very grateful or generous in him to leave me entirely out of account now. If I, by my inherent structural and other force, am capable, as he insinuated I am, of constructing a globe and clothing it with life and beauty, I think it very illogical, to say the least of it, to maintain, as he now does, that even with the proper combinations of filth, over-crowding, decomposing matters, putrid water, and so forth, I cannot originate and *de novo* construct so paltry an organism as a typhoid fever germ. Professor Tyndall had no right to exalt me so high as he did, and then, when the ecclesiastical dust which he raised about me is subsiding, to spurn my powers and capabilities in so small a matter as this."

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 21, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL DUTIES FROM A MEDICAL POINT OF VIEW.

CAREFUL consideration of the troubles and difficulties of our neighbours may often serve as a useful lesson to ourselves, and as a warning against incurring liability to similar disagreeables. A case of this kind has lately presented itself in a discussion carried on in America in reference to certain points of pharmaceutical ethics, and *à propos* of the feeling that has been manifested in some quarters at home to disparage the effort to attain and maintain a high standard of pharmaceutic efficiency, it may not be altogether useless to reproduce here the chief features of the case we refer to.

The discussion to which we refer arose out of a proposal to establish at St. Louis, in the State of Missouri, a joint-stock company, under the title of the "Apothecaries Hall Association." The objects of the Association, as set forth in a circular inviting persons to become shareholders, were, generally, the manufacture, purchase, and sale of chemicals, drugs, and pharmaceutical preparations, as well as instruments, appliances, and apparatus used in surgery; also the compounding of medicines and dispensing prescriptions of medical men. As incidental to these main objects, measures were to be taken to ensure purity in all drugs, chemicals, and articles of the materia medica, as well as uniformity in the strength and quality of the standard preparations of the Pharmacopœia. It was also proposed to establish a scale of prices on the basis of gratuity to the poor, moderation to the public, and equity to the medical profession.

The pharmacies to be established at such places as might from time to time be selected were to be managed by pharmacists and chemists of approved competency and skill, and they were to be under the direction of the medical profession.

As regards the objects here set forth, there can be little question that they are good and desirable; but the proposal to establish a special corporation for their attainment obviously involves the assertion, or at least the suspicion, that they are not generally or sufficiently sought for under existing circumstances. In reference to this point, a writer criticizing the proposal in the New York *Druggists' Circular*, objects to the formation of such an association, on the ground that there is nothing to warrant such inferences as may be drawn from the wording of the circular in question. He declares that there is no necessity for such an organization in order to attain the objects set forth, since the local pharmacists are perfectly competent to accomplish all the desirable objects referred to by the projected association.

The writer of this criticism, signing himself "P. W. B.," further urges that such an organization would compromise the dignity and honour not only of pharmacists but also of medical men, and that, as regards the direction of such a business being placed in the hands of medical men, they would as a rule be wholly incompetent to carry it out.

In a subsequent number of the *Druggists' Circular*, Dr. JULIAN BATES, of St. Louis, comes forward with arguments in reply to the above-mentioned writer, who is assumed by him to be Mr. P. W. BEDFORD, the Professor of Pharmacy in the New York College. After indicating that among those who originated or favoured the project of joint-stock pharmacies there were reputable medical men, highly and justly esteemed by the medical profession, by pharmacists, and by the general public, he goes on to the question whether there are such abuses to be corrected in the conduct of pharmacies as would call for organizations like the proposed Association. He maintains that since the life of the patient, the reputation of the prescriber, and all intelligent progress in therapeutics, often hinge upon the skill and faithfulness of the dispensing chemist, physicians are not stepping out of their own sphere when they scrutinize and commend or condemn—as the case may demand—those who come always between the prescription and the patient, and in whose hands is the power to determine whether the patient shall or shall not have the treatment prescribed by the physician.

On these grounds he defends the attempt to establish pharmacies where only adult and expert dispensers will be employed in making up prescriptions, where only the articles and instruments used in the management of the sick should be sold, together with such chemicals of familiar domestic use, or serviceable in arts and manufactures, as, from their nature, may be expected to be found in a pharmacy. The miscellaneous merchandise, and the nostrums forming a large and lucrative part of the stock in trade of many dispensing establishments, Dr. BATES regards as constituting a serious abuse of the pharmacist's calling, and he urges that, by excluding such business from the pharmacies of the Association, the directing and dispensing druggists would have more time for the study of their calling and for due attention to the prompt and accurate compounding of prescriptions, since they would not be diverted by the study of prices of a manifold and promiscuous merchandise, and by the constant efforts to conciliate and retain remunerative traffic in heterogeneous articles foreign and unfriendly to the faithful preparation of medical prescriptions.

As regards the City of St. Louis, it is asserted by Dr. BATES that in many cases the dispensing of prescriptions is intrusted to unskilful and unsuitable hands, that there is a large engagement in various trades and in the sale of nostrums or quack medicines; also that some druggists, without any pretence or profession of preparation therefore often prescribe for the sick, while for medicines furnished on prescription of physicians, prices exorbitantly high are often demanded. He contends that for those druggists who are upright men, as well as expert and proficient pharmacists, avoiding the evils he enumerates, the enterprise he advocates would not be hostile but helpful, as tending to concentrate and confirm the public confidence in establishments conducted on a method so manifestly right.

As regards the competence of the St. Louis pharmacists to accomplish all the objects which the Association aim at, Dr. BATES admits entirely what "P.W. B." asserts, but he asks are they doing it? Will they do it? Lastly, while expressing a hope that the leaders of pharmaceutical opinion may exercise such an improving influence as would leave no room for complaint, he declares his conviction that if pharmacists fail to effect such reform "in their own ranks," it will be brought about by other methods.

The particular circumstances here referred to are too local and too remote from our appreciation to admit of the unreserved adoption of the views put forward on either side; but we think the discussion affords material for reflection, and for suggesting to pharmacists the necessity of making full provision for holding their own.

CRYSTALLOGRAPHY.

IT is announced that Professor MASKELYNE has offered to give a short course of lectures on Crystallography, commencing on the 23rd inst., if a sufficient number of the members of the Chemical Society, intimate to Dr. RUSSELL their intention of attending. It is the intention of Mr. MASKELYNE to treat of his subject with as small an amount of mathematical detail as is consistent with its proper development. The lectures will be open to anyone introduced by a Fellow of the Chemical Society.

CANTOR LECTURES.

THE Council of the Society of Arts announces that it has made arrangements for the delivering of the following courses of Cantor Lectures in the forthcoming session:—"Alcohol, its Action and its Use," by Dr. B. W. RICHARDSON, F.R.S.; "The Material, Construction, Form, and Principles of Tools used in Handicraft," by the Rev. ARTHUR RIGG; and "Some of the Forms of the Modern Steam Engine," by F. J. BRAMWELL, F.R.S.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

November 18th, 1874.

Present—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

MAJOR EXAMINATION.

Two candidates were examined. Both passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Stamps, Frederick..................West Bromwich.
Adams, William ....Barnstaple.

MINOR EXAMINATION.

Fifteen candidates were examined. *Eleven* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Newton, Alfred Henry ....Kenilworth.
Harrington, Arthur ....Needham Market.
Simpson, Charles Alfred ....Fenton.
Price, Robert John ....Wrexham.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

Certificates as undermentioned were received in lieu of this Examination:—

Certificate of the Society of Apothecaries.

Allsworth, Norman ....Havant.

Certificate of the University of Cambridge.

Gostling, Thomas P. ....Diss.

Certificate of the University of London.

King, Edward Albert Godfrey...Southsea.

Certificates of the University of Oxford.

Hunt, Ince Harry..................Hendford.
Stukeley, Edward Charles ......Gloucester.

Provincial Transactions.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The first ordinary monthly meeting of the session was held on Wednesday evening, Nov. 11, Mr. Councillor Brown, President, in the chair. Mr. Gibson was elected a member, and Messrs. Newlove, Rosson, Blain, Allen, Illesley, Benson, Gant, Moss, Bond, Baxter, Dawson, Fletcher, and Nicholls as Associates.

The Chairman, in calling on Mr. Siebold to deliver the first of his special course of lectures, "On the Analysis of Common Articles of Food and Drink," said that though in past sessions gentlemen had always been found willing to provide lectures or papers for the monthly meetings, it had often been with considerable difficulty. This year, however, Mr. Siebold had most generously stepped forward and relieved them from all anxiety on this point by promising a series of lectures which he was sure would be most interesting and instructive to them all. These lectures would be given on the second Wednesday in every month, and would occupy about three-quarters of an hour each, after which the meeting would be open for the discussion of any matters of interest to the Association members might bring forward. He was very glad to see that such a large audience had assembled.

Mr. Siebold said his first lecture would be devoted to an examination of water, which, though not liable to adulteration, was always more or less impure; and the question to be answered was always whether these impurities were of such a nature, or existed in such quantities, as to render the water unfit for use. He should endeavour in his lectures to describe those tests which might be applied by the average chemist and druggist, and though in some cases these might be less delicate than more elaborate and laborious ones, they would be found sufficiently reliable.

A sample of water should be first examined as to its colour. A clear white glass flask of it should be compared with a similar flask of pure distilled water. It should be colourless. Next as to its smell: if no odour be apparent when cold, it should be raised to the boiling point, when it should still remain odourless. Lead might always be detected in the Manchester town's water, which was contaminated with this metal to the extent of about one-tenth of a grain per gallon. Though this quantity was not considered to be injurious to health in ordinary cases, it was quite possible that some persons might be affected by it. Water containing half a grain of lead per gallon might be unhesitatingly declared unfit for human consumption. Lead existing in water to this extent might be detected as follows:—Place four ounces of the water in a white glass flask, add a few drops of pure sulphuric acid, and boil; then add some fresh, clear solution of sulphuretted hydrogen, when a brownish colour will be produced should the water contain an injurious quantity of lead. The object of boiling the water with sulphuric acid is to decompose any nitrites which might possibly be present, and would produce a turbidity by precipitating some of the sulphur of the sulphuretted hydrogen, and this might obscure the reaction with very small quantities of lead. Copper is occasionally present in water, and would produce a similar coloration to lead, with sulphuretted hydrogen, but the precipitate (sulphide of copper) would be soluble in cyanide of potassium, which is not the case with the lead precipitate.

Nitrites indicate the presence of sewage or the products of the putrefaction of organic matter, and may be detected by placing four ounces of the water in a flask, and adding a mixture of iodide of potassium, starch paste, and acetic acid (this latter mixture should be colourless; if the iodide contain iodate it will be tinged and unfit for use). A blue colour will be produced if nitrites are present, the nitrous acid liberated from the nitrites decomposing the iodide of potassium, and the free iodine forming blue iodide of starch.

In the above test acetic acid is preferable to sulphuric, as the latter would liberate nitric acid from any nitrates present, and this, in the presence of organic matter, would be reduced to nitrous acid, and give a false indication of nitrites.

Nitrates do not necessarily indicate sewage contamination, as they are frequently derived from mineral matter, but when they co-exist with small quantities of nitrites and ammonia in water, there is good reason to suspect that they may have been derived from nitrites, and the water should be condemned. They may be detected by adding a little sulphuric acid and powdered zinc to a sample of the water, and then a little of the iodide and starch solution; the hydrogen evolved will reduce the nitric to nitrous acid, and give the blue coloration.

Lime and magnesia render water hard. In small quantities they are not injurious. To half a test-tubeful of the water to be tested add a little solution of carbonate of soda and caustic soda; a decided cloudiness would then show too large a proportion of the impurity. What is called temporary hardness is due to bicarbonate of lime or magnesia, which on boiling is reduced to carbonate and precipitated. Permanent hardness is due to sulphates and chlorides of these bases. Lime and magnesia may be very easily estimated quantitatively in water by Clark's soap test, which every chemist and druggist knows by name. The original formula proposed by Mr. Clark is now somewhat antiquated, and the modification suggested by Mr. Wanklyn and others is now generally adopted. It depends on the fact that when a solution of soap is mixed with water containing salts of lime or magnesia the soap is decomposed, yielding an insoluble compound. The amount of lime present is best estimated in the following manner:—To 70 cubic centimetres of the water in an 8 ounce white stoppered bottle, add the soap test by means of a burette, one cubic centimetre at a time, thoroughly shaking the bottle after each addition. So long as no permanent lather is formed, the whole of the lime has not been removed, but as soon as the froth formed by shaking the bottle stands two or three minutes, the quantity of soap test used must be read off. Each cubic centimetre corresponds to one grain of carbonate of lime, or its equivalent of chloride or sulphate, per gallon. In the specimen of water used to illustrate this test to the meeting, 11 c.c. of the soap test had been used; the water, therefore, contained 11 grains of carbonate of lime to the gallon, or, as it is sometimes expressed, was of 11 degrees of hardness. If more than 17 c.c. of the soap test be required, it is best to mix the water with an equal volume of pure distilled water before adding more of the test, but as one c.c. of the soap solution is required to produce a permanent lather with 70 c.c. of pure distilled water, one c.c. must be deducted in this case from the quantity read off from the burette at the end of the experiment.

Water containing 25 grains of lime salts to the gallon is unfit for use.

More than a trace of ammonia should never be overlooked. Nesler's test, which is one of the most delicate known, should give only the *faintest* yellowish red tinge to four ounces of the water in a clear glass flask. Any darker colour, or the formation of a precipitate, would indicate an unwholesome water.

Organic matter may be easiest detected by the permanganate of potash test. Frankland's and Wanklyn's processes are too difficult, and require too much practice to be of much use to the ordinary chemist and druggist. It is best applied as follows:—Heat 16 fluid ounces of distilled water to the boiling point, and add, by means of a glass rod, sufficient solution of permanganate of potash to tinge the water a delicate pink (the strength should be such that when one part of this water is mixed with three parts of distilled water the colour should be just discernible). To eight ounces of this hot distilled water and permanganate add four ounces of the water to be tested; if the colour is discharged, organic matter is present. Ferrous compounds and nitrites will also destroy the colour of permanganate. Should the former be present in the water to be tested, it should be boiled with a little nitric acid to raise them to the ferric state. Nitrites should be removed by boiling with a little sulphuric acid.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

The second meeting of the session was held in the West Hall, Anderson's University, on Wednesday, November 11, at 9 p.m., the President, Mr. John C. Hunter, in the chair. There was an average attendance of members. The minutes of the last meeting having been read and confirmed, the Chairman introduced Mr. William Currie, who read a paper on "Bleaching."

At the close of the paper the Chairman proposed a hearty vote of thanks to Mr. Currie for his very valuable paper, which was unanimously agreed to. The following gentlemen were elected members of the Association:—Messrs. A. Cowan, D. Cassels, G. A. Marrs, D. McGillvray, J. Rait, J. Campbell, W. Lawson, B. T. Connolly, and J. M'Nicol.

Messrs. Hunter and Murdoch reported having called upon the gentlemen who were discontinuing the early closing movement. The members would be glad to learn that they promised to be more prompt in future.

A few more members having been enrolled for the tutorial and chemistry classes, the meeting was brought to a close.

HULL CHEMISTS' ASSOCIATION.

The annual meeting of this society was held at the Cross Keys Hotel, on Thursday evening, November 12, the President, Mr. Anthony Smith, in the chair. The report was read by the Secretary, Mr. C. B. Bell, and adopted. The financial position of the Society showed an increase on last year's balance. The election of officers for the ensuing year took place by ballot, with the following result:—President, Mr. Anthony Smith; Vice-President, Mr. Geo. Myers; Hon. Sec. and Treasurer, Mr. C. B. Bell; Committee, Messrs. Grindall, Jubb, Oldham, and Earle.

The President, in thanking the members for the compliment they had paid him in electing him to the chair for the third consecutive year, stated that he re-entered upon the duties with some degree of hesitation, as he considered two years should be the maximum time allowed for the same President to occupy the chair, but as it was their wish, he should continue in that position. He assured them that he felt most warmly the proof of their confidence, and no exertion on his part would be wanting to ensure the success of the Society, and to increase the facilities for the instruction of the rising generation in the trade.

Mr. C. B. Bell thanked the members most heartily for the confidence they had always reposed in him, and for again electing him to the office which he had held since the formation of the Society six years ago, and he trusted the usefulness of the Society would continue to increase.

Thanks were recorded by the members present to the past officers of the Society for their services, which were duly acknowledged.

The annual dinner was fixed for the first week in December.

CHEMISTS AND DRUGGISTS' ASSOCIATION OF IRELAND.

A meeting of this Association was held at 44, Molesworth Street, on Monday evening, November 16, Mr. J. T. Holmes in the chair. The minutes of the previous meeting having been read and confirmed, the Honorary Secretary said the principal business was to make final arrangements about the classes. The Secretary was requested to procure rooms in a central position; until then, through the kind offer of Professor Tichborne, the classes will be held in the Carmichael School of Medicine. On the motion of Mr. R. Watson, seconded by Mr. Goodwin, it was resolved that the class books recommended by the Pharmaceutical Society should be used.

Several new members were admitted, and about forty have already joined the classes, which promise to be quite a success.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Carbon and certain Compounds of Carbon.*

BY PROFESSOR BARFF.

(*Continued from page* 396.)

Lectures IV. and V.

It is generally known that coal was originally wood—*i.e.*, vegetable matter—which, under excessive pressure in the presence of moisture, and at a suitable temperature, has become slowly converted into the substance which is now called coal. There are various ways in which the formation of coal is accounted for—first, by the elements of water leaving the vegetable matter, then by the carbonic acid, and then by the marsh gas being given off. It is most probably formed by the loss of all these. What would be the result of wood or vegetable matter losing the elements of water? The composition of cellulose, the principal constituent of vegetable matter, is $C_6H_{10}O_5$. If from two molecules one molecule of water is taken there will remain $C_{12}H_{18}O_9$. It must be manifest that this compound would contain more carbon than the other did in proportion to its other constituents, and if the same thing be repeated, doubling the formula of the new substance, and taking away the elements of water from it, we shall at last get a substance known under the name of anthracite coal, which contains about 94 per cent. of carbon, and we could even imagine the process going on so far that eventually pure, or nearly pure, graphite would be left. Here, then, it is quite easy to conceive how such changes as these effect the decomposition of woody fibre, and convert it into that substance which is called coal. Again, carbonic acid and marsh gas are given off during the process, so that the loss of these two would change the composition of the woody matter, and produce a substance which would be rich in carbon compared to the substances from which it was originally formed. We may, then, imagine this to be the chemical method in which coal is formed. That it is of vegetable origin there can be no doubt. More than 500 different kinds of plants have been found in coal, and 250 ferns of the most beautiful structure. That it was once submerged beneath the ocean is not only not improbable, but it is almost absolutely certain, for we find in the coal traces of a substance which must have come into it in some such way as this. Sulphur is found there, and iron pyrites. From whence could the sulphur come? Probably from the sulphates of the sea—from the sulphate of calcium which got reduced by the action of marsh gas, for marsh gas, like hydrogen, is a reducing agent, so that at last, in the presence of the iron which was there, sulphide of iron or iron pyrites would be formed, which contains 56 parts by weight of iron, and 64 parts by weight of sulphur, and is a bisulphide of iron. It is in this way that this substance, which is a trouble to the ironmaster and ironfounder, came into the coal; and it is a matter of great importance to all who have to carry on, by the aid of heat from coal, delicate chemical operations where the presence of sulphur is injurious. Although the ironmaster may select his iron ores as free from pyrites as possible, if he use coal containing sulphur, sulphur will be present in the iron, and it is a most injurious substance to have in iron. A means by which sulphur can be readily eliminated from fuel is still a desideratum.

Coal is of different kinds; there are coals that will cake, and coals that will not cake. The coal which will cake is usually what is called bituminous. Many substances are got from the earth under the name of coal, from bituminous shale down to substances which are very little better than fireclay. Householders can form an opinion as to the quality of coal from the appearance of it. Some coals are brittle and break readily, and have a shining surface. These appearances are promising, and generally denote that the coal will burn well. Then there are those which have a slatey appearance and break in laminæ. These, as a rule, are not such good coals, and not such economical ones for use. They are generally found to contain a large percentage of ash or cinders, not that cinders are the ash of coal really, because in cinders there is a large portion of combustible matter very often thrown away. The coal which contains most bituminous matter is the Boghead cannel coal. It is found in the neighbourhood of Wigan, and in small quantities in some other places. It is known to be a very bright-burning coal, and is used when it is desired to produce a bright blaze and a cheery light. When burning it crackles, and the pieces fly about, not out of the grate but in the fire. A peculiarity of it is that its fracture is square and laminated if broken in one way, but conchoidal if broken in another. It is a coal which may be polished, and which is used for making ornaments in imitation of jet; the difference

---

* Abstract of a course of Cantor Lectures, delivered before the Society of Arts.

being, however, that they are heavy, whilst those made of jet are light. Anthracite coals vary in their composition and in their usefulness for household purposes. South Wales anthracite contains about 90 or 94 per cent. of carbon; the coal obtained in Munster, Carlow, and other provinces of Ireland contains a very large quantity of sulphur. The better kinds of anthracite contain about ·9 per cent. of sulphur, or nearly 1 per cent., but there are many varieties which contain a much larger percentage, even as high as 2½ or 3 per cent. It is quite manifest that for any metallurgical and other purposes of that class, coals containing sulphur must be very injurious; and also for making gas.

The heating property of coal, and how practically to determine that heating property, is an important subject. If several samples of coal be first weighed, and then burned perfectly, so as to burn away every trace of carbon, hydrogen, and oxygen from them, and leave nothing but ash behind, and the ash then weighed, the relation between the weight of the coal and the weight of the ash may be ascertained. The ash contains a silicate of alumina, some oxide of iron, sometimes traces of oxide of lead, the principal constituents being silicate of alumina and oxide of iron. A gentleman experimenting on this subject has come to results which lead him to believe that the heating powers of average coal are inversely in proportion to the ash—the less ash the greater heating power. If this be true, and there is no reason to doubt it, it would be very easy to determine the heating power of coal. Persons in private life could easily have an apparatus made by which they could burn away the coal and weigh the ash. All that would be wanted is a fireclay cylinder open at both ends, through which a current of air would pass. Then, if the coal were put into a porcelain dish, after having weighed it with accuracy, and the air allowed to pass through while at a red heat, the whole carbon, oxygen, and hydrogen would pass off, and there would be nothing left but the mineral residue, which could be weighed.

But there is another extremely interesting method of determining the heating power of coal. This method was described by the lecturer as follows:—

"In this glass vessel I have a known volume of water—two litres. In this small copper cylinder there is a known weight of coal, which is mixed with certain substances, which at a high temperature will give up their oxygen to it, and will burn it; for it is not necessary in all cases that we should have air, or the gases of air, to burn such substances as coal; we can put with it substances containing oxygen which will part with their oxygen readily, and thus, at the proper temperature, carbonic acid gas and water are formed, and a perfect combustion of the coal takes place, as perfect as in atmospheric air. We have a known weight of coal here, and we have a powder containing enough oxygen to burn that coal, and when that coal has been burned it will have given out all the heat which it can give out. I may mix it with chalk or with lime, or with anything else, but it will not make it give out any more heat. There is a certain quantity of carbon, which on burning will give out a certain quantity of heat, and a certain quantity of hydrogen which will give out a certain quantity of heat, and no more. Around the bottom of this cylinder there are holes to allow the escape of the gases generated in the combustion of the coal, and the whole of the heat will be communicated to the water. There are, however, certain sources of loss of heat, which have been tested, and it has been found by experiment that these losses, by radiation from the vessel, etc., amount to 10 per cent. Therefore, when we have determined the heating power of the coal according to the best of our ability by this apparatus, we have to add to it 10 per cent. The first process is to take the temperature of the two litres of water in this vessel, which appears to be 16° C. Then the coal is ignited by means of a piece of tinder at the top of the cylinder, and it is then lowered into the water, and you notice there is immediately a violent action going on under the water. The whole of the heat, minus the 10 per cent., which will be lost, will be transferred to the water, and on removing the cylinder, and again inserting a thermometer, we shall find the rise of temperature in the water."

Although this experiment gives very satisfactory results, it would be much better if the heating power of coal could be determined by simply burning it down to an ash and weighing the residue. At the close of the combustion the temperature of the water was 24°, so that there had been a rise of 8° in the temperature. It is usual to take as a unit of heat the amount of heat which will raise the kilogramme of water 1° C. The temperature of two kilogrammes of water being raised 8°, there has been as much heat given off as would raise 16 kilogrammes of water from zero to 1° C, or sixteen thermal units. In this way it is easy to determine the heating property of coal, or any other substance.

There are other fuels used besides coal. Peat is used as fuel in the ordinary form and in the compressed form. The difficulty that has been met with in introducing peat as a commercial article, at such a price that people will purchase it and use it, is that it occupies so much bulk, and there is a difficulty in compressing it. The water contained in bog peat is in little cysts, as it were, and in submitting it to pressure we have, in fact, to fight against incompressible water. The only way is to cut it up, and that is now done by rotating knives; when so cut up it can be compressed. Of course there would be an advantage in using peat fuel for certain purposes, because it does not contain sulphur, as coal does.

What are the effects produced by sulphur in coal? In the country villages in Carlow the people burn anthracite coal, and, if asked whether they like it, they will tell you it gives a very hot fire when it is lighted, but it is very difficult to light, and that they cannot use iron fire-bars because the sulphur burns away the iron. The effect of sulphur in coal is to destroy iron or copper. The effect will therefore be to corrode the metal pipes and small fastenings in connection with the engines through which the vapours pass, and it is therefore most desirable that sulphur in coal should be got rid of. Another effect which it produces, and which is experienced when travelling in railway tunnels, is the offensive odour that it gives off. That offensive odour is not always owing to sulphurous acid, but sometimes to sulphuretted hydrogen; but in railways, where they are obliged to condense their steam during their passage through the tunnels, and when the products of combustion pass out dry from the chimney into the tunnel, the sulphurous acid is manifested in all its vigour. It comes out mixed with a large proportion of carbonic acid. The question arises, Is this substance injurious to health? It certainly is most offensive, but is it injurious? It is stated that when sulphurous acid is breathed in large quantities it stops the breathing, and produces asphyxia; and when breathed in small quantities it produces catarrh. "It is quite certain," said the lecturer, "that the perpetual irritation of the mucous surfaces in persons who have a tendency to disease of the lungs must be most injurious. I cannot speak on this subject without deep feeling. I see people on the Underground Railway suffering manifestly from the inconvenience produced by the inhalation of this most injurious gas, and I myself have suffered from it continually. I have to go early in the morning to give lectures in the City twice a week, and frequently I am so affected by it that it takes me some time before I can recover myself to give my lecture with ease and freedom. Such a thing as this is shocking. We are compelled to travel by that line; ought we not, by our opinion manifested here, and by public opinion generally, to compel the directors of it to do their best to remedy this, not nuisance only, but this serious evil? I have received a communication from a neighbourhood where manufacturing processes are carried on by which means this gas is evolved, and I am told in that neighbourhood that, although diseases which are called epidemic are generally absent, yet diseases of the lungs increase wonderfully, and they are very serious in their results. There is no doubt about it. I know very well that you might get persons to say that there is no very great harm in it; that a little of it can do no harm. But a little of it can do harm; and there are many medical men, I am perfectly certain, who would be willing to come forward and state their opinions that disease might not perhaps be originated by it, but when produced would be increased by the inhalation of this gas. I should not speak so strongly about it as I do if it were not possible to remedy it. But the thing which has made me feel most strongly about it is this, that when ways and means for remedying it have been suggested to the directors of the company, they would not even try an experiment. Five years ago I performed an experiment in the presence of Mr. Burnett, their then engineer, which I will repeat for you to-night. I burnt in his presence, in a small room, a vessel full of pure brimstone, and he was unable to detect the smell of sulphurous acid. After that, when the means are very simple, when the scientific principle is not a complicated one, one might imagine that at least the company would give directions that some experiments should be tried to see whether it was successful. But as far as I know none have been tried; in fact, I am sure none were tried, for I saw some of the directors two years after, and I knew from one of them that none had been tried."

Sulphurous acid is a gas which readily unites with bases, formings salts called sulphites. Sulphurous acid is a strong-smelling substance, but sulphites have no smell of sulphur. The conversion of sulphurous acid into a sulphite is easily accomplished by causing it to pass through a tube in which there are lumps of coke saturated with caustic soda. The sulphurous acid readily unites with the hydrate of soda, and forms sulphite of soda. Coke contains at least one-half per cent. of sulphur, which is somewhere about 10 lbs. per ton. If 10 lb. weight of sulphur he burnt, it forms a very large quantity of sulphurous acid, and that large quantity must without doubt work an injurious effect upon the health of railway passengers who suffer from weakness in the lungs; at all events, it produces considerable discomfort to all travellers; and if it only did this, it is the duty of the managers of that railway to try and remedy the evil. There is not the slightest doubt they can do it if they take the proper means; the means already tried only very partially remedy it.

Now, to pass on to liquid hydrocarbons. Paraffin, petroleum oil, and marsh gas are all three substances of the same family. The symbol for the molecule of marsh gas is CH_4, or 12 parts by weight of carbon, and 4 parts by weight of hydrogen. This weight taken in grains, at the normal temperature and pressure, occupies twice 11·2 litres. Added to this CH_2, which will give C_2H_6; then add to this again CH_2, that will give C_3H_8; then, if we add another CH_2, that will be C_4H_{10}; the addition of another will make C_5H_{12}. Now, C_5H_{12} is one of the most important hydrocarbons in this ordinary petroleum oil. But there is still one more important than that, which is obtained by the addition of one more CH_2, namely C_6H_{14}. This is what is called by chemists an homologous series. To each term of it CH_2 is added, or 12 parts by weight of carbon, and 2 parts by weight of hydrogen, and it makes a new body, but still one of the same series. For some time the hydrocarbons of this class, paraffins, etc., were considered to belong to the olefiant gas series, to that gas which burns with a luminous flame, but this is disproved by their behaviour towards chlorine.

It is very important that we should know the class of compounds to which those substances belong upon which we wish to experiment for applied science. We ought to know that, because their actions on other bodies are different. Marsh gas must be heated to a white heat, in order to cause a deposit of its carbon; but olefiant gas, when heated to a red heat, gives up half its carbon, and marsh gas is formed. All these are points of considerable importance for those to understand who are going to practise upon these things for the purpose of applying their knowledge to useful purposes.

Petroleum oil, or, as some call it, rock oil, comes from various sources. It is found in America and in different parts of the world, but the same substances, or nearly the same, are obtained from coal tar and wood tar. Solid paraffin is obtained from wood tar or coal tar, or from some of these petroleum oils, by treating them in a particular way. If crude paraffin oil be distilled, a hydrocarbon comes over at 50°, probably another at 86°; there is one which comes over at 68°, the hydride of hexyl, C_6H_{14}, a principal constituent of all paraffin oils. We may go on heating it up to 280°, and get volatile matters coming off, but at last there will be a residue left, from which, if left to cool, white crystals will separate out; those are crystals of paraffin. Thus paraffin is obtained, that can be purified by subsequent treatment. For instance, it may be dissolved in hot alcohol, and, then when the alcohol gets cool, the paraffin will crystallize and deposit in scales. Then the paraffin scales, after cleansing them by pressing them with blotting paper to absorb the liquid about them, may be treated with strong sulphuric acid. If the paraffin belonged to the olefiant gas series, it would not be possible to treat it with strong sulphuric acid, because Nordhausen sulphuric acid will absorb olefiant gas; but marsh gas may be treated with a strong sulphuric acid, so that by heating the paraffin and strong sulphuric acid up to 100° C., the temperature of boiling water, and then leaving the mixture to cool, the sulphuric acid will remain at the bottom and the paraffin will come to the top, in a state of considerable purity. This is the substance of which paraffin candles are made, and it is called "paraffin," because it has no affinity for anything else; it is very difficult to oxidize or to affect in any way chemically, therefore it is called *par affine*, without any affinity. Some of these oils, as they are called, will vaporize at a low temperature, and some will vaporize as low as 4° C., namely, that represented by the formula C_4H_{10}. If a mixture of these oils, some very light and some very heavy, were heated in an ordinary lamp for burning paraffin oil, those which vaporize at a low temperature would be vaporized before the lamp is lighted. Suppose the temperature of the air to be somewhere about 18° or 19° C., all the oils that would vaporize, so that the chamber would be full of vapour and air mixed, and an explosion would follow the application of a light; for all these oils when mixed with atmospheric air produce very explosive compounds. But it is not so much the explosion that is dangerous, for it does not produce much damage usually; but what is more serious, the whole of the paraffin oil will catch fire. If ever such a calamity should happen, water should not be thrown upon it, but a mat put upon it, or anything to keep the air away from it. Paraffin lamps are now being used on railways for burning paraffin oils. Consider what would happen if a collision took place which caused the lamp to be fractured. The oil would catch fire and run down alight on the people in the carriage, and that would be a considerable addition to the calamity. It is therefore desirable that those who are engaged in promoting the use of these paraffin lamps instead of gas should turn their attention to some method to prevent a catastrophe of that kind happening. It never has happened yet, but that is no reason why it never should. The reservoir of oil is above the lamp, and if that gets broken the paraffin will have to run down in contact with the flame, and if it does so it will catch fire, and if it runs down over the passengers there would be no putting it out unless a person had the presence of mind to put something upon it to keep away the air.

The property of vaporizing possessed by these oils is very useful for some things, but very objectionable for other purposes. For burning in rooms it is best to have an oil which is heavy, and will not volatilize at any temperature to which it is likely to be submitted; but when it is wanted to apply the hydrocarbons to other purposes, such as illuminating purposes, in lieu of coal gas, or to increase the illuminating property of coal gas, then the lighter oils are better. For heating purposes the heavy oils do as well as the light ones, or rather better. Some time ago there was a scheme for making air gas by passing air through a liquid hydrocarbon in order to charge it with its vapour. It is quite certain that in its passage the liquid hydrocarbon to become vapour must take up heat from the air, must be cooled, and the cool air cannot hold in suspension so much vapour, either of water or any other liquid, as warm air can. Here, then, in passing air through hydrocarbons in order to charge it with their vapours, we have this difficulty to encounter at the first start, namely, that the vaporizing of the hydrocarbon causes absorption of heat, and therefore prevents so great a saturation of the air as might be obtained if this did not happen. But, however, we can make our hydrocarbon warm, and then we can charge air with a large quantity of it.

But suppose a gas so composed be passed through a series of mains, through a large town, when the weather is cold, the gas or air would take up a certain quantity of the hydrocarbon at a certain temperature, so as to make it fairly luminous when it was burnt; but if that hydrocarbon gets deposited by cold, as it will, then the thing must be a partial failure. When air gas was tried it did fail, and that is still the case, but that is no reason why some modification of it should not be used. Suppose there were a reservoir in each house containing some hydrocarbon, and air were forced through mains to it, and the hydrocarbon was taken up upon the premises, it might be then used, but there would still be this other difficulty to overcome, the vaporization, and some appliances would have to be added to the apparatus, in order that the hydrocarbon might be kept at a sufficient temperature to be taken up in sufficient quantity by the air passing through it, in order to get out of it the proper quantity of illumination. The lecturer said he did not despair yet of seeing this method employed.

But there is another method that is said to be doing very fairly at Chichester. Superheated steam is passed over red-hot carbon in a tube in the furnace, and a mixture of hydrogen and carbonic oxide is thus obtained, which is afterwards passed through a liquid hydrocarbon, when it takes up some of the liquid hydrocarbon, and then it will burn with a luminous flame.

If hydrogen gas be passed through petroleum oil, the petroleum oil is taken up by the hydrogen gas, and will burn with a luminous flame, which gives a large quantity of smoke. A considerable quantity of the liquid hydrocarbon is, however, deposited from the gas upon passing through a cooling medium. That experiment will illustrate what has been before said, that if the air charged with the hydrocarbon be submitted to a low temperature, a certain amount of hydrocarbon oil is sure to be deposited. If coal gas be passed through petroleum oil, on lighting it the flame is much more luminous, and deposits a very large quantity of soot on a saucer held in the flame. That is a very important point, and important results might be got from studying this action. In the first case we have gas containing carbon, hydrogen, carbonic oxide, and olefiant gas—that is, coal gas. That passes through the tube, and burns with a luminous flame. When we add to it a hydrocarbon it takes up some of the hydrocarbon in suspension, and the flame becomes more luminous and smoky, showing there is a very large quantity of carbon in the material burnt, which carbon cannot be fully burnt, or anything like fully burnt. But directly there is a greater supply of air introduced, as in the Bunsen burner, there is a more perfect combustion of the carbon of the coal gas, and of the carbon of the hydrocarbon with which the coal gas was charged. Experiments were performed some time ago with hydrocarbons for the purpose of making coal gas more luminous, but they so far failed that the material has never been brought into general use. But there is a very large field for inventors to work upon, in giving greater luminosity to coal gas.

Another point is, that if a certain quantity of the carbon and hydrogen of coal gas burn for a certain space of time, the carbon and hydrogen in burning must give out a certain amount of heat, and no more; and if more carbon be put to it, and more hydrogen, then that carbon and that hydrogen which is burnt must give out an additional quantity of heat. The Silber lamps and Mr. Dietz's lamps are very successful and good lamps, so far as the light goes, but they are excessively hot; there is an enormous amount of heat given out in the combustion, because the hydrocarbon oils are very rich in carbon. So with those fires that are arranged with lumps of asbestos, or fireclay. You turn on the gas and have a fire in a very short time; it is a very convenient and very agreeable substitute for, though it is not so good as, an ordinary fire; but they have certain merits. In these coal gas is burnt, and it would be well for those connected with the manufacture of these fireplaces to turn their attention to this fact, that the proportion of air and coal gas in most of those stoves is not properly regulated, for upon the lumps of asbestos a considerable deposit of unburnt carbon is formed. This ought not to be. A certain amount of heat is lost by the deposit of carbon on the fireclay. If the coal gas were passed, prior to its being burnt, through some of these liquid hydrocarbons heated in a vessel at the side, and projected upon the fireclay, and if it were properly apportioned to the quantity of atmospheric air allowed to pass in with it, a very high heating power would be obtained, and the advantage of it would be that the heat would be stored up in the fireclay, and would then be given out again into the room gradually. Experiment has proved that by adding hydrocarbons you do not intensify the heat of the flame at any given moment. Yet in the combustion of the coal gas, together with the hydrocarbon, you do produce a larger amount of heat, and if the heat be stored up in such a reservoir as lumps of fireclay, that heat is given out in the room, and a very economical use of fuel effected. In nearly all these experiments the mistake is that a sufficient quantity of air is not projected along with the hydrocarbon. People allow the natural draught to do it, but the natural draught is not always sufficient, therefore some kind of blowers should be used. Again, if the air be sent in cold its effect will not be nearly so great as if the air be sent in at a higher temperature, so that when it comes into contact with the hydrocarbons it will be at a temperature somewhat approaching that at which they are burning.

A word or two about the luminosity of flame. The flame of hydrogen gives no light, but directly a hydrocarbon is added to it it gives light, but the flame is very smoky. If we examine the flame of a candle carefully we shall find the yellow portion of the centre, with the little blue portion below, and if we look very carefully we shall see a sort of halo all around, which can hardly be called luminous, but is a flickering sort of halo; that halo is where the most perfect combustion in the flame of carbon takes place. In the centre of the flame there is imperfect combustion of the carbon, and the carbon gets set free. The carbon which is set free in the centre of the flame (from the marsh gas it may be, or most certainly from the olefiant gas, and from the hydrocarbons in the gas), that carbon in a state of very fine division becomes incandescent, and so gives light. The oxyhydrogen light does not give much light; but if a piece of lime be put into it we get a brilliant light, because the lime becomes incandescent. If we take a piece of iron it gives no light, but if we put it into the fire and heat it to a white heat it gives a light. The presence of solid matter therefore appears to be essential to the light-giving properties of our ordinary illuminating flames. There have been experiments performed by Professor Frankland, from which he says that the presence of solid matter is not absolutely essential, but probably neither he nor any one else would at all doubt the fact that the luminosity of ordinary flames is owing to the presence of solid particles heated to incandescence. What we want to do to make our flames give a proper light, and to economize our fuel to the fullest extent, is to add a proper portion of the oxygen of the air to the quantity of the hydrocarbon being burnt.

Coal is not the only source from which we can obtain a luminous gas. We can obtain it from any animal or vegetable substance. Any organic substance containing carbon and hydrogen, when heated out of contact with atmospheric air, will give off a gas similar to coal gas.

From whatever source we get gas its main constituents are the same. Coal gas contains certain gases which are useful for illuminating purposes, and also certain gases which are not useful, but, on the contrary, hinder the illuminating power of those which should give light, or contribute to give light. First of all, coal gas contains hydrogen; it also contains marsh gas, olefiant gas, and carbonic oxide gas. All these four gases are useful for illuminating purposes. Hydrogen by itself gives no light, and carbonic oxide gives no light, and marsh gas gives no light, but olefiant gas gives a light, owing to its containing a large quantity of carbon. Of what use, then, are those other three gases? One use is that they hold in suspension the hydrocarbons, for coal gas, if it has good illuminating power, especially that which is made from cannel coal, contains a very large quantity of hydrocarbons. It contains a hydrocarbon called butylene, and also napthaline, a solid hydrocarbon, and other hydrocarbons. Coal gas will take up hydrocarbons in small quantity, and keep them in suspension in spite of any freezing mixture through which it might pass. And these hydrocarbons assist in giving light. Gases that take them up in suspension assist in giving heat, for the carbonic oxide and the marsh gas flame and the hydrogen flame are all very hot, and they also decompose the hydrocarbons and deposit the carbon in the flame, and the carbon becoming incandescent gives light. Then there are certain impurities in coal gas, impurities which do not exist in gases made from such substances as oil. One of the greatest impurities in coal gas is sulphuretted hydrogen. Some of the hydrogen of the coal unites with carbon to form marsh gas, and with some of the carbon to form olefiant gas, and some of the oxygen and carbon to form carbonic oxide, and some of the hydrogen unites with the sulphur and forms sulphuretted hydrogen, and some sulphur unites with some of the carbon to form a liquid called bisulphide of carbon. The impurities, then, in coal gas are very numerous, and among them is ammonia.

(*To be continued.*)

Parliamentary and Law Proceedings.

Alleged Adulteration of Spirits.

At the Borough Police Court, Hanley, Wm. Jackson, manager of the Sea Lion Hotel Vaults, has been charged with having sold to one John Bamford, one of the borough food inspectors, a pint of whisky, which was adulterated in such a manner as to be injurious to health. Mr. Bamford stated that he purchased the whisky in question on the 13th of September, after telling the manager of the vaults, Mr. Jackson, that it was for analysis. The analyst's certificate was handed in, which stated that the sample in question was adulterated with wood spirit, methylated spirit, and also bore traces of lead, which made it injurious to health. Bamford was severely cross-examined, with a view to showing that a considerable time had elapsed between the time of receiving the sample and forwarding it to the analyst, and that in the meantime it might have been tampered with. The Bench held the objection as to the irregularity in not declaring the liquor bought for purposes of analysis fatal to a conviction, and dismissed the case.

Thomas Knot, landlord of the Royal Oak Inn, Stafford Street, was then charged with selling, as pure, a pint of gin, which the certificate of the county analyst stated was adulterated with water, impure spirit, and bore traces of lead, and was so adulterated as to be injurious to health. The objection in the former case was held to be fatal in this one, and defendant was discharged.

There where four other charges of adulterations against publicans, but after the above decisions the informations were withdrawn.—*Brewers' Guardian.*

Action by an Advertising Agent.

In the Court of Exchequer, at Westminster, on Tuesday, November 10, before Baron Pollock and a common jury, there was tried the case of Crook *v.* Steele, an action for breach of contract brought by Messrs. Crook and Co., advertising agents at Brompton, against Messrs. Steele and Marsh, chemists, of Bath. The plaintiffs sent one of their circulars to the defendants, asking for authority to advertise in a series of almanacs and directories certain vegetable pills. After some correspondence the defendants assented to the advertisements being put into 200 of these various almanacs aud directories, a list of which had been furnished by the plaintiffs. The agreement was to take half the amount of payment in goods and the other in cash; and the declaration alleged that the defendants had committed a breach of that agreement by refusing to give either goods or cash. The defendants denied that allegation, and said that the advertisement had not been put into the number of publications agreed upon, pleading never indebted. Mr. Palmer appeared as counsel for the plaintiffs, and Mr. Huddlestone, Q.C., for the defendants. In the course of the examination of the plaintiff Crook, the learned Judge took exception to the alleged contract being on unstamped paper, that objection being fatal to the case unless the plaintiff consented to pay the penalty. The learned Judge suggested to the plaintiff Crook and his counsel the propriety of considering whether he should pay the penalty or not under the circumstances. After some consultation with his client, the counsel for the plaintiff consented to a nonsuit.

Poisoned by a Medicine.

The *Lancet* says, an accident that recently occurred at St. Bartholomew's Hospital affords another illustration of the impropriety and the danger of leaving poisonous drugs, or, in fact, medicines of any kind, so exposed in the wards that patients may help themselves. In several of the metropolitan hospitals the medicines of the patients are left on a locker at the side of the bed, or are placed on the table in the centre of the ward. As a rule, no trouble or inconvenience arises from this practice, but the consequences may be serious if a delirious or an anxious patient should take an overdose of medicine of a poisonous nature. Still more objectionable than this practice of allowing medicines to lie about is that of leaving poisons, strong acids, and chemical tests on open shelves, especially when the bottles containing them are promiscuously mixed up with those containing lotions, liniments, and house medicines for the use of the patients. Poisonous liquids should not only be placed in specially prepared bottles, but they should be put in a secure place apart from the medicines of the patients. The hospital authorities cannot too speedily attend to this question, and so arrange matters that accidents cannot occur except from gross carelessness and neglect.

Sudden Death of a Chemist and Druggist.

Shortly after one o'clock, on Sunday afternoon last, Mr. Thomas Mittchell, chemist and druggist, was found dead in his bed, at his residence in West Street, Gravesend, Kent. The cause of death is stated to have been apoplexy.

Obituary.

DR. F. ROCHLEDER.

In Vienna, on the 5th of this month, died Dr. Frederick Rochleder, the successor of Redtenbacher in the University Chair of Chemistry. The deceased *savant* was one of the most successful teachers in the school, and enjoyed among his colleagues a distinguished reputation for his numerous contributions to science. Rochleder was the son of a Vienna apothecary, and was born in 1819. There he completed his studies, and graduated as Doctor of Medicine in his twenty-third year. While still a student he was an ardent lover of chemistry, working diligently in the laboratory of Redtenbacher, the then assistant to the Chemical Professor in Vienna. At the same time Liebig was making the little university town of Giessen a centre of attraction to all young chemical aspirants throughout the world, and in 1842 Rochleder was swept into the stream. After three years' zealous study under the great teacher he was appointed Professor of Chemistry in the technical academy at Lemberg, and such was the popularity of his lectures that there was barely standing room for his audience. In 1849, on the removal of Redtenbacher from Prague to Vienna, Rochleder succeeded him in the Bohemian School, where he worked indefatigably for twenty-one years, till Redtenbacher's death, in 1870, summoned him to the Chemical Chair in Vienna. In the laboratory recently erected beside the Chamber of Deputies, Rochleder drew around him enthusiastic auditors of his lectures and eye-witnesses of his experiments; and such were his energy and devotedness that his constitution gave way, all too early for science and for the Vienna School. He died, as already stated, on the 5th inst., and was followed to the grave on the 7th by a long train of sorrowing friends and pupils. Phyto-chemistry was his favourite department, in the science of which he was so accomplished a master, and formed the subject of two elaborate treatises from his pen, published in Vienna and Leipzig respectively in 1847 and 1854. His researches in aromatics and similar articles of luxury, in the chemistry and physiology of plants, his contributions to Liebig's 'Annalen,' and his papers in the 'Transactions' of the Imperial Academy of Sciences are so many proofs of his acute intellect and unwearied industry. In 1848 he was elected a Fellow of the Academy, a Member of the Bohemian Association of Sciences at Prague, of the Frankfort Physical Society, and of the Imperial Association of Naturalists at Moscow. Rochleder was, we may add, something more than a *savant:* he was an active and philanthropic citizen, inheriting the virtues of the good old apothecary, his father, and the suavity of demeanour and address of his greatly admired mother. His loss will long continue to be felt in the Kaiser city, of which he was at once a brilliant ornament and an able support.

DR. EDWARD SMITH, F.R.S.

The death has been announced of Dr. Edward Smith, F.R.S., Assistant Medical Officer to the Local Government Board. Dr. Smith had acquired a considerable reputation as the author of various treatises on subjects connected with food and sanitation. Perhaps that which attracted the widest attention was a paper read before the British Association at Brighton, in which he disputed the alleged virtues of extract of meat, in such a manner as to call forth a reply from the late Baron Liebig. The discussion was continued in the daily papers, and the latest communication from Baron Liebig on the subject was published a short time before his death in these columns. Since that time, a work by Dr. Smith, on "Foods," has been published, which has reached a third edition; also a "Manual for Medical Officers of Health," and a "Handbook for Inspectors of Nuisances."

Dr. Smith held the degrees of M.D. (1843), and LL.B., and B.A. (1848) of the University of London. He was also a corresponding member of the Natural History Society of Montreal and of the Académie des Sciences et Lettres de Montpellier.

Notice has been received of the death of the following:—

On the 23rd October, 1874, Mr. Henry James Woolley, Chemist and Druggist, of Ross, Hereford.

Reviews.

The Specific Action of Drugs on the Healthy System: An Index to their Therapeutic Value, as Deduced from Experiments on Man and Animals. By Alexander G. Burness, M.B., C.M. Univ. Aberd., and F. J. Mavor, M.R.C.V.S. London. 1874.

"To point out to their conjoint work that the full therapeutic value of each substance—its value in the treatment of disease—is only to be determined by ascertaining the symptoms produced and the parts influenced by each substance when introduced into the healthy animal economy; and that this is to be done by careful observation of cases when a substance has been introduced either by accident or intention, the quantity taken in each case, as well as the form and mode in which introduced, being also noted"—such, say Messrs. Burness and Mavor in the preface, is the object of the treatise before us.

The first three chapters are mainly theoretical. Every disease is shown to have certain primary, yet peculiar, symptoms, caused, in the majority of cases, by some unknown agency affecting specific tracts or viscera in a specific manner; while there are also shown to be certain known agents exerting a primary influence on certain parts, and producing symptoms peculiar to each when introduced into the healthy body. Chapter 2 indicates that the specific action of each substance thus obtained is the key to its therapeutic value—to its physiological action on the one hand, and to its restorative action on the other; while the third chapter treats of the form and mode of administering substances with a therapeutic object. A few remarks in chapter 4 on temperature in health and disease conduct us to the really practical portion of the work—that on the specific action of drugs. All non-nutrient agents, Messrs. Burness and Mavor contend, pass out by one or other of the eliminating tracts, *en route*, by their physical, chemical, or dynamical properties.

In all this there is little or nothing to object to, except that it is not very new, and is introduced with a pomp of diction justifiable, if at all, only by the announcement of a novel and startling discovery.

The hypodermic administration of drugs, the authors maintain (incommon, we may add, with every intelligent practitioner), has the advantage, especially in acute disease attended with pain, of producing a rapid physiological effect, without deranging the digestive organs or exposing the drug to alteration by the digestive fluids. Morphia, atropine, strychnia, aconitine, quinine, so administered, are most certain and most readily efficacious. The case mentioned by Mr. Surgeon-Major O'Leary, of the Indian army, in which a man, moribund from sunstroke, revived after quinine hypodermically administered, is one not mentioned by Messrs. Burness and Mavor, but highly confirmatory of their doctrine.

By way of antidote to poisonous drugs, hypodermic introduction of remedies is also more rapid and more certain than exhibition through the stomach. Take, for instance, morphia, and its counter-agent strychnia. Half a grain of acetate was given by Messrs. Burness and Mavor to a dog, and in two hours the full physiological effect of the drug having been obtained, $\frac{1}{16}$ of a grain of strychnia was administered, and in forty minutes the dog had quite recovered. This counteraction of morphia by strychnia, and *vice versâ*, was exemplified in repeated experiments by the authors, the hypodermic mode of administration being convincingly proved to be the best in all respects.

The volume is of as much veterinary as medical interest, a fact which must absolve us from entering more fully into the experiments described in it. Even in this department it can be justly characterized as only a contribution to the better understanding of drugs and their action. We expect higher things from Dr. Brunton's promised treatise, more rigid, as he undoubtedly is, in his scientific training, and more cognizant of the later German and Italian research. On the whole, however, Messrs. Burness and Mavor have worked honestly and intelligently, and their work will repay perusal, if not always for established fact at least for suggestive theorizing.

The Forest Flora of North-West and Central India; a Handbook of the Indigenous Trees and Shrubs of those Countries. By J. Lindsay Stewart, M.D., and Dietrich Brandis, Ph.D. London: W. H. Allen and Co.

This is a book of 608 pages of closely printed valuable matter, published by authority of the Indian Government. It is, in short, a type of what all our colonial Floras ought to be, for the botanical descriptions are concise, the details of distribution are full, the vernacular names are likewise fully given, and the uses of the plants are comprehensive. Though the book is essentially a *Forest Flora*, and its object, as Dr. Brandis says in his preface, "entirely practical," being intended as a handbook "to enable forest officers to acquire a knowledge of the trees and shrubs in the forests, and of the climbers, epiphytes, and other plants which impede and injure the growth of trees," it is, nevertheless, a book that should be equally as much in the hands of those interested in Indian vegetable products who stay at home as those actually resident in the country itself, though to the latter, especially those in the forest service, the book will be invaluable.

Though the title at a first glance seems to disqualify the book for a notice in our pages, we are sure no apology is needed for introducing it here, for it treats of forest produce in the widest sense. In view of objections being taken to the plan of the book or of its bulk, Dr. Brandis says: "Such objections will be supported by those who hold that the sole legitimate duty of forestry in India is to provide fuel and timber, and that the forester has no concern with bark, lac, gums, resins, caoutchouc, wax, oil, dyes, fruits, and other marketable products of trees and shrubs. Such views will continue to be maintained until it comes to be acknowledged that the principal aim and object of forest management in India is the formation of public estates, to be managed so as to secure large benefits to the country of an indirect nature, as well as a continuous and increasing yield of all descriptions of forest produce necessary to supply the requirements of the people and their export trade."

With regard to the plan of the book, it is almost identical with that of the colonial Floras which have been issued of late years from Kew, but with the addition, as we have before said, of a great deal of reliable information on the uses and distribution of each species.

An example will illustrate better the nature of the book than any description of our own. Thus, under the genus *Tamarindus*, we find a generic description of the Tamarind (*T. indica*, L.), followed by references to botanical works in which it has been described, then the vernacular names, and a short specific description; after which we read that it is—

"Cultivated throughout India and Burmah, save in the North-Western Punjab; trees are found as far as the Jhelam, but the fruit does not ripen West of Amballa. In the Central Provinces, the Bassi forests of Meywar, and in many parts of South India the tree is found self-sown in waste and forest lands, but there seems no sufficient evidence of its being originally indigenous to India. Wherever I have seen it it has been in the vicinity of existing or abandoned cultivation. The tree is cultivated in the tropics of both the new and old world, and is believed to be truly indigenous in tropical Africa (Oliver, *Fl. Trop. Afr.*, ii., 308). Never leafless, the foliage changes in March and April; fl. May, June; fruit ripens 7-9 months after flowering.

"A large tree, attaining 80 feet or more, with a short thick trunk (25 feet girth not rare), often ridged, with a magnificent, broad, and high, shady crown. Bark ½ inch thick, dark grey, brownish to blackish, tesselated by longitudinal fissures and cross cracks. Wood yellowish white, hard and close grained, the outer and younger wood a little softer, but the sapwood not defined by a concentric line, such as we find in the wood of teak, sissoo, sal, bija sal, oak, and other trees. Heartwood small near the centre, outline very irregular, dark purplish brown, projecting into the yellowish outer wood, with radiating ramifications, so that planks frequently show alternate layers of light and dark coloured wood. Annual rings indistinct, medullary rays very numerous, very fine, pores moderate, equal, uniformly distributed, each pore or group of pores surrounded by lighter coloured tissue. . . . . Polishes well, and, though extremely hard and difficult to work, is highly prized for many purposes when a tree past fruit-bearing is felled. Naves and other parts of wheels, mallets, planes, tent-pegs, furniture, rice pestles, oil-presses, and sugar-crushers are made of it; it is an excellent wood for turning. The heartwood is very durable. The outer wood is apt to be eaten by insects.

"Mainly cultivated on account of the acid pulp of the pod; there are several kinds, with sour, sweetish, and red pulp. The pulp contains citric, malic, and tartaric acid; large quantities are imported into England from the West Indies. It is officinal as a laxative and refrigerant (Pharm. Ind., 64). The seeds (*Chincha*) are used in native medicine; pounded, they are eaten in times of scarcity, and the powder mixed with gum makes cement."

At first sight of the book, it would appear that the *Forest Flora* was scarcely up to time in the identification of species furnishing medicinal and other products, the result of recent investigations, for almost at the commencement we find *Cissampelos Pareira* described as producing the *Radix Pareiræ* of the druggists, but this is fully compensated for in the "additions and corrections," where we read that "the botanical origin of the various stems and roots known as *Pareira Brava* and *Radix Pareiræ* has lately been investigated by Mr. D. Hanbury (*Pharm. Journ.*, 1873, Aug. 2nd and 9th). The result is that the drug is not yielded by this plant (Cissampelos). One of the best kinds is the root of *Chondodendron iomentosum*, Ruiz and Pavon, a large climber of the same family in Brazil, with bunches of large oval berries." In the same way, with regard to the species of *Boswellia* furnishing olibanum, which is used both medically and in incense in India, and is sold in the bazaars, in the body of the book, under "Burseraceæ," it is referred to *Boswellia thurifera*, of Colebrooke, but in the "additions and corrections," it is stated that "the correct name of this common and well-known tree has not yet been finally settled," and Dr. Brandis gives an outline history of its nomenclature. In the first reference (p. 62) he states that the Olibanum furnished by the tree is not identical with the "Olibanum, or frankincense, chiefly used in Europe, which is yielded by several other species of Boswellia, growing in the Somali country and on the Hadramaut hills, in Arabia, and described by Dr. Birdwood, in 'Trans. Linn. Soc.,' xxvii., III."

The book is splendidly illustrated by a separate volume of seventy quarto plates, faithful representations of the principal species referred to in the book, all of which have been drawn by Mr. W. H. Fitch, whose name is a sufficient guarantee for their accuracy.

BOOK RECEIVED.

SCIENTIFIC LONDON. By BERNARD H. BECKER. London: H. S. King and Co. 1874. From the Author.

Notes and Queries.

EFFECTS OF AMMONIA ON THE COLOUR OF FLOWERS.—Professor Gabba has been examining the effects of ammonia on the colour of flowers. It is well known that the smoke of tobacco will, when applied in sufficient quantity, change the tint of flowers; but Professor Gabba's experiments consist in pouring a little ammonia liquor into a saucer, and inverting a funnel over it. Placing the flowers in the tube of the latter, he finds that blue, violet, and purple-coloured blossoms become of a fine green; carmine and crimson become black; white, yellow; while parti-coloured flowers, such as red and white, are changed to green and yellow. If the flowers are immersed in water the natural colour will return in a few hours. Professor Gabba also found that asters acquire a pleasing odour when submitted to the fumes of ammonia. —*Garden.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE APPOINTMENT OF EXAMINERS.

Sir,—It was with very mixed feelings that I read the report of the discussion at the last Council meeting upon the election of examiners. All members of the trade will agree that such elections are of the highest importance, exercising as they necessarily do an incalculable influence upon our status. Hence it appears to me that whilst we may congratulate ourselves upon the fact that our councillors are awake to the necessity of keeping up the efficiency of the Board, there is cause for regret that they do not propose to adopt a course which would fully ensure it.

In the first place, it is essential that the Board should at all times command the respect of all students, and, indeed, of the trade at large. Can this be attained without giving a certain degree of stability to the Board, and to this stability is not the proposed ballot most inimical? To me it appears derogatory that a gentleman who has been called upon to perform such important duties should have to submit to an annual ballot.

I would suggest that the examiners be elected for a period of five years, except at the outset, and that three should retire annually by rotation, but be eligible for re-election.

Further, it would be well to get rid of the idea of "candidateship" for the office. This could be done if the members of the Council would look around, and having selected a certain number that they, as a body, considered eligible, to obtain from such gentlemen permission to choose (not elect by ballot) from them and the retiring examiners the three required to fill up the Board.

I am aware that there is little novelty in the last part of the scheme, but I attach some importance to the primary selection being an act of the Council collectively.

We should then have our examiners chosen in such a way as to exclude any idea of favouritism, and the fact of their election being for a specified term would give them that degree of independence which is necessary to render their position complete.

To those who say with Mr. Greenish that an examiner too rapidly falls into a groove, I would reply with Mr. Schacht, "that the duty of examining involves duties which are learned by experience."

E. NUTHALL.

Bank Plain, Norwich, November 17, 1874.

PHARMACEUTICAL EDUCATION.

Sir,—Reading Mr. A. R. Willron's communication in your impression of the 7th inst., I am constrained to ask permission to encroach upon your valuable space, and endeavour to console his injured feelings.

Well may he inquire what the poor unlucky Associates have done to be so unceremoniously recommended to become grocers. But, although I am an Associate myself, I cannot say I altogether differ from Mr. Proctor. He evidently means to show that if you remain an Associate, you are obliged to countenance those cheats, or whatever else you have a mind to designate them, who have managed to win the prize without the labour of the race; as not a few most undoubtedly do, to whom he reverts in a former part of his letter.

In my opinion, a man, if he worked conscientiously, would not rest until he had surmounted all obstacles, even to the passing of the Major examination, which too many unfortunately regard as an expensive, unnecessary, and unremunerative distinction.

It will be asked, how if you cannot afford the expense? I will only answer by directing their attention to Mr. Proctor's advice to "turn grocer," or some trade where there is not so much outlay required. In setting up for oneself, one surely ought to be able to spare the sum necessary for the Major, and I dont think Mr. P. means to urge the absolute necessity of passing it until about to enter business on one's own account. The only remedy I can see to reducing the detestable practice of cramming is to make the Major also compulsory, and I trust the day is not far distant when the step will be taken. It must come to it in time. I am sure there is no lack of men ready and willing to endorse what I have said, but at the same time there are but too many who will cry with indignation against it, as another unjust and dishonest means to improve our position. But I would beg them to remember that a serious disease requires severe remedies, and it is generally the most effectual medicines which are the most unpalatable.

Nor do I quite understand your correspondent from Truro, who declares that the "nefarious policy of educational demands" is instituted in order to cut off men from an accustomed mode of subsistence.

I think it is a matter rather to be regretted that some of those "educated men of mature age and sound judgment," of whom he speaks, did not take the opportunity of pointing out to our legislators, when about to pass the Pharmacy Acts for the better protection of the public against accidents, arising from ignorant men dealing in poisonous substances, what a measure *contra salutem publicam* it was.

I confess that if the letters in your impression of the 7th indicate the feeling of chemists in general on the important subject of pharmaceutical education, I don't exactly see how they can expect their trade to rank as an "art," and more especially as a "science," as Mr. Willron seems to be under the impression it is.

They might remind one of a weathercock, which at one gust of wind unite in crying for an improved position of the trade, while the next sends them flying round for the desirability of admitting all the dunces who cannot pass such a simple test as the Preliminary or Minor examination. I should only assure them in conclusion that if they were to secure the admittance of the much-to-be-pitied unsuccessful candidate without the trouble of an examination, I am rather afraid they would have to abandon their high-flown aspiration of ranking as a profession.

M. C. ATKINSON.

Queen's College, Galway, Ireland, November 15, 1874.

CALAMINE.

Sir,—The note which you appended to my communication upon calamine powder has puzzled me, in common with many others, very much. Firstly, you refer to "a note" by Mr. Reynolds, written five years ago, and remark that "the defect pointed out by Dr. Fox arises from the nature of the material used," whereas I lay the greatest stress upon the mode of preparation of the calamine powder. Secondly, you add "probably (!) the physician's object would be best obtained by using an artificial (!) carbonate of zinc, with just enough red oxide of iron to give it the correct tint;" whereas I emphatically state that "the colour should not be artificially mixed," and "that calamine powder should be real calamine powder."

I ask for true calamine powder, and you offer me an artificial preparation—a "stone" for a "fish." You will not be surprised that I decline to accept it.

TILBURY FOX.

November 18, 1874.

[*** As Dr. Fox declines to accept our suggestion that the use of artificially prepared carbonate of zinc, with just enough "red oxide of iron" to give it the correct tint, would probably be the best means of attaining the physician's object when he prescribes calamine, and since he declares that he is "puzzled" by this, we may explain that our suggestion was instigated by Dr. Fox's statement that Mr. Martindale had sufficiently explained the special reason for the use of calamine together with oxide of zinc. If that explanation be sufficient, this use of calamine would appear to belong more to the cosmetic art than to therapeutics. In that case, since the grey, green, or brown colour of calamine is due to the admixture of carbonates of iron, manganese, etc., in accidental proportions, we should be disposed to consider it a somewhat barbaric article of materia medica, and should incline to the opinion that a pure carbonate of zinc, appropriately coloured, would be preferable to a material of such variable composition, colour, and texture as native calamine, and it would, we believe, be more likely to possess the characters which Dr. Fox regards as desiderata.—ED. PH. JOURN.]

GLYCERINE JELLY.

Sir,—I notice in your Notes and Queries an inquiry respecting glycerine jelly, I presume from a student. The formula given in answer to the inquiry I believe would not be found satisfactory, and students generally have not time to spare to be floundering about in making unsuccessful trials in a matter of this kind, and having great sympathy with those who try, but for lack of help don't succeed, I have much pleasure in sending to the Curator of our Museum one dozen bottles of glycerine jelly, and half a dozen dammar varnish, for the use and benefit of such students connected with the Society as may require either one or the other.

For all fresh vegetable or mineral tissues no medium is so good or so convenient. The dammar varnish is used for either fixing the covers or as a medium for mounting, instead of balsam.

THOS. RIMMINGTON.

November 9, 1874.

[*** Our correspondent is correct in saying that the formula as it stands on p. 379 might not give a satisfactory result, as directions for the clarifying of the gelatine by means of albumen were accidentally omitted. With this addition, we are informed the recipe is a very good one. See also an article on the subject by Mr. Pocklington, at p. 401 of the present number.]

EARLY CLOSING MOVEMENT.

Sir,—As the subject of early closing is again brought before our notice, I, as an employer, hope and trust that all the chemists will now unite and endeavour to shorten the hours of business. I am ashamed to say in this neighbourhood we do not close until 11 p.m. About three weeks since a gentleman of known repute undertook to call upon all the chemists in his immediate district, and, as a result, one and all agreed to close at 10 p.m. That movement, I am sorry to say, only lasted a fortnight, one of the number (one black sheep in every flock) withdrawing, his excuse being too simple to mention. I am convinced that earlier closing would be a step in the right direction; it would tend to give our young men time for study and recreation, and to throw off that odium which now exists; and it would shorten the mental anxieties as well as the physical labour of business. I trust one and all will join in promoting the cause.

CURA UT VALEAS.

London, November 16, 1874.

"DISSATISFIED YOUNG MEN."

Sir,—Permit me the use of your columns to inform those gentlemen who are so fond of writing to you about the long hours, the small remuneration, and other *désagrémens* incidental to the drug business, which I fear are inseparable from the practice of pharmacy, that the Rev. Dr. M'Auslane, the pastor of the Finsbury Chapel, preached on Sunday evening last a special sermon—one of a series—on the subject of "Dissatisfied Young Men." It is probable that many among us would like to hear the concluding discourses, and for the benefit of those who were not able to be present at the opening lecture, I would mention what the Rev. Doctor said:—

"The question as to what was true satisfaction was answered by the Apostle when he said, 'I have learned in whatsoever state I am, therewith to be content.' Of all who ought to be most satisfied were the young men who lived in the great metropolis of the empire. They had health and strength, vigour and elasticity, were buoyant with hope, with few cares, burdens, or trials. Yet a great number of them were as restless as the ocean. They were dissatisfied with their homes, their situations, their friends, their country, and, worst of all, with themselves. This was a terrible evil, and would continue to grow unless they struck at the very root from which it sprang, and removed it."

As a chemist who has been in business for himself twenty years, I myself am too apt to compare my profession unfavourably with that of others, and when it is my "Sunday evening out" I think I shall wend my way to Finsbury Chapel, and try and get a little comfort from Dr. M'Auslane.

Dissatisfaction with one's calling in life is a very old complaint. Horace well notes it when he says—

> "Qui fit Mæcenas, ut nemo, quam sibi sortem
> Seu Ratio dederit, seu Fors objecerit, illa
> Contentus vivat, laudet diversa sequentes."

"A DISSATISFIED MASTER."

London, November 17, 1874.

H. Hyne.—We were aware that Ung. Plumbi Carb. is sometimes supplied when "unguentum" is asked for, but did not think the custom sufficiently general or commendable to recommend you to follow it.

"*Another Examined Assistant.*"—Our correspondent was referring to the utilization of unoccupied time, but, according to your description, that is a commodity with which you were not troubled at the place you mention. The two grievances entirely differ, and we prefer to limit the discussion at present to the former, as being the more pertinent to pharmacy. Surely a little energy on your part would, in less than two years, have put you into a better position than one where, after being fifteen hours behind the counter, you were required to fill up the remainder of the evening in "rolling a few pills."

W. E. Smithies.—You are recommended to consult your solicitor on the point. We do not think the practice of prescribing over the counter is one that should be countenanced by pharmacists in any way.

J. Horncastle.—We are obliged to you for your communication. The paragraph had been already marked by us for insertion. We shall take an early opportunity of giving a résumé of Kolbe's paper.

S. Wylde.—The first form is correct, but the second is perhaps more commonly used. The latter requires, however, some phrase to be understood which shall become the direct object of the transive verb.

B. P.—(1) We think not. (2) We can give you no better answer than to repeat the sentence in the examiners' regulations which raises your doubt. (3) Yes.

T. C. B. K.—We know of no book treating of the subject, and it is one of which a knowledge can only be acquired practically.

A Dispenser.—The slight taste of the salt may easily be covered by means of a little bitter infusion—gentian, for instance.

D. H.—Simple solutions of the respective colours.

J. A. Butler.—In using soda as a precipitant it is more difficult to remove the alkali.

F. O. B. Marchant.—According to the Preface to the British Pharmacopœia, the avoirdupois ounce would be implied, though it is just possible the apothecaries' might be intended.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Hayes, Mr. G. M. Smith, Mr. Pitman, J. F.

NEW METHOD OF PREPARING SALICYLIC ACID, AND ITS PHYSIOLOGICAL ACTION.*

BY PROFESSOR KOLBE.

Artificial oil of gaultheria, in which the percentage of salicylic methyl ether is very variable, is too costly for the preparation from it of any considerable quantity of salicylic acid. Professor Kolbe experimented, therefore, whether a method formerly described by Lautemann and himself, for the preparation of artificial salicylic acid ($C_7H_6O_3$) from carbolic acid by the joint action and carbonic anhydride and sodium, could be simplified and improved so as to allow of salicylic acid being obtained at a more reasonable cost. This object he has succeeded in attaining. After numerous experiments, Professor Kolbe finally adopted the following method:—In a strong crude soda-liquor of known strength is dissolved a sufficiency of previously melted crystals of carbolic acid to saturate the caustic soda. The solution is then evaporated in an iron capsule, and by means of stirring brought to a dry powder. The sodium carbolate so obtained is gradually heated in a retort to a temperature of from 220° to 250° C. in a continuous current of dry carbonic anhydride. The reaction is ended when at the above-mentioned temperature no more carbolic acid passes over. It might have been expected that, the reaction going forward in this manner, a molecule of carbonic anhydride would be introduced into the molecule of sodium carbolate, and thus a molecule of sodium salicylate be formed:—

$$C_6H_5O\,Na + CO_2 = C_6H_5O\,COO\,Na.$$

This, however, is not the case, only half the sodium carbolate being converted into salicylate. The reaction proceeds according to the following equation:—

$$\begin{matrix} C_6H_5ONa \\ C_6H_5ONa \end{matrix} + CO_2 = C_6H_5ONa\,COO\,Na + C_6H_5OH.$$

In two molecules of sodium carbolate under the influence of carbonic anhydride an interchange of H and Na takes place, so that on the one hand carbolic acid, and, on the other side, disodic carbolate result, which latter then combines with the carbonic anhydride to form disodic salicylate.

$$C_6H_5ONa + C_6H_5ONa = C_6H_4NaONa + C_6H_5OH$$
$$C_6H_4NaONa + CO_2 = C_6H_4ONa\,COO\,Na.$$

From this salt the salicylic acid is separated by means of hydrochloric acid.

The special physical and chemical properties of salicylic acid are well known, but its physiological action almost not at all. The knowledge that salicylic acid could be so easily prepared from carbolic acid and carbonic anhydride, and that it could be again decomposed by heat into the same bodies, led Professor Kolbe to think that, similarly to carbolic acid, salicylic acid might stop or entirely prevent fermentative and putrefactive processes, and operate generally as an antiseptic. This expectation has been confirmed. Mustard meal, which, in a few minutes after being mixed with warm water gave off a strong smell of mustard oil, formed with water a scentless mixture when a little salicylic acid had been previously added. No fermentation was set up by yeast in a solution of grape sugar to which salicylic acid had been added; whilst in a sugar solution already in fermentation the action stopped after the addition of some salicylic acid. The preservative influence of this acid upon fresh meat is referred to on another page.

The following, among other experiments, in their results illustrate the physiological action of salicylic acid:*—

Solution of amygdalin mixed with emulsion of sweet almonds developed no smell of bitter almonds if some salicylic acid were added.

Beer, to which salicylic acid in the proportion of 1 in 1000 was added, was thereby prevented from being spoiled by fungoid growth.

Fresh pure cow's milk mixed with 0·04 per cent. of salicylic acid, and allowed to stand in an open vessel at a temperature of 18° C., curdled thirty-six hours later than a similar quantity of milk standing by the side of it, but containing no salicylic acid. The milk remained of a good flavour, the small quantity of salicylic acid present not being perceptible to the palate.

Some fresh urine was divided into two portions and placed in separate vessels, after some salicylic acid had been added to one portion. The urine containing the acid was on the third day still clear and free from ammoniacal odour, whilst the other portion was far advanced in putrefaction.

Professor Thiersch has investigated the antiseptic action of this acid specially in relation to surgery. He has found that as a powder, either alone or mixed with starch, it destroys for a long time the fetid odour of cancerous surfaces or uncleansed wounds, without setting up any inflammatory symptoms. A solution of 1 part of salicylic acid and 3 parts of sodium phosphate in 50 parts of water, promotes the healing of granulating surfaces.

* *Archiv der Pharmacie* [3], vol. v., p. 445, from the *Journal für practische Chemie.*

* *Dingler's polytecnische Journal,* vol. ccxiii., p. 167.

CHONDODENDRON or CHONDRODENDRON?

BY DANIEL HANBURY.

In the *Pharmaceutical Journal* for Nov. 14, it is remarked that the authors of the *Pharmacographia* prefer to write *Chondodendron*, and not as the derivation of the word would seem to require, *Chondrodendron*. The proposal to insert an r in the second syllable emanated from Mr. Miers, who, in his *Monograph of the Menispermaceæ*, states that the word was originally mis-spelt through an error in the press.

As this name, which is that of the genus to which the Pareira Brava plant has been shown to belong, may come into more frequent use than hitherto, it is well that we should know what reasons may be urged in favour of each way of spelling.

The genus made its first appearance in the work of the Spanish botanists Ruiz and Pavon, entitled *Floræ Peruvianæ et Chilensis Prodromus, sive novorum generum plantarum Peruvianarum et Chilensium descriptiones et icones*, published at Madrid in 1794. Here we find it *Chondodendron*, with the derivation explained thus—"*a granorum copia quibus arboris truncus et rami obsiti sunt.*" This is in allusion to the Greek word χόνδρος, signifying *a corn, grain, or any small roundish mass;* and is appropriate to the plant by reason of the little black warty spots that cover the bark, chiefly of the younger wood.

From such an origin, coupled with δενδρον, *a tree*, the word *Chondrodendron* would naturally result: but for some reason,—as I believe, for the sake of euphony,—the authors of the genus chose to drop the first r, and to write *Chondodendron*. That this was by no typographical error is obvious. The word occurs again and again; and though there are enumerated several "*erratas de impresion*," *Chondodendron* is not among them. Four years after the *Prodromus*, the authors published their *Systema Vegetabilium Floræ Peruvianæ et Chilensis*, in which they still retained *Chondodendron*: in fact, the name has been almost universally accepted.

Thus De Candolle in his *Systema*, published in 1818, as well as in the first volume of his *Prodromus*, which appeared in 1824, wrote *Chondodendron*; and so the word is adopted by Pöppig and Endlicher*, Lindley in his *Vegetable Kingdom* (1853), Eichler in the *Floræ Brasiliensis* of Martius, Bentham and Hooker† (1862), and lastly by Baillon in his *Histoire des Plantes*‡ (1871).

With the sanction of such an overwhelming amount of authority, I am satisfied to accept the name without an attempt at improvement. It has served for eighty years in botanical literature, and may fairly claim admittance to that of pharmacy.

* *Nova Genera ac Species Plantarum quas in regno Chilensi, Peruviano, etc., legit* . . . Lipsiæ, II. 1838.

† *Genera Plantarum*, I. 1862-68, index and p. 34.

‡ *Monographie des Ménispermacées et des Berberidacees*, 1871. 36.

SULPHOCARBOLATES.

BY GEORGE BROWNEN, F.C.S.

The sulphocarbolates having come pretty extensively into use, a notice of one lately examined and found peculiarly impure may be of interest, and prevent these salts from falling into unmerited disrepute.

The specimen was labelled "sulphocarbolate of soda;" it had a disagreeable odour, and a pink colour.

It precipitated solutions of barium nitrate and chloride, and the precipitate from a hundred grains of the so-called "sulphocarbolate," after washing, etc., left an insoluble residue of barium sulphate, equivalent to 11·5 per cent. of crystallized sodium sulphate.

That carbolic acid (?) in a somewhat loose state of combination existed in this sample was proved by heating a strong solution of the salt and condensing the vapour in nitric acid; on diluting this acid, picric (carbazotic) acid was precipitated.

Other tarry compounds, fixed and volatile—probably of the phenyl or benzene series—formed the remainder of the impurities found in this sample.

It seems probable that this salt must have been made by a careless operator from the formula given in the *Pharmaceutical Journal* for Jan., 1869, p. 429; and a few remarks on that formula may not be amiss, especially as the process requires some skill or care to be successful. Acids of known strength should be used and heated to the proper temperature to ensure combination, avoiding on the other hand an excessive heat, which would decompose the acid into tarry matters and other compounds of the phenyl series. If the carbolic acid was pure and exactly sufficient to change the whole of the sulphuric acid used into sulphocarbolic acid, then any salt required might be prepared by neutralizing the acid with the special base.

If free sulphuric acid be found in the sulphocarbolic, it might be combined with an additional quantity of carbolic acid, or removed by the cautious addition of solution of barium hydrate as long as a precipitate of barium sulphate occurred—an excess of baryta should be avoided, as barium sulphocarbolate is soluble; this, however, would not matter much if an alkaline salt was required, for an alkaline carbonate would displace barium as the insoluble barium carbonate. Pure salts might also be obtained by decomposing barium or lead sulphocarbolates with sulphates, as noticed in previous journals.

Volatile, odorous, and tarry compounds should be avoided or removed, their therapeutic value being unknown, and their presence in a definite salt objectionable.

Sulphocarbolates (at least the sodium salt) are pretty stable compounds; I do not think they are liable to spontaneous decomposition.

I admit that this is an exceptional case, possibly publicity will prevent its recurrence.

ALKALOIDAL COMPOUNDS WITH IODINE.*

BY HARRY S. BAUER.

(*Concluded from p. 403.*)

Compounds of Morphia with Iodine.

Morphine Hydriodate.—$C_{17}H_{19}NO_3,HI + 3H_2O$.—Morphine dissolved in aqueous solution of hydriodic acid forms after some time a white silky crystalline salt, readily soluble in hot water, ether, and alcohol, and difficultly soluble in chloroform. Pelletier first described this salt, but the author is unable to confirm his statement that it is soluble in cold water. Winkler obtained it in four-sided prisms, by adding two parts of acetate of morphine to one part of iodide of potassium.

Morphine Sesqui-iodide.—$2\,C_{17}H_{19}NO_3, 3\,I$.—Upon rubbing together two parts of morphine with one part of iodine the mass is coloured red-brown, and upon being heated with alcohol is entirely dissolved. Upon dilution of the alcoholic solution reddish brown crystalline plates are deposited, which are soluble in alcohol, ether, and chloroform; in cold acids they are insoluble, but become soluble upon the application of heat.

Morphine Tetra-iodide.—$C_{17}H_{19}NO_3HI_4$.—When a morphine salt was added to a solution of iodine a kermes brown precipitate was immediately formed, which was separated by decantation and dissolved in alcohol. Upon dilution of the alcoholic solution a dendritic crystallization was deposited. Finer crystals were obtained by dissolving the precipitate in solution of iodide of potassium.

Morphine tetra-iodide is soluble in alcohol, chloroform, benzol, and solution of iodide of potassium; ether and carbon bisulphide dissolve traces. Nitric and hydrochloric acids dissolve it with a fine red colour.

An iodic salt of morphine cannot be prepared; for instance, if morphine be brought into contact with iodic acid, iodine is set free by the formation of morphine sesqui-iodide. The reducing action of salts of

* Abstract of a Paper in the *Archiv der Pharmacie*, for October.

morphine upon iodic acid is very characteristic. After dilution of a morphine salt to one part in 10,000, the iodine set free by the decomposition of iodic acid may be detected by means of chloroform and carbon bisulphide. According to Lefort, the reaction is rendered yet more delicate by the addition of ammonia. All the foregoing morphine iodides when dissolved in alcohol have a brown yellow colour, and are changed by hyposulphurous acid and hyposulphite of sodium.

Compounds of Veratrine with Iodine.

Veratrine Periodate.—This salt is formed upon bringing together alcoholic solution of veratrine and periodic acid as a pitchy mass, in which, under the microscope, crystals may be detected. The author reserves further particulars.

Veratrine Tri-iodide.—$C_{32}H_{54}N_2O_8, HI_3$.—If a veratrine salt be added to a solution of iodine a kermes brown precipitate is immediately produced, which is easily dissolved by the addition of alcohol. Evaporated at a gentle heat a red-brown amorphous mass is obtained, readily soluble in alcohol, chloroform, and ether; insoluble in water and cold and hot benzol. Only traces are soluble in carbon bisulphide. If, in the evaporation, a heat above 60° C. be used, a tarry mass is produced which cannot be evaporated to dryness.

The estimation of the iodine was made by precipitation with silver nitrate; this, however, gave too high a result, some iodate being mixed with the iodide of silver precipitate.

As this compound contained hydriodic acid besides two atoms of iodine, the author treated some by shaking it with metallic quicksilver. The result was a double salt in which only two atoms of quicksilver had been taken up. The compound might therefore, perhaps, possess the following constitution:—

$$C_{32}H_{54}N_2O_8, HI \begin{matrix} / \, I \\ \| \\ \backslash \, I \end{matrix}$$

Compound of Strychnine with Iodine.

Strychnine Tri-iodide.—$C_{21}H_{22}N_2O_2, HI_3$.—This iodide appears to have been previously obtained by Herapath, who prepared it by warming one part of strychnine, dissolved in one part of alcohol and three parts of water, together with a little tincture of iodine. Upon allowing the mixture to cool spontaneously, fine six-sided prisms were deposited. Herapath attributed to this compound the formula $C_{21}H_{22}N_2O_2, I_3$. The same compound has been described by Tilden, who gave it the correct formula, but calculated it from different results.

The author obtained this iodide in violet-coloured prisms, similar to those of permanganate of potassium, upon mixing together sulphate of strychnine and solution of iodine, dissolving in alcohol the precipitate produced, and evaporating. Its very remarkable optical properties were described by Herapath. For instance, a crystal placed under the micropolariscope so that the axis is vertical to the polarized ray appears to be almost white; but if placed so that the long axis is parallel to the polarized ray it appears nearly black.

Strychnine tri-iodide is readily soluble in alcohol, with difficulty in ether, water, chloroform, benzol, and carbon bisulphide. The alcoholic solution is very unstable, whilst the undissolved compound can withstand a temperature of 135° C. Sulphuric and nitric acids dissolve this iodide with a red coloration. Strong ammonia decomposes it in the cold, as also does nitrate of silver. Alcoholic solution of the strychnine tri-iodide heated with alcoholic solution of cyanide of potassium becomes coloured, but upon cooling does not deposit strychnine cyanide, as the author expected, but the unaltered potassium cyanide. The alcoholic solution of the tri-iodide mixed with an excess of alcoholic solution of iodine, and heated in a sealed tube by means of a water-bath, yielded a compound crystallizing in black prisms, which upon admitting air into the tube was decomposed into a tarry mass, containing much free iodine besides unaltered tri-iodide. (The residue probably of a higher iodized product?)

Compound of Brucine with Iodine.

Brucine Tri-iodide.—$C_{23}H_{26}N_2O_4, HI_3$.—This compound is obtained by precipitating a solution of sulphate of brucine with solution of iodine. The voluminous red brown precipitate is washed by decantation, and dissolved in a sufficient quantity of alcohol. After slowly cooling, the solution gives a crystallization of long, bronze-coloured needles.

Brucine tri-iodide is soluble in alcohol, chloroform, and benzol; insoluble in water, ether, and carbon bisulphide. It dissolves in dilute acids upon warming. After long contact with the acids the compound is decomposed, and iodine vapour is given off.

The behaviour of this compound with polarized light is very remarkable, being quite the reverse of that of the strychnine tri-iodide. Placed with its axis parallel to the polarized ray, the crystal appears to be of a clear yellow colour; placed vertically, it appears to be brown, with a bluish shade. Its behaviour in alcoholic solution is analogous to that of the strychnine tri-iodide.

*Compound of Coniine with Iodine.**

Hydriodated Coniine Tri-iodide.—$3(C_8H_{15}N) HI, I_3$.—Geiger has stated that when iodine is triturated with anhydrous coniine, at first a blood red, and afterwards an olive-green mass is formed, which is partially soluble in water. Blyth has said that alcoholic solution of iodine, mixed with alcoholic solution, gives a yellow turbidity, which quickly disappears, and that upon evaporating this solution *in vacuo*, there remains behind a brown mother liquor and crystals, which are readily soluble in water, alcohol, and ether. The author sought to obtain this substance in a crystalline form by adding coniine dissolved in alcohol drop by drop to an alcoholic solution of iodine, until the whole of the coniine was precipitated without any excess of iodine solution remaining. There resulted at first a turbidity, which quickly disappeared. The alcohol was therefore evaporated at a gentle heat, when there remained a pale yellow-coloured mass, smelling strongly of coniine, readily soluble in water, alcohol, ether, and chloroform; insoluble in cold and hot benzol; only yielding traces to carbon bisulphide. Dissolved in water and allowed to stand during a week over chloride of calcium, pale yellow perfectly formed octahedra were deposited, which smelt strongly of coniine. From solution in ether it crystallized in stellate groups.

After several unsatisfactory attempts at analysis the author obtained concordant results by adopting Carius's method of heating the alkaloidal compound

* Abstracted from the *Archiv der Pharmacie* for October p. 214.

in a closed tube with nitric acid and silver nitrate. Five experiments gave a mean of 57·370 per cent. of iodine, from which the formula $3(C_8H_{15}N),HI,I_3$, was calculated, which requires 57·466 per cent. of iodine. It was sufficiently evident that the compound contained hydriodic acid, for when it was shaken with metallic quicksilver, a double salt was formed, into which three atoms of mercury had been taken up.

The author's experiments were conducted in the laboratory of Dr. Wittstein, at Munich.

THE DIAGNOSIS OF BLOOD-STAINS.*

The *American Journal of the Medical Sciences* for July contains a paper, by Dr. Joseph G. Richardson of Pennsylvania, on the "Value of High Powers in the Diagnosis of Blood-Stains," as a sequel to a former paper on the same subject in that journal for July, 1869. He then stated that the residuum of a dried blood-clot left after the action of pure water, long mistaken by Virchow, Robin, and others, for pure fibrin, was composed chiefly of the cell-walls of the red blood corpuscles, and that, by proper management, these capsules of the red discs could be brought clearly enough into view, to enable him to measure them accurately, and so distinguish the dried blood of man from that of an ox, pig, or sheep, with a certainty disputed by previous observers. He regards this theory of the possession of a cell-wall, deduced chiefly from experiments upon the gigantic blood-discs of the Menobranchus, which are nine times as large as human ones, in which crystals of hæmato-crystallin were seen to crop out of a visible membranous capsule, as the foundation of his success in recognising and measuring blood-discs. The experiments of Owsjanniskow and Dr. Roberts, and the examination of blood-discs upon a dark ground, tend to confirm Dr. Richardson's views. The conclusions then published have not yet met with general acceptance; and a considerable part of the present paper is occupied with answers to theoretical objections. In the course of the argument, he aptly compares various sized blood-discs to shot of different sizes (numbers). It is to be remembered that, whilst the relative differences between corpuscles of human, ox, and sheep's blood remain the same, the absolute difference becomes more perceptible in proportion as the discs are magnified, so that when the former appear nine-eighths of an inch, and the latter five-eighths of an inch across, they can hardly be mistaken for one another.

Among one hundred freshly drawn red corpuscles, from five different persons (three white males, one white female, and one black female), the average of mean diameters was $\frac{1}{3378}$th of an inch. The measurement of twenty corpuscles from part of the first of these specimens, hastily dried in a thin film upon a slide, gave a maximum of $\frac{1}{2800}$, a minimum of $\frac{1}{3621}$, and a mean diameter of $\frac{1}{3182}$th of an inch. It can be shown that the smallest of human red discs, whether dried or fresh, are larger than the largest corpuscles of an ox, or, *à fortiori*, of a sheep. Professor Wormley brought Dr. Richardson a slide of human blood, upon which were seven corpuscles, designated by numbers on a drawing. Dr. Wormley's measurements gave an average of $\frac{1}{3236}$ of an inch; whilst Dr. Richardson's, with $\frac{1}{25}$ immersion-lens, gave an average of $\frac{1}{3266}$ of an inch; while some of the measurements (made independently) were identical. Virchow's objections he meets by stating that contraction in drying only increases the differences between the red discs of oxen, horses, pigs, sheep, deer, and goats, and those of man, since all the above are much smaller. But all theory is now practically set aside, inasmuch as Dr. Richardson has solved the question so far by experiment. Professor J. J. Reese and Dr. S. Weir Mitchell sent him three samples of blood, on paper, from ox, man, and sheep, simply numbered 1, 2, and 3, with no clue to their origin. No. 1 was treated as follows:—Some small particles were broken up into a fine dust with a sharp knife upon a glass slide, and treated with a solution of common salt, containing 0·75 per cent.; after covering with thin glass, this was then absorbed at one end by blotting paper, whilst fresh was added from the other end—thus washing away all colour. Then aniline was added, and in its turn washed away by salt. The specimens Nos. 2 and 3 were similarly treated, and all examined under $\frac{1}{25}$ immersion-lens, giving, with the A eye-piece, a power of 1250 diameters. Ten of the most perfect discs in each were examined, giving the following results. Dr. Richardson gives all the measurements in the original.

No. 1...	Minimum, $\frac{1}{3572}$;	Maximum, $\frac{1}{3125}$;	Mean, $\frac{1}{3407}$.
No. 2...	" $\frac{1}{4878}$;	" $\frac{1}{4444}$;	" $\frac{1}{4694}$.
No. 3...	" $\frac{1}{6666}$;	" $\frac{1}{5405}$;	" $\frac{1}{5828}$.

Now Gulliver's measurements are $\frac{1}{3200}$, $\frac{1}{4267}$, and $\frac{1}{5300}$ for human, ox, and sheep's blood respectively, and his own experiments had prepared him for slight contraction; he therefore decided that No. 1 was human; No. 2, ox's; No. 3, sheep's blood, which was so.

Three other specimens were treated with liquor iodinii compositus, with these results: No. 1, a mean of $\frac{1}{4662}$; No. 2, of $\frac{1}{5952}$; No. 3, of $\frac{1}{3430}$ for ten measurements. The conclusions were that No. 1 was ox's blood; No. 2, sheep's blood; No. 3, human blood, which again proved correct.

Dr. Richardson says that Robin's favourite solution of sulphate of soda is too prone to crystallize, and often contains large quantities of a peculiar fungus, the spores of which closely resemble human blood-discs. He thinks no fluid equal to the 0·75 per cent. solution of chloride of sodium. Fragments scraped from the edges or thinnest parts of the blood-stain are best, as freest from fibrin. A fragment from a blood-stain prepared in May, 1869, after five years, could still be distinguished from those of ox and sheep; and the mean of ten measurements gave $\frac{1}{3425}$ of an inch—the corresponding average five years ago being $\frac{1}{3474}$ of an inch.

He concludes, therefore, that the results of the above experiments prove, that since the red blood globules of the pig ($\frac{1}{4230}$), the ox ($\frac{1}{4267}$), the red deer ($\frac{1}{4324}$), the cat ($\frac{1}{4404}$), the horse ($\frac{1}{4600}$), the sheep, ($\frac{1}{5300}$), and the goat ($\frac{1}{6366}$) of an inch, are all so much smaller than even the ordinary minimum size of the human red disc, as measured by him, we are now able, by the aid of high powers of the microscope, under favourable circumstances, to positively distinguish stains produced by human blood from those caused by the blood of any of the animals just enumerated, and this even after the lapse of five years from the date of their primary production. This question is one eminently deserving the attention of English medical jurists and microscopic observers. It can be no longer possible to ignore these interesting researches of Dr. Richardson. We would, however, earnestly caution that no opinion should be given unless founded upon measurements of several blood-discs, and after much practice with the micrometer and the power employed.

* From the *British Medical Journal*, Nov. 28.

PREPARATION OF SULPHOVINIC ACID AND ITS SALTS.*

BY T. L. PHIPSON, PH.D.

The preparation of sulphovinic acid is by no means an easy operation, and, as certain compounds of this acid are now beginning to be used in medicine, perhaps the following observations may not be devoid of some practical interest.

When sulphuric acid and alcohol are mixed together without any special precautions, the temperature rises, and a certain quantity of sulphovinic acid is formed at once; but as in the formation of this acid a certain proportion of water is set free, and prevents the continuation of the reaction, it is never completed, even after the mix-

* From *The Chemical News*, vol. xxx., No. 781.

ture has been kept for some hours in a water-bath, and at a higher temperature decomposition at once ensues. It may, nevertheless, be quite possible to obtain a sulphovinic acid tolerably pure with alcohol and sulphuric acid alone (instead of the present tedious method based on the decomposition of the baryta salt), by keeping the mixture at 100° for two or three days and not acting upon too large a quantity. I intend to try this experiment shortly.

To obtain sulphovinate (ethyl-sulphate) of lime, it is best to mix equal volumes of concentrated sulphuric acid and alcohol; they may be mixed without any special precautions when small quantities only are used, and the uncovered vessel containing the mixture must be transferred to a water-bath and kept there eight or ten hours at least, during the whole of which time the temperature should be 100°, or nearly. The liquid will then have acquired a slight degree of fluorescence and a decided odour of ether (not an odour of sweet oil of wine), and should be only very slightly coloured. When cool, it is added, drop by drop, to about twenty times its volume of cold distilled water, carefully avoiding any rise of temperature, and keeping the liquid well stirred. This solution is saturated with pulverized chalk, added in small quantities at a time, until effervescence ceases. When a slight excess of chalk has been added, filter off the sulphate of lime, heat the filtrate in the water-bath with a little carbonate of lime for about half an hour, filter while warm, and evaporate at a heat not exceeding 100° till a permanent saline layer forms at the surface;* then place the capsule in a moderately dry place. In about twenty-four hours the crystals are formed; the mother-water will give another crop when allowed to evaporate over sulphuric acid or chloride of calcium. If the chalk contains iron or manganese, their sulphovinates remain in the mother-water, and are perfectly separated by pressing the crystals.

Sulphovinate of lime crystallizes rather slowly even in very concentrated solutions; it forms large, brilliant plates, something like chlorate of potash; its composition is represented by $C_4H_5O, SO_3 + CaOSO_3 + 2\,HO$; it is very soluble in water and in alcohol. The impure salt can easily be purified by re-crystallization from alcohol.

Sulphovinate of baryta has a similar composition and similar properties; it can be obtained in the same manner. When the crystals are pure, they form very large, brilliant plates, oblique rectangular prisms, modified in certain angles. Both this salt and the lime-salt often present a peculiar pearly aspect, which I do not observe on small pure crystals; these are perfectly transparent, and I believe this pearly aspect to be mainly owing to minute quantities of carbonate or sulphate dispersed through the larger crystals.

The sulphovinate of soda could be obtained pure from either of these salts without difficulty, but, for the preparation of the pharmaceutical product on a large scale, it is more economical to make it directly. I hope to refer again to this compound.

JAPANESE VEGETABLE WAX.†

The *Japan Mail* contains some further particulars respecting the preparation of the vegetable wax produced in Japan, and chiefly exported to England. This wax is obtained from the fruit, or, more correctly, berry, of the wax tree. The tree, which is by no means unlike the juniper tree, flourishes more especially in the southern provinces of the empire. The fruit, which usually ripens about the month of October, is gathered when ready, and cleansed from its loose, outer husk, a process which is accomplished in large wooden vessels, with wooden malls, similar to those in use for cleaning rice. The residue product, available for the manufacture of wax, is a bean-shaped kernel of the size of a lentil, possessing an unusual degree of hardness, of a dark yellow wax colour, and offering a saponaceous exterior to the touch. The kernel is subsequently exposed in a sufficient degree to a steaming process, which deprives it of its extreme hardness, and allows of its oily properties being more easily extracted in the pressing stage. In this process the oil is received into small earthen vessels, in which it subsequently hardens to a bluish-green mass, in the shape which it is commonly met with in home consumption.

Wax so produced is impure, and is only suitable for certain descriptions of candles and for wax-thread manufacture for home use. In order to render it merchantable for the exporter, the following refining process is resorted to:—The wax is boiled with a lye until it is brought to a perfectly fluid state, and is then drawn off into a reservoir filled with clear water, the pure wax, which floats upon the surface, being removed. The mass is then exposed to the sun's rays for a period of fifteen or sixteen days, during fine weather, for the purpose of bleaching it, at the expiration of which time the wax presents a dirty white crumbling appearance and a strong tallowy smell. The boiling and bleaching are repeated with the view of rendering the refining process still more complete, the only difference being that, instead of lye, pure water alone is employed in boiling it. The product is a clear white powder, which, in place of its former crumbling appearance, has assumed an almost crystalline formation. The last stage of preparation for export consists in rendering the powder a compact mass, which is effected by melting it over a fire with a little water (in order to avoid burning), and running it off into flat vessels. The product thus obtained, and known to commerce as vegetable wax, differs exceedingly little from white beeswax, with which it possesses the properties of colour, brittleness, and similarity in its fan-shaped fracture in common. The only characteristic difference may be said to be in the odour, the beeswax giving off a refreshing aromatic scent in burning, while the tallowy smell of the Japanese wax is far from being agreeable. Vegetable wax is chiefly used in England in the manufacture of wax candles.

THE HYPOPHOSPHITES.*

BY CHARLES G. POLK, M.D.

The hypophosphites, introduced to the medical profession by Dr. Churchill on the erroneous theory that they supply phosphorus to the system, and thereby restore the normal amount of that element which he considered to be deficient in phthisis, and from which deficiency he supposed the tubercule was caused, have outlived the excitement attendant on novelty, and have attained an official position in our pharmacopœia. Without being a panacea for phthisis, hypophosphorous acid and its salts have proven to be valuable companions for cod-liver oil in this and other wasting diseases. Further research has demonstrated that hypophosphorous acid exists in the brain and nerve structure in combination with glycerin and fat, and that it is a deficiency of this, and not uncombined phosphorus, which lies at the foundation of this frequent and fatal malady. Churchill erred in the selection of neutral salts instead of free acid. Therapeutically, nitrate of potassium is not the same as nitric acid; neither is muriate of ammonium muriatic acid. The alkali salts are not always indicated, and if continued through the protracted treatment required in chronic diseases they impair the *crasis* of the blood, and do a detriment uncompensated for by any good which can accrue from their use. With the free acid, and with its combinations with iron and manganese, these objections do not obtain. Time and again I have tested them with marked advantage, and have learned to regard them second only to cod-liver oil in staying the development and progress of tuberculosis. As is well known,

* During this evaporation, a slight, but distinct, odour of butyric acid is perceptible.

† From the *Journal of the Society of Arts.*

* From the *Tennessee Pharmacal Gazette,* for November.

there are two syrups—the ferric syrup and the ferrous syrup. The former is obtained by decomposing sodic or calcium hypophosphite with ferric tersulphate. The following is a formula I formerly followed for a physician who used the syrup of the ferric hypophosphite considerably :—

℞. Sodic Hypophosphite	256 grs.
Sol. Ferric Tersulph.	q. s.
Acid. Hypophosph. Sol.*	1 oz.
Syrup q.s. ad	12 oz.

Decompose the sodic hypophosphite with sufficient of the iron solution, wash the ferric hypophosphite, dissolve it in the acid, and add the syrup.

The ferrous hypophosphite, owing to its extreme solubility, requires a different mode of manipulation. It has been proposed to form it by decomposing ferrous sulphate with sodic hypophosphite. By making highly concentrated solutions of the ferrous and sodic salts the greater part of the ferrous hypophosphite will be precipitated, and can then be dissolved in syrup acidulated with hypophosphorous acid, so that each drachm will represent about five grains of the ferrous salt. The proportions for forming ferrous hypophosphite thus are five parts of iron to eight of sodium. I do not deem it the most economical or the most satisfactory process. I have found the following to give a valuable syrup, although the process does not come under the laws of double decomposition :—

℞. Ferrous Sulphate.	15 drs.
Potassic Hypophosphite	1 oz.
Hypophosphorous Acid.	14 oz.
Sugar	14 oz.
Water, sufficient.	

Dissolve the iron in five ounces of boiling water, and the potassic hypophosphite in ten ounces of boiling water, mix the solutions ; let it stand in a closely-covered vessel two hours, filter on the sugar, and add the hypophosphorous acid solution. No doubt there exists some sulphuric acid and sulphate of iron, and also some hypophosphite of potassium ; nevertheless, therapeutically, I have found it a fine combination, and the most economical of any I have tried. The following is my choice for making syrup ferrous hypophosphite :—

℞. Fresh Ferrous Oxide	q. s.
Hypophosphorous Acid	5 oz.
Sugar	8 oz.

Saturate three ounces of the acid with the ferrous oxide, add the remainder of the acid and the sugar, and dissolve without heat. Each drachm will contain about six grains of ferrous hypophosphite almost entirely free from any impurities. This is the formula I give the preference. I am indebted to my friend Mr. Creuse, of New York, for it.

Another formula I have used for a dozen years is to decompose ferrous sulphate with calcium hypophosphite, pour off the supunatant solution from the sulphate of calcium, evaporate with gentle heat, filter on sugar, add hypophosphorous acid, and dissolve. I am confident, however, that I have derived better results from manganese than from iron, and from both than from either alone. The satisfactory formula for a combination for these agents is yet a desideratum. I use the following :—

℞. Ferrous Oxide	256 gr.
Manganese Hypophosphite . . .	256 gr.
Hyphosphorous Acid	10 oz.
Sugar	10 oz.

Dissolve the iron and manganese in the acid, add the sugar, and dissolve. To this I add hypophosphite of ammonium, when disease does not contra-indicate, in the proportion of three grains to each drachm. It preserves the syrup, and also enhances, in a very positive manner, its therapeutical properties. If it be desirable, one grain of quinia and one-fortieth of a grain of strychnia may be given with each dose. Thus administered, I have found it, in conjunction with cod-liver oil, to arrest the progress of phthisis in a decidedly positive degree. I can recall many cases in which the cure seems permanent. In the wasting diseases of children in which there seems to be a deficiency of lime in the system, with general impairment of the nutritive functions, the following combination has done very well in my hands :—

℞. Calcii Hypophosph. recent. . . .	256 gr.
Manganesii Hypophosph. recent, .	64 gr.
Acidi Hypophosph. Sol.	2 dr.
Syrupi q.s. ad.	16 oz.
M.	

Teaspoonful thrice a day to a child of two or three years of age. I usually combine this with an aromatic elixir of calisaya, which makes it agreeably tasted and therapeutically more efficient.

* The strength of this solution is not indicated in the original, but we presume it is to be understood that only sufficient is to be used to dissolve the respective precipitates of hypophosphites.

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following List of persons whose names will be erased from the Register unless they communicate with him on or before 30th December next.

*Those marked * are Pharmaceutical Chemists.*

Adcock, William	49, Vauxhall Road, Birmingham.
Adey, Edward Linnell.	5, Oak Villas, Park Road, Hornsey, N.
Alcock, Alfred.	290, Shales Moor, Yorks.
Alcock, James William	265, Whitechapel Road, London, E.
Aslin, Richard	55, Market Street, Chorley, Lancs.
Atkinson, William Charles	Dunster, Somerset.
Baillie, Alexander Mitchell.	Callander, Perthshire.
Ballard, Frank Perry	High Wycombe, Bucks.
Bardsley, William	1, Chepstow Terrace, High Road, Peckham, Surrey.
Beattie, James	144, Asylum Road, Peckham, Surrey.
Bebbington, Thomas.	66, Great Howard Street, Liverpool.
Bell, Thomas	Harrogate.
Bidwell, John.	300, Holborn, London, W.C.
*Bilney, Joseph Thomas.	Brighton.
Binstead, Arthur	226, Blackfriars Road, Surrey.
Birch, Thomas Frederick	45, Clark Street, Stepney, London, E.
Blackith, Charles Robert.	Queen Street, Market Rasen, Lincolnshire.
*Booth, Alfred	59, Peru Street, Salford, Lancs.
Bowler, James Arthur	Alton, Staffs.
Bradbury, Robert	Great Yarmouth.
Bradley, Thomas	Castle Northwich, Cheshire.
Brandum, Alfred	254, Whitechapel Road, London, E.
Brett, John	94, Commercial Street, Newport, Mon.
Brett, Samuel Fisher.	29, Upper Priory, Birmingham.
Broad, Henry C.	Denbeigh Street, Bristol.
*Brown, A. McLaren	Brighton.
Brown, Robinson	332, Kennington Road, Surrey.
Burder, Robert	Mount Radford, Exeter.
Calvert, John Henry	1, Osborne Street, Hull.
Campbell, John	13, Corn Street, Bristol.
Cant, John Reymer	105, Lord Street, Liverpool.
Cantrell, William	277, Upper Parliament Street, Liverpool.
Carns, Thomas	94, Fenton Street, Leeds.
Carroll, Denis	9, Upper Foster Street, Walsall.
Castell, Thomas Barford	112, Brunswick Road, Poplar, London, E.
Chambers, Charles	30, Clarence Street, Liverpool.
Chapman, John	19, King Street, Leicester.
Christie, James	Aberdeen, N.B.
Chudleigh, Nicholas Major	Bovey Tracey, Devon.
Clark, George.	92, City Road, Manchester.
Clatworthy, Seymour Walter	1, King's Mead Square, Bath.

Cocking, Samuel	Howden, Yorks.
Collingwood, Felix Friend	116, High Street, Camden Town, London, N.W.
Cooke, Henry John	11, Brougham Road, Dalston, London, E.
Cooper, Helen	97, Fleet Street, London, E.C.
Corke, Alfred	1, Portwood Street, Liverpool.
Cox, Richard Cobden	25, Chilworth Street, London, W.
Cranidge, John	Dirtness Bridge, Lincoln.
Criswell, Frederick	Seaforth, Lancs.
Crompton, Benjamin	Morton Bottoms, Harpurhey, Manchester.
Cronkshaw, John	38, Great Russell St., London, W.C.
Crooks, Joseph	Bradford.
*Crossby, Joseph Parker	Bakewell, Derbyshire.
Dancaster, Arthur Edwin	3, Cambridge Terrace, Kingsland, London, E.
Davies, Henry Edward	48, Little Britain, London, E.C.
Dawson, Charles	6, Ellen Place, York Road, Wandsworth, Surrey.
Dawson, Robert	74, Collyhurst Street, Manchester.
Deacon, Arthur	Witham, Essex.
Dickson, Alfred	Monkbar Within, York.
Dixon, Joseph	14, Hampden Street, North Ormesby, Middlesborough-on-Tees.
Dixon, Joseph	53, Roman Road, Victoria Park, London, E.
Dobson, John Benjamin	133, Jubilee Street, Mile End Road, London, E.
Donald, James	3 4, Caledonian Road, London, N.
Doughty, Thomas	Holloway, London, N.
Doyle, Patrick	66, Great Howard Street, Liverpool.
Dubois, Bernhard William	2, Roberts Place, Stepney, London, E.
*Dulley, Joseph	Wolverhampton.
Duncombe, John Lionel	5, Portland Street, Southampton.
Duncombe, Wm. Pauncefort	Wincanton, Somerset.
Dunkerly, James	3, Promenade, Uxbridge Road, Ealing.
Durham, Frederick William	Norbiton, Kingston-on-Thames.
Dutton, Wm. Quinton	9, William Street South, Stepney, London, E.
Edmunds, John	20, Fanlight Terrace, Nunhead, Surrey.
Edwards, Joseph	101, Chester Gate, Macclesfield.
Ellis, Henry, jun.	8, Richmond Terrace, Friar's Causeway, Leicester.
*Ely, George	Old Basford, Notts.
Eskdale, Thomas	232, Great Homer Street, Liverpool.
Evans, Frederick William	Tredegar, Mon.
Evans, John James	London.
Evans, Price James	Hope Cottage, Slad Road, Stroud.
Evans, William	Tredegar, Mon.
*Evans, William Henry	Haverfordwest.
FitzGerald, Henry	Bath.
Forrest, John Challand	54, Brunswick Street, Sheffield.
Fox, John William	Aylesbury, Bucks.
Fullager, Charles	Stanmore, Middlesex.
Funnell, Edward	14, Charles Street, Brighton.
Funnell, William Henry	14, Charles Street, Brighton.
Furze, Leader	47, Hughes Street, West Derby Road, Liverpool.
*Fyfe, John Lawrence	Brighton.
Gay, Christopher William	103, Lisson Grove, London, N.W.
Goadsby, Francis	94, Upper Brook Street, Manchester.
Goodall, John Edward	35, Myddelton Street, St. John Street Road, London, E.C.
*Goodson, Jabez	37, Leadenhall Street, London, E.C.
Goulstone, Cornelius Edward	14, Clarence Street, Liverpool.
*Gowland, George Robert	4, Olive Terrace, Chester Road, Stretford, Manchester.
Grainger, John	1, East Robert Street, Salford, Lancs.
Greasley, Henry	78, Bolton Street, Bury, Lancs.
Greaves, Bernard George	2, Caton Street, Tamworth Street, Manchester.
Greaves, James Alfred	58 Park Lane, Liverpool.
*Green, Joseph	Bridge Mills, New North Road, London, N.
Green, Nathan M.	103, Thirlmere Road, Everton, Liverpool.
Griffith, Richard William Smith	Southampton.
Griffiths, John	112, Woodward Street, Manchester.
Griffiths, Joseph	138, Great Homer Street, Liverpool.
Halfhide, Thomas Young	16, Halsea Terrace, Chelsea, London, S.W.
Hall, Joseph	Darlington.
Halley, William	503, Lawnmarket, Edinburgh, N.B.
*Hamilton, Francis Dancey	Apothecary's Quarter, Aldershot Camp.
Harker, Robert Alfred	25, Porter Street, Hull.
Harold, Edward Charles	Tenterden, Kent.
Hartshorn, Albert	10, Prince's Square, Finsbury, London, E.C.
Haswell, Joshua Edwin	9, Marlborough Terrace, Upper Holloway, London, N.
Havart, Charles	310, Euston Road, London, N.W.
Hawks, John Swain	Cookley, near Kidderminster.
Hawksworth, Thomas	231, Bradford Street, Birmingham.
Hayman, Henry	9, Aspland Terrace, Amhurst Road East, Hackney, London, E.
Hendebourck, John L.	33, Park Street, Camden Town, London, N.W.
Herries, William	14, Charles Street, North Road, Darlington.
Hodges, Edward Richard	1, Holmesdale Road, Selhurst, South Norwood.
Hodgson, John Wilkins	121, Mill Street, Crewe, Cheshire.
Hoe, James Wellard	Spring Hern, near Ross, Herefordshire.
Holmes, William Court	London.
Horden, Thomas Rear	Norwich.
Horner, James William	92, Buckingham Road, Kingsland, London, E.
Hosie, John	Aberdeen, N.B.
Howard, Thomas Lister Ogden	54, St. Oswald Street, Old Swan, West Derby, Liverpool.
Howarth, William	37, London Road, Manchester.
Howse, Henry William	29, Exmouth Street, London, E.C.
Jackson, Robert	Blakenhall, Wolverhampton.
James, William	Purfleet Place, King's Lynn, Norfolk.
*James, William Albert	Walton-on-Thames.
Jefferson, John Mitchell	Southport, Lancs.
Jenkins, Joseph	27, Regent Street, Leamington.
Johnson, Joseph	53, New Town Row, Birmingham.
Johnstone, William	53, St. James's Street, London, S.W.
Jones, Abraham Dale	Hill Top, West Bromwich.
*Jones, Henry	Andersonian University, Glasgow, N.B.
Jones, James Gibbs	55, King Henry's Walk, Stoke Newington, London, N.
Jones, John	1, Amersham Park Villa, New Cross, Kent.
Jones, William	34, Langrove Street, Everton, Liverpool.
Juler, Richard Roan	15, Albion Road, Wandsworth Road, Surrey
Keall, Francis	17, High Street, Canterbury.
Keats, George	New Malden, Surrey.
Kelland, George Henry	16, Broadway, Deptford, Kent.
Kennedy, Patrick Maclean	Oxford Street, Glasgow, N.B.
Kidd, John George	73, Shepherdess Walk, London, N.
Kitchin, Jonathan	18A, Rodney Street, Pentonville, London, N.
Langman, Jonathan	Cambridge.
Lansdale, John Richard	Trowbridge, Wilts.
Lawson, Henry	7, Green Terrace, Middlesex.
Leaker, John Waterman	17, Antill Road, North Bow, London, E.
Lear, Charles	7, South Audley St., London, W.
Lear, William	25, John Street, Pentonville, London, N.
Ledger, Edmund	17, Walton Street, Ovington Square, London, S.W.
Leonard, Thomas	86, Grafton Road, Kentish Town, London, N.W.
Lewis, Eleanor	Aberdare, Merionethshire.
Lock, William	60, Mount Street, Grosvenor Square, London, W.
Longley, Charles	223, New Kent Road, Surrey.
Lord, Frederick	10, Brougham Place, Edinburgh, N.B.
Low, Joseph	34, Low Street, Banff, N.B.
Lucas, John Philip	Colchester.
McAvoy, George	115A, King Street, Great Yarmouth.
McCree, William	3, Russell Road, Leyton, Essex.
Macdonnell, Daniel	27, Hall Craig Street, Airdrie, N.B.
Macfarlane, William	34, Essex Street, Newcastle-on-Tyne.
McKenny, William Hall	45, Rosamond Street West, Chorlton-on-Medlock, Manchester.
Macneilage, David	43, Stevenson Street, Calton, Glasgow, N.B.
Mann, William	73, South Portland Street, Laurieston, Glasgow, N.B.
Marshall, Elizabeth Ann	Maldon, Essex.
Marshall, Frederick	38, Bedford Place, Southampton.
Marshall, William Finlayson	16, Howe Street, Edinburgh, N.B.

Martel, William Agnew	Landport, Hants.
Mathias, Henry Lewis	4, Marshall Street, Golden Square, London, W.
Matthews, Edward	53, Sidmouth Street, Regent Square, London, W.C.
Matthews, John	St. Paul's Street, Portland Square, Bristol
Meacham, James Edwin	129, Sussex Street, Lower Broughton, Manchester.
Meeke, Walter	Colmore Buildings, Highgate, Birmingham.
Melhuish, John	Exmouth House, Hastings.
Mewes, Alfred	100½, Islington Fiveways, Birmingham.
Miller, James	42, Maryfield Place, Edinburgh.
Monkman, James	10, Lower Cheltenham Place, Bristol.
Monro, Henry L.	301, Hope Terrace, Chester Road, Hulme, Manchester.
Morgan, William Hitchings	Walters Road, Swansea.
Morris, Frederick Robert	59, High Street, Lowestoft.
Munday, Alfred George	43, Leather Lane, London, E.C.
Munday, Walter Henry	43, Leather Lane, London, E.C.
Murray, William	125, Brunswick Road, Liverpool.
Myers, William	38, Barnet Street, Hackney Road, London, E.

Nayler, Joseph	3, High Street, Bow, London, E.
Neal, John Breward	26, Steelhouse Lane, Birmingham.
Neale, William	159, Grange Road, Bermondsey, Surrey.
Newton, Samuel	Farnworth, Lancs.
Nicholls, Joseph Charles	211, Blackfriars Road, Surrey.

*Orton, Thomas Johnson	27, Regent Street, Leamington.

Pattinson, Matthew Lee	216, Park Road, Liverpool.
Peal, Charles James	83, Bold Street, Liverpool.
Pearce, Frank Tring	8, Millman Street, Bedford Row, London, W.C.
Pearson, Daniel	Dudley.
Pearson, Edward	Grantham.
Pearson, William	3, Mildam Bank, South Shields.
Pettinger, John Swift	161, Sussex Street, Lower Broughton, Manchester.
Pickrell, George	23a, Heywood Place, Hanson Lane, Halifax, Yorks.
Platt, Samuel Hyde	Stockport Road, Denton, Lancs.
Plummer, Arthur	Reading.
Pogson, Thomas Frederick	2, Bull Ring, Horncastle.
Pollexfen, Edward	17, Bull Ring, Horncastle.
Powell, Edward James	4, Burlington Place, Bath.
Pugh, Hugh Meyricke	Machynlleth, Montgomeryshire.

Rabson, Henry	Dulwich, Surrey.
Radford, Isaiah Can	Devonport.
Raff, James	1, Toll Cross, Edinburgh.
Ragsdell, Walter	Clifton Road, Norwood, Surrey.
Read, Henry Holditch	Lynn Regis
Rees, George Louis	11, Leighton Road, Kentish Town, London, N.W.
Rees, Thomas	128, High Street, Merthyr Tydvil.
*Reynolds, Arthur	Watton.
Richardson, Robert	Dumfries, N.B.
Ridge, James	Shavington, near Nantwich, Cheshire.
Ridge, Jesse	15, Etham Place, Old Kent Road, Surrey.
Ritchie, George	1, Minerva Street, Glasgow, N.B.
Roberton, Henry Matthew	194, Grange Road, Bermondsey, Surrey.
Roberts, David Watkin	Chester.
Roberts, James	102, Breck Road, Liverpool.
Roberts, Robert	Prospect Street, Huddersfield.
Robertson, William Gardiner	7, London Street, Edinburgh, N.B.
Robinson, Edward George	2, Fishmonger Alley, Fenchurch Street, London, E.C.
Robinson, John	Oakenshaw, near Bradford, Yorks.
Rogerson, Jonathan Lowndes	178, Chapel Street, Salford, Lancs.
Rose, George	Rolleston, near Burton-on-Trent.
Rowe, Thomas Dowden	44, Kentish Town Road, London, N.W.
Ryder, James Brown	15, Albert Road, Morice Town, Devonport.

Sanders, Richard	15, Mulberry Street, Liverpool.
Sangster, William	25, Morton Road, New North Road, London, N.
Saph, Henry	9, Victoria Terrace, Hampstead, London, N.W.
Searl, Thomas	Loughton, Essex.
*Searl, Thomas King	Loughton, Essex.
Selfe, William Gilbert	27, Fetter Lane, London, E.C.
Sewell, Joseph	34, Albion Road, Stoke Newington, London, N.
Sharpe, Edwin	210, West Street, Sheffield.
Shillito, Richard	68, Marsh Lane, Leeds.
Shipley, William	St. John Street, Ashbourne, Derbyshire.
Simons, Nathaniel Wells	45, Baldwin Street, Bristol.
Sinclair, James	116, Tunnel Road, Edge Hill, Liverpool.
Skinner, Thomas	82, Sidbury, Worcester.
Slack, George	Bow Street, Sheffield.
Slack, George Thomas	Bow Street, Sheffield.
Smith, Benjamin William	53, Ernest Street, Bermondsey, Surrey.
Smith, Clara Brook	13, Dean Street, London, W.
Smith, George Cuthbert	Rosedale, East Yorks.
Smith, Henry James	12, Carlton Road, Nottingham.
Smith, Robert	Llanymynech, Montgomeryshire.
South, George	Camden Town, London, N.W.
Sprague, Daniel Joseph Howe	All Saints' Road, Westbourne Park, London, W.
Sproat, Robert	22, Market Place, Hull.
Spurling, John	Wivenhoe.
Stewart, Robert Gordon	15, Cheyne Street, Edinburgh, N.B.
Suggate, Henry E.	28, Russell Road, Holloway, London, N.
Sutcliff, John	Much Wenlock, Salop.
Sykes, Joseph Spencer	Sheffield.

*Taite, James	Southwark Street, Southwark, Surrey.
Tanner, Alfred John	Torquay.
Taroni, George	730, Old Kent Road, Surrey.
Tatlow, Benjamin	30, High Street, Wisbeach.
Taylor, Henry	10, Grosvenor Place, St. Paul's, Bristol.
Thomas, George Morgan	18, Whitechapel High Street, London, E.
Thomas, Rees Henry	3, Gerard Street, Derby.
Thompson, George	Rock Ferry, Cheshire.
Thompson, William	Harpenden, Herts.
Threlfall, Hugh	25, Great Coram Street, London, W.C.
Timothy, Edward Vincent	121, Netherfield Road North, Liverpool.
Todd, Edward	Guisborough, Yorks.
Tothill, John	2, Copenhagen Street, Islington, London, N.
Trix, Alfred John	36, Swinbrooke Road, Notting Hill, London, W.
Trundle, William Edward Rust	Long Stratton, Norfolk.
Twitchell, Richard	Stonehouse.
Tyrer, Thomas Frederick	81, Redcliff Street, Bristol.

Vickerman, David	1, Clarence Street, Hull.
Vine, John	54, Crawford Street, London, W.

Walker, James Joseph Frederick	77, Infirmary Road, Sheffield.
*Watkins, Thomas W.	Dudley.
Watts, Alfred	7, Rosefield Terrace, Holly Walk, Leamington.
Waugh, Henry	116, High Street, Camden Town, London, N.W.
Wealthall, James	55, Butler Street, Ancoats, Manchester.
Weeding, William Samuel	Hastings.
Westmacott, John Martin	Alcester, Warwickshire.
Whitfield, Henry Spencer	Boundary Cottage, Chapeltown, Leeds.
Whitfield, John Longley	19, Stevenson Street, Glasgow, N.B.
Wilcox, William	Dover.
Wilkins, James	Eastbourne.
Williams, David	41, Manchester Street, Crewe, Cheshire.
Williams, Edwin Lewis	Berkeley, Gloucestershire.
Williams, Henry Prydderch	31, Pier Street, Aberystwith.
Williams, James	13, Curzon Street, Mayfair, London, W.
Wilson, Henry Digby	23, John Street, Brighton.
Wilson, Joseph Gilpin	York.
Wilstrop, William Richard	3, Weatherills Place, Carr Lane, Hull.
Winter, William	47, Minories, London, E.
Wood, Thomas	47, Minories, London, E.
Wooley, James	4, Cambridge Crescent, Gough Road, Edgbaston, Birmingham.
Wright, William Henry	107, High Street, Camden Town, London, N.W.

Yeats, William Aubury	254, Goswell Road, London, E.C.
Young, James John	Carr Street, Ipswich.
Young, William Fitzherbert	3, Grundy Street, Poplar, London, E.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 28, 1874.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY AND THE IRISH PHARMACY BILL.

MISCONCEPTIONS are shadowy creations that are frequently evoked with a facility in inverse proportion to the difficulty experienced in allaying them. In fact, were it possible to apply the doctrine of abiogenesis to abstractions, misconceptions would certainly supply forcible illustrations of its truth. One good illustration might be found in the subject-matter of two letters from Professor TICHBORNE, which are printed at pp. 399 and 439.

The first of these letters, although commencing with a profession of admiration for the dissertations of Messrs. GILES and PROCTOR, so evidently disclosed a *raison d'être* in an opportunity for breaking a spear with the Council of the Pharmaceutical Society of Great Britain, on behalf of an indefinite number of sufferers from its action in respect to the Irish Pharmacy Bill, that we ventured to append an opinion that the writer was labouring under some misconception. In his second letter, Professor TICHBORNE, appreciating at least our intention, says that he is "pleased to be disimbued of that impression," which he had shared with others, and then proceeds to make an assertion which is a reiteration in a specific form of a grievance which could only have been inferred from his former general statement. He states that "the Select Committee appointed to investigate the "Irish pharmacy question was informed that the Phar- "maceutical Society would give no assistance to an "educational movement in Ireland, although it would "be urgently required."

So far, this definite statement is a step in advance, since it can be brought to the test of facts. The question need no longer remain an affair of impression, or memory, or misconception on either side, because the official "minutes of evidence taken before the Select Committee" are published, and may be purchased for a few pence. In our opinion, arrived at after hearing that evidence and reading it in its printed form, no information was given before the Committee which could be so construed as to identify it with Professor TICHBORNE's statement. Possibly the impression was produced by trusting too much to oral reports as to the nature of the evidence; but if there be any more tangible ground for it in the printed report, Professor TICHBORNE will confer a favour by pointing it out.

Indeed, the attitude—or absence of attitude—hitherto taken by the executive of the Pharmaceutical Society in respect to the Irish pharmacy question has been inconsistent with the charge of antagonism to pharmaceutical education in Ireland. At the time of the passing of the Pharmacy Act, 1868, its extension to Ireland was abandoned on the ground that there were difficulties which could be better dealt with in a separate Bill. Such a Bill the Attorney-General promised to introduce if in office the following year; but, that condition failing, the legislation did not take place. Amply occupied by the increased labours thrown upon it by the passing of the Pharmacy Act for Great Britain, there was nothing to induce, or even excuse, the Council in taking the initiative in seeking legislation for Irish pharmacy. It was known that the Apothecaries' Hall of Ireland had prepared a draft Bill; it was known also that several interviews—sometimes amicable and sometimes the reverse—had taken place between the authorities of the Hall and the Chemist and Druggists' Society of Ireland. But no official communication was made to the British Council, and it seemed possible that the interviewing might serve for a perpetual illustration of the old adage, "Amantium iræ amoris integratio est," when, without any notification of its intention, the King and Queen's College of Physicians introduced its Bill to extend the provisions of Pharmacy Act, 1868, to Ireland.

So little was this step expected that there was no time to consult the whole Council. A Committee hastily summoned to consider an application to give evidence before the Select Committee decided upon telegraphing immediately to Mr. MACKAY, asking him to attend as a representative from Scotland, and Mr. SANDFORD gave evidence as a former President of the Pharmaceutical Society. Of course so informal a deputation was incompetent to advocate or oppose any course in the name of the Society, and consequently it did not do so. All that was done was to describe the nature of the operations of the parent Society and the North British Branch, and to express an opinion that what the Society had done in Scotland—neither more nor less—it would be willing to do in Ireland. We fail to see that in this there was anything antagonistic to pharmaceutical education in Ireland.

But a later sentence in the second letter, which alludes rather censoriously to the relation of the Society to its School of Pharmacy, allows of the inference that perhaps the culpability of the Council, in Professor TICHBORNE's eyes, lies not so much in having done any positive wrong as in not doing what might have been hoped for. If the absence of an offer to provide a School of Pharmacy for Ireland, where Professors paid by the British Society should impart, upon terms more or less remunerative, the education afterwards to be tested by a Board of

Examiners appointed by the same Society, be construed as antagonistic to pharmaceutical education, then we think it probable that the Society will remain antagonistic.

Without depreciating the value of pharmaceutical education in the least degree, we would remark that throughout the discussion of this question there has been a curious affectation by our Irish brethren of superiority in educational requirements and business advantages. It has been assumed that directly upon the passing of such a Bill as that brought forward last session, there would be an exodus from Great Britain of chemists and druggists, of all degrees of efficiency, eager to clutch the pharmaceutical prizes dropping from the hands of the Irish apothecaries. The nature of these prizes may be gathered from the words of Dr. LEET, who gave evidence on behalf of the Apothecaries' Hall, with which institution Professor TICHBORNE is also honourably connected. He says:—

(Q. 118.)—"The object which we have in view is, to supply a want which is felt in certain districts in Ireland, which are not the best fields for practice and making money. A man who occupied the position of pharmaceutical chemist in those remote districts would have a struggle for existence, and must resort to every kind of trade for a subsistence."

Again:—

(Q. 48.)—"If they could exist in those places you would find apothecaries, but the eagle will not be where there are no carcases."

And yet the same gentleman, describing the Apothecaries' Hall Bill, had said (Q. 8), "We say Pharmaceutical Chemists, because a mere Chemist and Druggist would not meet our purpose, as proposed by that Bill." Ordinary mortals would perhaps have been content with the "mere chemist and druggist," and have had some chance of the attainment of their objects.

In referring to this subject in these columns, our wish is to assist in dispersing the unfounded impressions respecting any sinister aims of the Pharmaceutical Society against Irish pharmacy, which appear to have gained currency. Although we do not speak authoritatively, we believe that if the Irish pharmacists desire to stand alone British pharmacists will be well content; but if, on the other hand, they wish to secure the co-operation of the Pharmaceutical Society of Great Britain in promoting pharmaceutical education—not in educating pharmacists—in Ireland, that Society would be ready to co-operate on the same terms as obtain in England and Scotland. If this result, however, is ever to be accomplished, it is necessary that some almost childish misconceptions and apprehensions should be abandoned. To show that we do not speak without cause, we quote a passage from the evidence of Sir Dominic Corrigan, which is only typical of much more that he said:—

(Q. 598.)—"Then with regard to the Pharmaceutical Society of England, do you suppose that there would be a arge increase of funds to the British Pharmaceutical Society, if the society formed in Ireland were united with it?—(A.) Of course they would take every penny from us, and give us nothing in return. I think the case is quite clear."

(Q. 599.)—"And that is one of your objections to the union, is it not?—(A.) That is a very serious objection."

Considering that the only legitimate source of revenue would be the fees for examinations, which are not sufficient in this country to defray the expenses attending them, and that any deficiency would have to be made up from the voluntary annual subscriptions of the Members and Associates of the whole Society, the amount that would be brought over to England yearly, even if "every penny" were brought, is a problem worthy of the acute intellect of Sir DOMINIC to elucidate.

RECTIFICATION OF THE REGISTER.

THIS week our pages contain a List of about three hundred persons whose names will be erased from the Registers of Pharmaceutical Chemists and Chemists and Druggists unless they communicate with the Registrar before the 31st December next. Only two years have elapsed since a similar list was published, and it is difficult to believe that nearly so many unreported deaths of registered persons have occurred during that time. On the former occasion more than 25 per cent. of the persons so advertised afterwards communicated with the Registrar, and probably at least as large a proportion of those on the present list will do the same before the close of the year. Such a result can only arise from gross neglect and carelessness on the part of the only persons beneficially concerned. If it be remembered that at least two registered letters have been sent to everyone on this list, and returned through the Dead Letter Office, it will be acknowledged that the Pharmaceutical Society has a right to complain that so much trouble and expense should be thrown upon it, because so many persons are too neglectful or lazy to keep corrected the entries on the Register which are the sole evidence of their right to carry on their calling.

In default of the persons most interested in doing so, it would much assist the Registrar in keeping the Register correct, if upon any necessary corrections becoming known to our readers they would kindly communicate them to him. And on the present occasion it will not be out of place to ask that they would look through the published list and forward any information they may possess respecting the defaulters to the Registrar, 17, Bloomsbury Square, London.

MEAT PRESERVATION.

THE interesting discovery by Professor KOLBE of a method of preparing salicylic acid at a comparatively low cost, which is described on p. 421, promises to have a much wider interest than economy in producing a compound at present not very extensively used. For the discovery seems to have been consequent upon the result of numerous experiments which revealed that salicylic acid possesses valuable antiseptic and preservative properties. The importance this fact may assume in respect to the supply of food, may be inferred from the following statements. Professor KOLBE has found that fresh meat rubbed with salicylic acid may be exposed to the air for a week without spoiling. A large quantity of beef and mutton, prepared with salicylic acid, was packed closely together in a cask, and at the end of a month was then examined as to its usefulness in the kitchen and as to flavour. The greater part of the acid was removed by washing, after which the not unpleasant, weak, sweetish taste of the remainder could only be detected with difficulty. This favourable result suggested to Professsor KOLBE that by this means meat might be imported cheaply, yet in good condition and well-flavoured, from South America, where the excess supply is at present partially utilized in the preparation of extract of meat. Of course, if this be found practicable, other sources will be available, and this application of salicylic acid may have a great future before it.

THE VAMPIRE versus THE PHŒNIX.

Two or three years since the reading of a paper on the nutritive properties of blood, before the French Academy of Sciences, by M. BOUSSINGAULT, was followed by an epidemic of blood-drinking in Paris, where patients of both sexes and all ranks and ages were said to have flocked to the slaughter-houses to drink the still smoking blood of slaughtered oxen. According to the *Philadelphia Record*, the taste has now migrated across the Atlantic. Inquiry at the slaughter-houses has revealed the fact that there are in the city of New York nearly two hundred persons who are in the habit of drinking, as food and medicine, blood warm from the oxen. Sheep's blood, it appears, is not in favour; but it is said that if the patient's eyes be closed the blood of beeves, warm from the neck, has the same taste as milk warm from the cow, and is far more efficacious for weak lungs than cod-liver oil. Should fresh bullocks' blood ever be added to the widening list of articles that the chemist and druggist, as purveyor to the members of the healing art, has to keep for sale, the gilded phœnix which still decorates many a shop front might well give place to the vampire, should an authentic model be forthcoming.

ACCLIMATIZATION OF IPECACUANHA IN INDIA.

IN the last report of Dr. KING, the Superintendent of the Calcutta Botanic Gardens, he states that the propagation of the ipecacuanha plant by root and leaf cuttings has been so successful that there is at present a stock of 63,000 living plants; whereas four years since there were at the Cinchona Gardens but twelve cuttings, of which seven were afterwards accidentally destroyed.

THE MIDDLESEX CORONER.

THE effort put forth by the medical profession to secure the return of a medical gentleman to the Middlesex coronership, vacated by the death of Dr. LANKESTER, whose predecessor was the late Mr. WAKLEY, has been completely successful. The election took place on the 19th inst., when 1164 votes out of 1972 were recorded for Dr. HARDWICKE.

ANALYSTS' CERTIFICATES.

THE *Medical Press and Circular* has long suspected the existence of a roguish dodge of sending a specially excellent sample of an article to an analyst, and then using his certificate to cover the sale of an enormous quantity of a product entirely different and vastly inferior in quality. Referring to the recent use of a certificate of tea given by Dr. SAUNDERS, and we suppose with a full knowledge of the facts of the case, it stigmatizes the conduct of the brokers in terms which we, not possessing such information, cannot venture to reproduce here.

SOCIETY OF PUBLIC ANALYSTS.

A GENERAL Meeting of this Society will be held at the Cannon Street Hotel, on Tuesday, December 1st, at four o'clock p.m., to receive a report from the Committee appointed at the meeting held on August 7th; to appoint scrutineers to examine voting papers for Officers and Council; to consider and decide upon the constitution and rules of the Society; to consider the Definition of Adulteration submitted by the Committee; and to deliberate upon the steps which it is desirable to take to further the Amendment and Consolidation of the Adulteration Acts.

THE SCHEELE MEMORIAL.

WE are requested to say that the Subscription List for the SCHEELE Memorial Fund, which is now lying at 17, Bloomsbury Square, will be finally closed on the 15th December. We take the opportunity of announcing the following subscriptions that have been received up to the present time:—

	£	s.	d.		£	s.	d.
Bell, J. and Co.	1	1	0	Schweitzer, J.	1	1	0
Bradley, J.	1	1	0	Southall, W.	1	1	0
Hills, T. H.	1	1	0	Williams, John	1	1	0
Morson, T.	1	1	0				

THE NEXT EVENING MEETING.

AN Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, December 2nd, when a paper on an Additional Method of Testing Glycerine, by Professor GODEFFROY, of Vienna, and one on the Preservative Action of Chloroform upon Vegetable Infusions, by Mr. J. B. BARNES, will be read. The Chair will be taken at half-past Eight precisely.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The second monthly meeting of the above Society during the present session was held, under the presidency of Mr. G. F. Schacht, at the Bristol Institute, on Tuesday, November 17. The subject of the evening was the following lecture on—

Chinese Therapeutics.

BY DR. F. PORTER SMITH.

It is impossible to contemplate an isolated race of some 400 millions of human beings without a thought of the *immense* quantity of physic such a mass of *civilized* fellow-creatures as our Chinese brothers and sisters must be daily consuming! The drug bills of such a people must represent an enormous sum of money, all of which they have the satisfaction of spending amongst themselves. For the Chinese are a patriotic physic-taking people, spending large sums for particular remedies, and for what we should call patent medicines. The yellow bills of quack-doctors take up more than half of the room of the hoardings of Chinese towns and cities. Filial piety, the great civilizing morality of Chinese society, finds no more fit or frequent exercise of its principle of devotion to the parent than in the purchase of some "restoring pill," or cordial, for the revival of the strength of some longevous individual of a Chinese household, with its harmonious members of at least three generations. Large sums are often spent in the treatment, by a secret and costly remedy, of some young concubine, pregnant in the old age of her master, whose wives have failed to present him with anything better than wenches, all duly consigned to a watery grave, save perhaps two, kept sometimes for a worse fate. But these remedies are eclectic, as our American friends would call them, or homegrown. Visions of these large Chinese populations taking large quantities of sugar-coated pills, seidlitz powders, and tinctures are all to be demolished, for the Chinese make the only drug which they import in any quantity into an article of daily use, or rather abuse. I allude to opium, largely imported into China from British India. This drug is now being produced in China and Tartary in much larger quantities, and much better quality, than formerly. So great are the barriers of dialect and distance in the huge Babel-land of Cathay, that the medicinal products of some far-off province of the Chinese polyarchy have all the novelty of a foreign drug to the people of another province. The study of "Chinese Therapeutics" must therefore be one of *curious*, rather than *commercial*, interest to us all, this evening, in our brief survey of the subject in hand.

The alternations of great heat and intense cold of the climate of China, the very irregular cultivation and occupation of the vast territory of 5,300,000 square miles, and the exigencies of continually recurring flood, drought, famine, epidemics, and rebellion, or external war, combine to produce a fearful amount of disease amongst the population, and, notably, disease of external parts, such as the skin, eye, etc. This latter circumstance has given great prominence, as we shall presently see, to all topical remedies. Still, that fondness for the use of strong external applications in almost all cases of sickness, which is characteristic of all Oriental people, is in part due to a wholesome dread of attacking the internal parts of the body, of which they have very scanty and incorrect information. Dispensaries, asylums, and lazarettos have existed, for many hundred years, in China, as the pure result of heathen sympathy with suffering humanity, apart from the higher motives of Christian feeling. This admission is important, and made after very careful investigation. It is not a *claim* made by the Chinese, but a *fact* established by their municipal records. Taxes and voluntary contributions are made for the support of free dispensaries, etc., in every large city, and many of the native druggists, to their credit be it spoken, give medicines gratis to the poor. It is not one of the least important of the indirect effects of Protestant medical missions in China that they have stimulated the exertions, and multiplication, of these local native charities in some of the large cities of the land.

Whilst there is much that is crude, disgusting, and senseless in some of the methods and means of Chinese doctors, it is important that we should avoid all libellous caricatures of the subject. The early Jesuit missionaries, to whose self-denying labours the Chinese owe so much, and to whom we are so largely indebted for our early knowledge of Chinese literature, were not always *sufficiently* careful in their translations of native works on medicine, etc. The missionary Hervieu made a mistake of some hundreds of years in the date of an old work on the pulse, and actually took the trouble to translate, by mistake of course, a *spurious* edition of a well-known classical treatise on this (to the Chinese physician) important subject. He thus contributed to place the doctrine of the Chinese faculty on this subject in a much less favourable light, and, worst of all, the translated account has been greedily copied by all subsequent European writers. Similarly in the translation of works on "Chinese Therapeutics," which have a voluminous literature of more than twenty centuries, the queerest names and things have been given by European critics. To give an instance of this fun-making tendency of translators, there is a well in the Yang-Kuh district of Shantung province, whose waters, like those of Barèges, in France, would appear to contain a sort of mucilaginous principle. These waters are directed to be evaporated, and the extract resulting to be strengthened by the addition of the glue made from the skin of any one of several animals, amongst which the ass is certainly, but not prominently, mentioned. Straightway, seizing the most ridiculous part of the subject, the European translator stamps this article of the Chinese materia medica with the nickname of "*Asses-Glue!*" The dried lining membranes of the stomach of the fowl (domestic) has been long used by Chinese doctors in the treatment of disorders of the stomach, bowels, etc. What have we here but an anticipation of the modern use of pepsine in the very disorders mentioned in native works? In the Pharmacopœia of the Royal College of Physicians of London, for 1721, we have this very same substance, officinalized under the name of "Pelliculæ stomachi gallíæ interiores," almost a literal translation of the term used for it in the Chinese Pharmacopœia. It was ejected from the London Pharmacopœia in 1746. It was the last remnant of a whole host of cheap and nasty remedies, such as the coagulum taken from the stomach of the leveret, or the lamb, "stercus bovinum, humanum, pavonis," etc., etc., which distinguished or disgraced the pharmacopœias of Europe, in the 17th and 18th centuries, but which still remain in the unreformed *Pun-tsau-Kaung-muh* of the Chinese prescriber. This last-mentioned and interesting work of 1597 is usually published in some thirty-eight or more volumes, and has three volumes of plates, etc. It represented and embraced the observations of about eight hundred authors, and the writings embodied in some thirty-nine previous publications. This work, of some forty years of literary and experimental labour, was a "Synopsis of Ancient Herbals," a name which is justified by the fact that 1096 out of 1892, the whole number of officinal genera of drugs, are referred to the vegetable kingdom, which grows with such imperial magnificence in China. There are 11,896 formulæ given throughout the work, which has been reprinted in the form of at least four principal editions, but without any additions, or excisions. Chinese medical writers and practitioners have always gone on the assumption that *every* natural and artificial substance in existence is possessed of medicinal and curative, or antidotal, properties. Their pharmacopœia, the *Pun-tsau*, is therefore their most complete work on natural history. This comprehensive belief has led them into the successful, though completely empirical employment of many crude substances, which constitute useful and shrewd anticipations of particular isolated drugs or active principles which we seem to have long waited for, until we could obtain them in more individualized and perfect form or condition. Their use of animal "materia medica" is very considerable. Many parts of the human body even are reputed to be endowed with special medical properties. In fact, at least some thirty-nine different parts, or secretions of the human body are mentioned in the *Pun-tsau* as medicinal in their effects. This accounts for instances of apparent cannibalism after Chinese executions. Soldiers often seize the liver, gall-bladder, or heart of an executed man, and cook them as means of adding to their pluck or courage, which they curiously locate in the biliary secretion. The bodies of animals remarkable for their strength are thus eaten. The skin of the elephant is thus used as a plaster. By the way, they believe our india-rubber of commerce to be elephant-skin, and call it often by the same name. The horn of the rhinoceros is made into a drinking-cup, and water or wine allowed to remain in the cup, to confer supposed tonic properties upon it. The bones of fossil animals (often extinct) confounded with the assumed remains of their stock heraldic emblem, the dragon, and also fossil ivory, are officinal. The testes of some animals, dressed up as if in imitation of castor-pods, are eaten to provoke virility, the great ambition of every Chinaman. In fact, "Kirby's pills" of phosphorus would be a "real blessing" to Chinese would-be-fathers, and a great source of profit to any enterprising exporter of drugs to the "Flowery Land." Cantharides are given in hydrophobia.

It must not be supposed from their fondness for vegetable materia medica that the Chinese faculty do not employ mineral medicines. Sal ammoniac, urea, orpiment, realgar, white arsenic, calomel, corrosive sublimate, æthiops mineral, alum, and copperas, are all used as drugs, but the wholesome clauses of the excellent Tartar Code of laws in force in China have checked many daring dabblers in such useful drugs. Sulphur, realgar, and some other substances are made into cups, and wine or water placed in them to acquire alterative, anti-periodic and antidotal properties. Poisoning is commendably rare in China, but suicide by means of watery extract of opium is very frequent in some parts of the country, as the mode of most "happy despatch," as the Japanese would call it. This extract of opium, though carefully prepared, is not so narcotic in its effects as might be expected, for a considerable quantity of refuse, ash, etc., from opium pipes is added to the mass, to render it more bulky and combustible. Would-be importers of Chinese "prepared opium" into England should be cautious in their selection of samples, even when prepared, as has been the case at the treaty-port of Amoy, under foreign supervision.

Every part of a plant, shrub, or tree has distinct properties assigned to it in Chinese Therapeutics. The properties of the stem, or ascending axis of a plant, are assumed to be antagonistic to those of the root, or descending axis, as a rule. The root of a plant, upon which they set greatest store, may thus be used as an antidote for the effects of the leaves of the same medicinal plant. The pollen of many plants is officinal, and sundry empyreumatic preparations of vegetable substances are largely enumerated in the *Pun-ts'au*. The particular properties of medicinal substances are described in such choice, archaic, or idiomatic terms as can only be translated by the free use of such words as alexipharmic, pectoral, lenitive, carminative, alterative, etc., which have long been, or ought to be, discarded from our pharmacologies. Dr. Paris would have delighted in a Chinese prescription, with its eight or ten different ingredients, answering as many distinct indications. Adjuvants, correctives, corroborants, distributives, etc., are employed under cover of the most elaborate and irresistible justifications. Vehicles, menstrua, and syrups are always directed in special formulæ; those of the Rhamnus or Zizyphus genera being in great favour. Decoctions are the favourite form of Chinese prescribers, the dose being large, hot, and final. For upon the exhibition of a single draught of a carefully, solemnly contrived and concocted formula do the Chinese doctor and druggist stake their credit. The collection of drugs sufficient for the momentous experiment is packed up in a sort of pyramidal or triangular parcel, with the finer doses all separately packed and tied at the top, and the grosser, meaner constituents at the base. The whole pile, tied in position by coarse string or straw, without outside wrapper, hanging and swinging by the finger of the purchaser, looks much more like a lot of purchases from the grocer or oilman than from the druggist. It is an important part of the proceeding that the dregs of the draught should be thrown deliberately into the middle of the street, the patient being supposed to part with the disease at almost the same time. Thus the Chinaman literally throws his physic to the dogs, so common in Chinese streets; but he does it more sensibly—after having exhausted its properties. The usual directions to the compounder (whose shop always wears a festal garb, and is bright with beaded oil lamps), or to the patient, are on this wise:—The medicines to be slowly boiled in a clean vessel, without a cover, and with as little disturbance in the way of stirring, or suddenly lifting from the fire, as possible. The principal compound decoction containing the substances directed against the main symptoms of the disease is called the *Ta-t'ang*, or "grand ptisan." The menstrua, or disguises, are called the "minor draught." A second boiling of the drugs is often carried out when the drugs are costly.

Placebos, diet-drinks, simples, and domestic remedies are much employed, and have special names. In fact, the Chinese are great nominalists rather than realists. There could not possibly exist in Chinese medical works such things as the "os innominatum," or the "arteria innominata." Attached to the Chinese prescription for the better class of patients is the "pulse-table," which explains the nature, seat, cause, treatment, and prognosis of the disease.

Very much importance is attached by both doctors, druggists, and patients to the grave question of diet during the administration of medicines. Very rigid and minute instructions are given in reply to the invariable question of the patient to the doctor, "What do you forbid?" as to "what to eat, to drink, and what to avoid." The universal practice is to avoid the five alliaceous condiments in daily use amongst the Chinese—namely, garlic, onion, etc.; game of certain kinds, such as the wild goose, the flesh of the carp, and of the blenny, the flesh of the dog, the plowing ox, and of the domestic cock. Some of these restrictions are suggested by the general adherence of the Chinese people to the Buddhistic faith, which preaches against the destruction of animal life. This same creed enforces the use of vegetable oils and fats, in place of those of animal origin, in pharmaceutical processes, in the arts, and in household cookery. Surgical patients with tumours are specially forbidden to eat the flesh of the cock bird. Although many of their prohibitions are absurd, yet some of their hygienic and dietetic directions show a degree of appreciation of the importance of these auxiliary measures.

Certain drugs, such as arsenic in its various forms, calomel, opium, nux vomica, and native cantharides, are not allowed to be sold by druggists in the ordinary way. Securers are required to put in their appearance for the sale of arsenic. Nux vomica beans are only to be sold for killing dogs, those pests of Chinese streets and villages (of which they are the scavengers, in part), and opium is not allowed to be sold (as a drug by druggists) or prescribed. In fact, this last drug has no place in legitimate medicine. It is scarcely correct to say that the cultivation of the poppy has been forbidden by statute. When some immaculate public censor has memorialized the throne, a virtuous proclamation has appeared against it. The Tartar Code provides that one month's wearing of the cangue or square wooden collar, and banishment for life, to serve in the frontier army, shall be the punishment for those who traffic in opium, and that their abettors shall receive one hundred blows, and banishment from their native country for three years. Those who by opening illicit opium-saloons shall seduce the sons, or relatives, of decent families shall have sentence of death by strangulation recorded against them. It is unnecessary to say that these laws are not carried out at present. To keep an opium-shop it is only necessary to fee the constable, and stick a square of used filtering-paper, showing the black patch of the dregs of the watery solution of opium-extract, against the half-closed shutters, and the whole thing is safe and sure. A regular duty is assessed upon the foreign (East Indian) opium, and the native drug is fast replacing the former. Chinese home-produced opium is well worth the attention of the English drug buyer, as the drug is carefully prepared, seldom adulterated, and is very efficacious in medical practice. The seller and buyer of arsenical and other metallic poisons, contrary to the statute, are punished with the bamboo, and exiled for a time, even if the poison has missed its mark. If the drug should prove fatal, both parties have sentence of death recorded against them, which is commuted to imprisonment during the imperial pleasure. The procuring of abortion by means of the mylabris and the blistering cicada, in common use as epispastics, in China, is frequent, and is punishable by exile to a distant province. The twenty-fifth volume of the code, under the head of capital offences, requires sentence of death to be recorded against any practitioner of medicine who abuses his professional opportunities to destroy his patient. This and the question of malpraxis is determined by reference to medical assessors, and is punished, in its minor degrees, by prohibition from future practice. Instances of malicious actions-at-law against medical practitioners who have incurred the displeasure of litigious patients, or have ventured upon some unsuccessful innovation on the ordinary rules of practice, are not unfrequent.

The Chinese have for ages been conversant with some part of the processes of the fluid circulations of the human body. From their minute description of certain physical, as well as sympathetic communications between the various organs, and between the trunk and the extremities, it is evident that they must have practised some sort of coarse dissection at some early period. Their defective drawing is quite sufficient to explain the rudeness and incorrectness of their curious anatomical plates. It is moreover to be remembered that in their *earlier* history the Chinese offered human, as well as animal, sacrifices, so that their opportunities for observation of the general structure of the human body have been undoubted. Their later Buddhistic prejudices have prevented such desirable researches. Their physiology and pathology is physico-vital, and they have borrowed from both solidists and humouralists. Whilst their therapeutical practice is to be described in general as allopathic, it is impossible to describe their theories of the action and applications of medicines without a brief reference to their principles of philosophy or cosmogony. From a monad, or ovum mundi, there is produced, by a primary segmentation, a male or seminal principle, and a female or germinal principle. The *yang*, or male element, is nearly synonymous with light, heat, phlogiston, motion, action, contraction, positive electricity, clearness, dryness, and tonicity, and is peripheral. The other dual element, the *ying*, or female influence, is passive, inert, turbid, sombre, relaxed, moist, cold, antiphlogistic, negative, and interstitial. The *ying* has capacity, but the *yang* is characterized by exertion. The *ying* is not superior to the *yang*, though commonly enumerated first, as rest usually precedes motion. The *ying* is visceral, lunar, and telluric, tends downward and centrically, and resides more particularly in the heart, lungs, liver, spleen, and the kidneys. The *yang* is solar, external, determines upwards, is specially located in the small and large intestines, the stomach, the gall-bladder, the testes, and the urinary organs. It is pathologically identical with external flushes, inflammatory excitement, sanguineous exudation, and peripheral excretion. The *ying* includes the condition of passive congestion, like that of the stagnant focus of an inflamed part, and commonly ultimates in secretion and flux.

Altogether this doctrine runs somewhat parallel with the common theory of typical inflammation. It has served, in Chinese medicine, much the same purpose as the neater, more matter-of-fact, stock doctrine of vascular action, and its consequences, of European pathology, namely, to connect together the few genuine *facts* actually observed.

The blood, as a whole organ, and its secretions, are spoken of in Chinese medical language as the *ch'ing*, and belong, for the most part, to the *ying*, which resembles the *anima*, or vegetative life of the body. When Chinese doctors describe a tonic medicine, they speak of it as restoring or repairing the material and the dynamical elements, the *ying* and the *yang*, in their proper sufficiency and proportion.

Medicines are originally divided into those which develope the *ying*, and those which develope the *yang*. The nature of the individual drug is also distinguished from its notable, or extrinsic, properties, and referred to the *yang*, as the latter is to the *ying*. A disease which is characterized by ascendancy of the *yang* is treated by a medicine which calls forth the *ying*, and *vice versâ*.

As these principles are too recondite for ordinary minds, Chinese medical authors usually speak of the *ying* as cold, and of the *yang* as heat. A cold medicine is given in a hot disease, which is something like our talk about using refrigerant medicines in febrile diseases. Hot medicines are said by some luminous authorities to be given in combination with cold remedies, as auxiliaries, to modify the morbid chill, which may have been the antecedent cause of the heat. All diseases characterized by weakness and chronic flux, and especially of the kidneys and testes, which they call by the same generic name (distinguishing them only as *outside* and *inside*) are spoken of as *ying*. Stimulant, tonic, astringent, alterative, derivative, diaphoretic, rubefacient, and counter-irritant medicines are *yang*, and would be given in diseases attended with debility, remora, and passive flux. Emetics, purgatives, antiphlogistics, and resolvents are included under the *ying*.

Another relation is sought to be established betwen medicinal agents and diseases through the five (Chinese) elements, metal, wood, water, fire, and earth. No such element as air is ever reckoned amongst these five factors of all things. There is a primordial essence, or subtle basis of all created things, sometimes called in Chinese a breath; but Duhalde and his copyists must have been thinking of the four elements of Western philosophy when they replaced wood by air. The viscera of the human body are connected with these elements. *kin*, or metal, rules the lungs; *muh*, or wood, the liver; *shwui*, or water, the kidney; *ho*, or fire, is related to the heart; and *tou*, or earth, to the stomach. Certain rules, as to the supposed mutual generation or mutual opposition of these five elements, are the guides of the prescriber in the choice of his remedies.

Much importance is attached by Chinese writers and practitioners to the influences of the seasons. The element of wood is said to prevail in spring, and as this is connected with the liver, such is the result of this conjunction that hepatic and splenic diseases are most frequent in the spring quarter of the year. Fire is associated with summer, justly enough in a warm climate, and with the south, and cardiac affections are said to predominate then. This is a fact; cases of sudden syncope and death, with no head-symptoms, are common in the midst of Chinese thoroughfares, crowded, and covered in as they are with large mat-frames, stretched across from the houses on one side to those on the other. These communications between the houses render a fire in summer, in a large Chinese city, a fearfully and widely destructive thing. Autumn is related to metal, and, therefore, its associated viscus, the lung, is said to be injuriously stimulated. As metal opposes wood, liver diseases are somewhat frequent at this period, as the liver is said to be depressed. In winter, when water is in the ascendant, the kidney is thought to be excited to morbid action. The element earth has four periods of morbific influence, namely, in the third, sixth, ninth, and twelfth months. At such periods, the stomach and the spleen, which is also related to earth, are unusually liable to disease. Much of this is all stuff and nonsense. There is, however, a clue to be made out, by means of which some practical rules, of great utilily to foreigners resident in China, might be deduced f:om the actual *facts* observed by a few reliable native authors. So much attention has been given to this subject of seasonal influences, that a separate class of practitioners confine themselves more or less to this speciality, and have a distinct name. Astrology and alchemy have both had an evident influence upon Chinese medicine.

Traces of the existence of a sort of homœopathy are found in the common phrases "with a poison to attack a poison,"—"to combat hot diseases by heat."

Setting aside all other considerations, it is a stubborn fact that the Chinese doctors are able to render a considerable amount of prompt relief to their patients, and that without such a slavish attention to the mere treatment of prominent symptoms as might be expected. The statements of educated Europeans, who have submitted themselves, at first from necessity, and subsequently from choice, to native doctors, in China, sufficiently attest the truth of this assertion, made after a good deal of previous scepticism felt upon the point.

Contrary to what might have been expected in so exclusive a country as China, some of the plants in common use as drugs, or articles of diet, are not indigenous to the country. The grape-vine, the cotton-plant, and the tobacco-plant are all admitted to be of foreign origin. There is a division of fruit-bearing trees in the *Pun-tsau*, devoted to foreign additions to the full catalogue of excellent native fruits. Persia, India, and Arabia are often referred to as the sources of valuable drugs and perfumes, and there is a remarkable frankness (for the Chinese) exhibited in acknowledging obligations of this kind.

The carefully prepared catalogues of the tribute sent by the states and sovereigns tributary to the Chinese emperor, give us examples of many new things introduced successfully into China in this way. It was a prescribed and regulated privilege of the servants of the retinue of these ambassadors, or tribute-bearers, as the Chinese term them, that they should be allowed to sell certain quantities of articles admired on previous occasions by would-be possessors of such rarities.

All presents by European Governments were interpreted by the Imperial Government as similar tribute. Holland, Russia, England, and the United States, like the Sultan of Sulu, in Borneo, are all enumerated amongst the tribute-sending countries, and strict ceremonies are solemnly set forth, in the court regulations, for the observances of "Her Majesty's Servants," assumed to be sent to do this suit and service before the Lord of the World.

Chinese doctors have long used arsenic in ague, mercury in syphilis, borax for whitemouth, iron as a tonic, corrosive sublimate as an escharotic, indigo in epilepsy, tar in skin diseases, and zinc as an astringent.

The pharmaceutical operations are performed by Chinese druggists with great care, but their drugs are often carelessly secured, conveyed, and preserved. Many substances, such as aconite and digitalis, are treated in such a way as most surely to deprive them of all useful properties. Thus aconite root, extensively used in China, so that a distinct set of dealers buy and sell it alone, is often treated, before drying it, with a week's soaking in vinegar! Distillation was learnt by them from the Arabians. Wooden mortars are largely used for pulverizing, and the powder is sifted over and over again, to produce an impalpable powder. Levigation and elutriation are frequently made use of, and most excellent samples of drugs are to be met with in the market, prepared in this way. Large quantities of cosmetic powders are consumed in China. The white face-powder, scented with musk, and containing a small quantity of the celebrated Borneo, or Baros, camphor, is a very agreeable application to the skin in cases of eczema, slight burns, or sun-scalding. Root-fibres and stems are set in a press, and planed off into fine sections for purposes of decoction and infusion.

Every drug-shop has its altar to the god or king of medicine. A foreign beer-tumbler filled with oil, and burning day and night, by means of a floating wick, before a gilt image of the god, is the newest thing in this way. The Chinese medical profession rejoices in a god of surgery, and there are at least ten canonized doctors in the Chinese calendar of saints and heroes. Charms, amulets, incantations, brass images, mirrors, and many other subsidiary means are used by the Tanist quack-priests, or Zadkiels, of China, to cure formidable or special complaints. The small-pox is deified and propitiated, which is at least more sensible than neglecting vaccination and all other known means of averting this plague of mankind. Scarifying, cupping, both bloody and dry, bleeding, artificial production of subcutaneous ecchymosis, ginger blisters, the moxa, the lamp cautery, copper discs heated in boiling water, drainage issues, and many other means or appliances, are or have been used in China for ages. Rude trusses are sold, and used in hernia, often confounded with hydrocele and some other diseases of the scrotum. In fact, pretty much the same mistakes are made in China as in Europe.

Hydropathy is strongly recommended in early medical works. The common and effectual use of very hot water as a drink in colds, fevers, etc., is instructive to us Europeans. They produce sweating, vomiting, expectoration, diuresis, and almost every usual effect of the most powerful medicines by means of this simple agent—water, *plus* heat. Doctors who prescribe for their patients at a distance, after examination of their urine, are met with in China. Worm doctors are numerous, for in the fruits of the quis-qualis, and other native drugs, the Chinese faculty possess several excellent vermicides. Chorea doctors are a separate class of specialists.

There is such a jealous separation of the province of the physician from that of the druggist, in China, and such a strict etiquette, by which collusion is endeavoured to be prevented on their part, to the detriment of their mutual client, the patient, that the pecuniary interests of the physician are said to be often seriously interfered with. Should the patient be rich, there is room for both. The doctors themselves are divided into "ordinary practitioners," and "celebrated doctors," as before the law. They style themselves as "literary," "self-taught," and the "hereditary doctors." These last are a very numerous and much trusted class of practitioners, as they are the secret holders of the traditions and recipes of their perhaps long line of related practitioners. As to departments of practice there are the "outside" (surgical), "inside" (medical), "ophthalmic," and "veterinary" doctors. The last are a very ancient craft, and have a literature of their own. Midwifery is not recognized as a distinct or legitimate branch of the faculty. A set of old dames, called "birth-hasteners," carry on this business. Distinct names are sometimes given to several minor specialities, such as small-pox doctors, children's doctors, &c. Travelling quack doctors have a distinctive name. There are medical officers of some sort attached to the staff of general officers, but there are no regimental appointments. There is a medical mandarin of the lowest rank, connected with each prefecture, and another of low grade, appointed to the district. These two officials are medical tutors, who are supposed to teach the graduates of the colleges connected with the prefectures and the districts, and to act as medical attendants upon the inmates of the jails.

The fee of the Chinese doctor is an honorarium, and delicately termed "thanks." Money for the three sedan-chair bearers, according to the distance which the beautifully japanned, brass-bound, blue-curtained chair has been carried rapidly over, is regularly given, and "refreshers" are given in severe cases requiring frequent visits. Doctors are not allowed to tout in any way for practice, or, as the phrase goes, "physicians must not go about knocking at folks' doors!" Some doctors are what are called "contract doctors," or engage to cure for a certain sum, or series of sums, to be paid at successive stages of the cure. Presents are given to the doctors, the articles given being covered, or rather garnished, with red paper, and carried openly and ostentatiously (as is always the case in China) through the streets, attended by a rabble of hired servants, dressed up in semi-military livery. It is an understood thing that either the half of the things sent are returned next day, or the retainers are handsomely rewarded. The gods or goddesses are not forgotten, and models of the parts affected, candles, incense, etc., are sent to the temples. The gods and doctors are both highly lauded in pithy sentences, engraved with gilt letters on gaudy tablets, which are hung up before or within the temple, or the doctor's house. The fame of a practitioner is to be measured by the number of those tablets at his residence, on which he is compared to the medical deities or heroes. The tendency of all communications in China is to hyperbole, compliment, and profuse idiomatic metaphor.

All prescriptions are required to be written plainly, in the vernacular language, for the Chinese have never made any excursions into foreign languages, only to return for their best nomenclature, to their own vulgar tongue.

Many amusing stories are told of the shrewd dealings of the Chinese people with their doctors, such as the statement that the Chinese emperor only pays his doctor when he is well; or the curious averment that the Chinese paterfamilias is "put to bed" at the same time as his parturient "better-half," and treated with the same diet and doctoring as she is. These stories are not true, for the "heathen Chinee" is not a bit more odd than many other fish in the great sea of humanity, of which he only occupies a great gulf. So, having caught some few facts out of this fishery, we once more come back to our own shores, a little entertained, and, perhaps, relatively enlightened by our short voyage in the direction of a very Old World, into which our thoughts have this evening been briefly projected.

LIVERPOOL CHEMISTS' ASSOCIATION.

The third general meeting was held at the Royal Institution, on Thursday, the 19th inst. Mr. A. H. Mason, F.C.S., President, in the chair.

Mr. Hugh Jones Hughes was elected a member of the Association. Donation of the *Pharmaceutical Journal* was acknowledged. The President announced that arrangements had been made for holding the chemistry class, which would commence on the following Thursday, at 9 a.m.

On this evening miscellaneous communications were dispensed with, to give more time for the lecture.

The lecturer, Mr. Louis Siebold, of Owens' College, Manchester, was introduced by the President as a man whose labours in scientific pharmacy had led to his appointment as professor in one of the first scientific colleges in the world, and also as editor of the 'Year Book of Pharmacy.'

The Lecturer commenced by saying that within the last twenty-five years the science of chemistry had been almost revolutionized. The volumetric relations of the constituent gases in hydrochloric acid, water, and ammonia were commented on, and the law illustrated that when whole volumes of the constituent gases were employed, the resulting compound, in a state of vapour, never occupied less than two volumes. The relations by weight in definite and multiple proportions led to an account of the atomic theory, the subject of the lecture. The Lecturer concluded by pointing out the results that have followed the adoption of modern views of molecular composition, in the artificial production of alizarine, coumarine, and other organic bodies, not by accidental discovery, but by scientific reasoning leading direct to the manufacture of the substance.

The lecture, which was listened to with the utmost attention by a large audience, partly composed of ladies, was illustrated by experiments and excellent diagrams.

After some remarks by the President, Mr. M. Murphy, F.C.S., proposed a vote of thanks to the Lecturer. He spoke highly of the clear and simple manner in which a difficult subject had been treated. He, however, dissented from some views which had been expressed, especially as to the identity of the force which held together the atoms in molecules of the elements, and that which united the atoms in chemical compounds. He thought that it was not certain that the increase of bulk in a gas on heating was entirely due to greater distance between the molecules, but that it might be partly due to expansion of the molecule itself. Mr. E. Davies seconded the motion, which was carried by acclamation.

Mr. Siebold replied briefly to the remarks which had been made, and thanked the meeting for the attention with which it had listened to him.

BRIGHTON ASSOCIATION OF PHARMACY.

On Friday last the inaugural supper of the current session took place at the Old Ship Hotel, at which many of the leading chemists in the town were present.

The chair was occupied by the President of the Association, W. D. Savage, Esq., J.P., and the vice-chair by Mr. G. J. Haddock. After supper the health of Her Majesty the Queen and the rest of the Royal Family was proposed by the Chairman, and received with the customary demonstration of loyalty. The Vice-Chairman then proposed "the Brighton Association of Pharmacy," coupled with the health of the President, Mr. Savage. Mr. Savage, in responding, spoke of the many advantages derived from associations of the kind, and although regretting that the Brighton Association was not in such a flourishing condition as those of many other large towns, he hoped that this year renewed efforts would be made on the part of the members, and that they would come forward with papers for the evening meetings which would result in their being better attended than they had been during the past year.

The Vice-Chairman next proposed "the Pharmaceutical Society of Great Britain," and coupled with it the health of the President, Mr. Thomas Hyde Hills. He said, representing as they did that evening the chemists and druggists of the large and important town of Brighton, he felt sure that the toast he had proposed to them would be well received. In speaking of Mr. Hills, he said no one had done more for the cause of pharmaceutical education in this country, and standing as he (Mr. Hills) did at the head of a firm which had been, so to speak, the birthplace of pharmacy, he felt sure, in calling upon them to drink this toast, they would do so with all the respect and honour due to him.

The toast was drunk with great enthusiasm.

Mr. Savage, in rising to acknowledge the toast on behalf of the Pharmaceutical Society, spoke of the unbounded liberality of Mr. Hills in the cause of pharmacy, and he said whenever there was a benevolent object in view, Mr. Hills was always ready with his purse to contribute towards it, and that through an acquaintanceship of many years he had always found Mr. Hills, as a personal friend, worthy of the greatest regard, and that when Mr. Hills retired from the Presidency of the Pharmaceutical Society they would find great difficulty in getting any one who could fill the chair more worthily or ably than he had done.

The other toasts were, the past and present Secretaries, the Treasurer, Mr. Cornish (with musical honours), and the assistants of Brighton, responded to by Mr. Cassie.

A few songs and a recitation served to enliven the evening, and after singing the National Anthem the proceedings terminated.

Proceedings of Scientific Societies.

BERLIN APOTHECARIES' ASSOCIATION.

At a meeting of the above Society, on Tuesday, November 3, a communication was read from Mr. Heubach in reference to Professor Kolbe's experiments with salicylic acid as an antiseptic, in which he entirely confirms the professor's statement as to the antiseptic action of salicylic acid upon saccharine substances and food material.

Mr. Kobligk called attention to the inspection of pharmacies, complaining on the one hand of the great necessity for a skilled and independent judgment on the part of the inspectors, instead of a clinging to the letter of often defective laws and ordinances, and, on the other, of the great carelessness of pharmacists in the purchase and testing of their goods; he considered that inspections at defined and known times were ineffective.

Mr. Kobligk also exhibited some specimens of resina scammoniæ, which had been prepared by him according to the directions in the Pharmacopœia Germanica. The yield was about 7 per cent. He further described the following methods of testing as worthy of notice:—

Estimation of Quinine in Cinchona Bark (Perrot).—The powdered bark is repeatedly exhausted with alcohol and an alkaline solution of sodium silicate, the evaporated filtrate treated with ether, the residue from the ethereal solution treated with sulphuric acid, and the resulting sulphate of quinine weighed.

Tests for Free Mineral Acids (Mohr).—(*a*) Pure acetate of iron so much diluted with water that several drops of potassium sulphocyanide solution cause no colouration, with the faintest trace of free acid, gives the well-known red colour. (*b*) A dilute solution of acetate of iron treated with a solution of iodide of potassium and starch acquires a blue colour in the presence of the slightest trace of free acid.

Method of Filtering Liquids containing Sulphur (Hager).—Some drops of carbon bisulphide are added to the turbid liquid, and after a good shaking the mixture is poured upon a moistened filter. The sulphur remains behind dissolved in the carbon bisulphide.

Test for Veratria (Weppen).—The smallest quantity of veratria mixed with powdered sugar gives, upon the addition of sulphuric acid, a splendid colour reaction passing from green into blue.

Herr Augustin then read the following communications:—

Oil of Wintergreen.—The interesting discovery of Kolbe, of a method of preparing salicylic acid from phenol and carbonic acid, also suggests the preparation of an artificial oil of wintergreen, that oil consisting principally of methyl salicylate. The oil obtained by distillation from *Gaultheria procumbens*, an ericaceous plant growing in the Alleghany Mountains in North America, contains also a hydrocarbon, named gaultherylon, $C_{10}H_{16}$. The principal ingredient of the oil of wintergreen, however, is the ether which on account of its agreeable smell is much employed in perfumery. The natural oil prepared from *Gaultheria procumbens*, and the two oil prepared from the Javan plants, *G. leucocarpa* and *G. punctata*, as suggested by De Vrij (*Pharm. Journ.* (3), vol. ii., p. 503), cost at present in commerce 18 to 20 thalers per kilo. The author thinks, therefore, that early communications respecting the composition of the methyl salicylate may be expected.

The next communication referred to the preparation of carbolic acid from oil of *Andromeda Leschenaultii*, by Mr. Broughton, as described in this journal (vol. ii., p. 281).

Citric Acid.—The Jahresbericht of Drs. Wiggers and A. Husemann contains a communication upon *Vaccinium Vitis-idæi*, from which it appears that the organic acids in the berries have been carefully studied by Graeger. He has found them to contain $1\frac{1}{4}$ to $1\frac{1}{2}$ per cent. of citric acid, and $\frac{1}{4}$ to $\frac{1}{3}$ per cent. of malic acid; and he believes that when the plant is plentiful the fruit might be used profitably in the preparation citric acid, and the more so because vinegar or alcohol can be obtained as a bye-product. The quantity of citric acid is dependent upon the ripeness of the fruit before gathering, the citric acid being more abundant in proportion to the ripeness of the berries but the malic acid is not altogether wanting in those that are perfectly ripe. Experiments have shown that by using sodium bicarbonate about half the quantity of acids could be removed and the sugar economized, it being possible to add to each pound of berries five to six grams of sodium bicarbonate without injuring either the colour or flavour of the fruit. The speaker stated that he had this year made some experiments upon the subject, and that he would revert to it at a future sitting of the Society.

CHEMICAL SOCIETY.

Thursday, Nov. 19, 1874; Professor Odling, F.R.S., etc., president, in the chair. After the usual business of the Society, Dr. C. R. A. Wright read a paper on the "Action of Organic Acids and their Anhydrides on the Natural Alkaloids, Part II," by himself and Mr. Beckett, being a continuation of that which he brought before the Society at the last meeting. Professor W. Ker Clifford then made a communication on "General Equations of Chemical Reactions," proving mathematically from the kinetic theory of gases, the generally adopted method for expressing chemical reactions. An interesting discussion ensued, after which the following papers were read:—"On Propionic Coumarin and some of its Derivatives," by W. H. Perkin, F.R.S.; "On the Composition of Autunite," by Professor A. H. Church; and "The Action of Bromine on Protocatechuic Acid, Gallic Acid, and Tannin," by J. Stenhouse, F.R.S. The meeting was finally adjourned until Thursday, December 5th, when papers on the "Formulæ of the Alums," by Mr. S. Lupton, and the "Colour of Cupric Chloride," by Mr. W. N. Hartley, will be read.

Parliamentary and Law Proceedings.

Sale of Fraudulent Musk.

This is a case of some interest to pharmacists; it was tried at the Court of Exchequer of Pleas, at Westminster, before Sir Fitzroy Kelly and jury.

Mr. H. A. Jeune, plaintiff, who is a broker in the City of London, sought to recover from Mr. A. Monjoseph, defendant, who is a drug merchant in the same city, the price of a caddy of musk weighing $19\frac{1}{2}$ oz., and valued at £32 13s.

The evidence went to show that, in the latter part of July last, plaintiff offered defendant a caddy of *fine Tonquin musk*; the latter did not at once purchase, but offered it to Messrs. Hallawell and Symes, export druggists of Liverpool, who replied that they could do with it if of fine quality; the defendant wrote plaintiff to this effect, and with his permission sent the caddy to his customers on approval, with a request that the pods should not be cut open or disfigured unless they were purchasers.

Dr. Symes made an examination of the pods, pricking with a needle in the usual way, and looking for stitches; they had, as a whole, the appearance of being genuine, and it was ultimately decided to purchase, accepting them, according to declaration, as fine Tonquin musk. About 10 or 11 days after, the pods were all cut open, and of the $19\frac{1}{2}$ oz. only $6\frac{1}{2}$ oz. were found to be musk, the remainder being earthy matter, etc. The pods of musk were then wrapped in tinfoil, and with the fraudulent ones were replaced in the caddy, and returned to defendant, who in turn offered them back to plaintiff, but he refused to take them, and brought this action to recover amount of invoice. On his behalf it was argued that it was the custom in the musk market to examine by pricking only, and not by cutting, and that the purchaser always took upon himself the responsibility of the contents, it being understood that musk was largely adulterated; and, further, he did not admit that the musk was offered back to him.

For the defence it was argued that whatever might be the custom in the market it did not rule in a sale by private treaty, where the article was specified and declared to be something which it afterwards proved not to be; fine musk had been purchased, but had not been supplied; it was not a question of quality, but of the actual nature of the article itself. The offer to return the whole, and retain and pay for the 6½ oz. musk, was proved, and the defendant stated that, although he had considerable experience in musk, he had failed to detect any appearances which would lead him to suppose these were fraudulent, until after they were cut open. Dr. Symes, in his evidence, said that he looked for stitches, but so ingeniously were they sewn that he failed to detect such till after cutting them open; he also identified the pods as those returned by his firm from Liverpool.

The Judge, in summing up, said that in all probability the fraud had been committed in China, and that both plaintiff and defendant were equally innocent of it, and it would be for the jury to say which of them was to suffer the loss. The evidence had narrowed itself into two points, and from these they should arrive at their decision. There was such a thing as buying an article from appearance without any declaration being made as to its nature; in that case as soon as the seller had handed over the article his part of the contract was complete. The plaintiff had, however, admitted having offered the contents of this caddy as fine Tonquin musk, and in so doing had contracted to supply the article named. The second point was one on which the law was very exact, viz., if the purchaser of an article keeps it for an undue length of time before he notifies to the seller that the article is not what it was declared to be at the time of purchase, then the responsibility rests with the purchaser, and he has no power to recover for any loss he may sustain. It was for the jury to decide whether in this case the article had been specified to be what it turned out not to be, and whether an undue time elapsed before this was notified and offered back to the seller.

The jury almost immediately returned a verdict for the defendant.

Alleged Attempt to Poison by Corrosive Sublimate.

On Monday, at the Worship Street Police Court, William Cherry was charged with attempting to murder his wife by poison. The wife, who refused to attend until she was summoned, deposed that on the 11th inst., on leaving home to go to her work, she took with her, as was her usual custom, some sugar in a paper, to use with coffee at the workshop. Having put some into her coffee, she noticed the coffee had a bitter coppery taste, and she threw away the first cupful and poured out another; for this she used some of the same sugar, and she noticed it had the same taste. She afterwards became ill, and went to St. Bartholomew's Hospital, where she was treated, and got well. The coppery taste remained during three days. Other workpeople who drank the same coffee were not affected. The remainder of the sugar taken to the workshop by the wife was examined by Dr. Pavy, who certified that it contained corrosive sublimate. Some evidence was given with the object of showing the source from which the prisoner might have obtained the poison, and the prisoner was remanded.

Suicide by Prussic Acid.

An inquest was held on Monday, at Brighton, upon the body of a gentleman named O'Brien, aged 22, who committed suicide by taking prussic acid. It appeared that the deceased had invested his money in English mines, and proceeded to Africa, where he failed in his profession, and on returning to England learned that his investment was also a failure. The jury returned a verdict of "Temporary insanity."—*Echo.*

Review.

The Chemical History of a Candle. A Course of Lectures delivered before a Juvenile Audience at the Royal Institution. By Michael Faraday, D.C.L., F.R.S. Edited by William Crookes, F.C.S. London, Chatto and Windus.

This volume, which professes to be the chemical history of a candle, has in reality a very much wider scope than such a name might be supposed to indicate, for it not only contains a description of the nature and properties of the elements concerned in the combustion of a candle as well as of the products of its burning, but supplies also brief accounts of some of the physical forces by whose agency the operation is carried on, and draws an instructive comparison between the phenomena of combustion as ordinarily seen in carbon compounds and the respiratory function in animals.

The lecturer introduces his subject by giving an outline of the *modus operandi* in the production of some of the principal kinds of candles; tallow, paraffin, and wax candles receiving a due share of attention. The account given of the manufacture of the latter, though quite intelligible to any one conversant with the process, will, we are afraid, not be perfectly understood by children reading it for the first time. A woodcut, for the purpose of illustrating what Faraday's model did on the occasion of the lecture, would have rendered this much more complete.

A brief reference to the more ornamental kinds of candles follows, in which allusion is made to some prominent disadvantages connected with them; then the lecturer passes on to notice the cup formed immediately below the flame, and the nice adjustment of forces necessary for its production and preservation.

Attention having been directed to these points, the question, "But how does the flame get hold of the fuel" is made the text of an exceedingly intelligible dissertation upon capillary attraction in general; this is succeeded by an experiment illustrative of the vaporous condition of the fuel when burnt, and some remarks upon the form of the flame, and the influences determining this form.

Thus far the first lecture.

We must content ourselves with merely giving a *résumé* of the plan pursued in working the subject out in the succeeding lectures.

After showing that air is necessary to the combustion of a candle, and describing the cause of its luminosity, the lecturer enters upon the largest division of his subject, in which he speaks of the products of combustion. Some of the heads, around which are clustered interesting facts and beautiful experimental illustrations, are:—Water: its properties in the solid, liquid, and gaseous states; its decomposition. Hydrogen: its properties; product of its combustion; the decomposition of water by the voltaic current, and its recomposition from the resulting gases. Oxygen: the combustion of various elements in it; tests for free oxygen in the air. Nitrogen: its importance as a diluent in the atmosphere; weights of gases and method of ascertaining them; practical evidence of the atmospheric pressure. Carbonic acid gas: its properties; its occurrence in the breath; its use in the economy of nature; the analogy of combustion and respiration. Carbon: its presence demonstrated in sugar, carbonic acid gas, etc.

These, and many other matters relevant to the subject, are treated in a manner which cannot fail to interest and instruct any children into whose hands the book may be placed.

A striking feature of Faraday's mode of imparting knowledge is seen in this volume—we allude to the beautiful manner in which, instead of presenting isolated facts to his hearers, the lecturer seeks rather to supply the necessary data for their inference, and thus to lead his audience to those just conclusions which he afterwards verifies by experiment.

In one or two cases an editor's foot-note would have been of advantage, in showing that some of the statements, apparently absolute, are in reality relative only. Thus, the clashing that occurs between the statements—first (p. 154), that oxygen is insoluble in water, and then p. 185), that fishes "respire by the oxygen, which is dissolved from the air by the water," would have been prevented by the former being a statement of the comparative solubility of oxygen, hydrogen, and carbonic acid gas in water.

After the course of lectures we have been considering, comes a lecture upon Platinum, which is a very concise and practical account of its extraction, both by the wet process and that devised and employed so successfully by Deville.

BOOKS RECEIVED.

A Course of Qualitative Chemical Analysis. By William George Valentin, F.C.S. Second Edition. London: J. & A. Churchill. 1874. From the Publishers.

The Chemists' and Druggists' Diary, 1875. From the Publishers.

Notes and Queries.

HYPODERMIC ADMINISTRATION OF MEDICINES.—Dr. Ernest Sansom states (*Med. Times and Gazette*, Oct. 31) that he has overcome some of the difficulties attending the use of solutions for hypodermic injection, by using gelatine discs containing definite quantities of the alkaloid or other active principle. When a solution is required for use one of the discs is dissolved in two or three drops of water placed in a teaspoon, and warmed over a spirit lamp or candle. Solution takes place in a few seconds, and the fluid is at once taken up into the syringe and injected.

NEW ANTISEPTIC DRESSING.—At a recent meeting of the Medico-Chirurgical Society of Edinburgh, Professor Lister described a new antiseptic dressing which he had used successfully in a case of rodent ulcer where the ordinary antiseptic dressing of gauze impregnated with carbolic acid, with a protective layer of oiled silk, would have been unsuitable. It consisted of an ointment composed as follows:—

Boracic Acid, in fine powder	1 part.
White wax	1 "
Paraffin	2 parts.
Almond-oil	2 "

The ingredients, after being mixed by melting the wax and paraffin, are stirred in a warm mortar till the mass thickens, and then set aside to cool, after which the firm substance is reduced in a cold mortar, in successive portions, to an uniform soft ointment. This is spread thin on fine rag, and when the almond-oil leaves it, as it soon does through capillary attraction of the porous external dressings, a smooth firm layer remains, consisting of blended wax and paraffin, together with the boracic acid, which comes off from the skin without leaving any greasy substance adhering, and does not at all confine the discharge, which, while freely shed, is perpetually supplied with a sufficient quantity of the boracic acid to ensure absence of putrefaction, while not preventing cicatrization. The *London Medical Record*, commenting on the above, says:—"A still better application for cases of this kind is an ointment composed like that above described, except that instead of one part of boracic acid, it contains half the quantity of salicylic acid, the antiseptic virtues of which have been quite recently discovered by Professor Kolbe, of Leipzig, who has also found out a method of manufacturing it cheaply. Salicylic acid, while possessing very remarkable antiseptic power, is even less irritating than boracic acid."

[418.] CRIMSON MARKING INK.—Can any of your readers oblige me with the formula for a really good crimson marking ink, one that will remain permanently crimson, without heat being applied, but on the addition of a hot iron changes to black?—Chemicus.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Education.

Sir,—Allow me to make a very short reply to your editorial comment upon my letter in last week's Journal, vide "Pharmaceutical Education."

You say I was "labouring under some misconception, in considering the attitude of the Council of the Pharmaceutical Society, twelve months ago, as antagonistic to pharmaceutical education." If so, I am pleased to be disimbued of that impression, which at that time was pretty generally shared in by others on this side of the Channel. The Select Committee appointed to investigate the Irish pharmacy question was informed that they (the Pharmaceutical Society) would give no assistance to an educational movement in Ireland, although it would be urgently required. And it was generally understood that there was a party in the Pharmaceutical Society who wished to sever the connection of their own school in London and the Pharmaceutical Society of Great Britain, although that excellent school in years past had done so much towards raising the Pharmaceutical Society to the very high position it now holds.

"Sympathy" is pleasant to receive and very easy to give, but will not always meet the exigencies of the hour, and of course will not educate the pharmaceutist in Ireland.

C. R. C. Tichborne.

Dublin, November 17, 1874.

Sir,—I have a great objection to public correspondence coloured by personal feeling, and would have preferred that my letter of Oct. 22 might rest on its own merits, but I regret that to leave the matter thus might appear to be an admission that I have a contempt for associates, which is not the case.

I have long regarded the Minor examination as the *pons asinorum* of pharmacy, and with this idea in my mind I wrote that "a man had better turn grocer than remain for life an ass of the Ph. Soc." I admit this was a rash expression, seeing that I did not mean to imply anything more than that the rejected student was, like this patient creature, condemned to fill only an inferior position; but some kind little printer's devil, willing to save me from such an error, printed it "associate." The meaning I intended to convey was that a man had better turn grocer than retain for life his connection with pharmacy, wanting the Minor qualification, being thus condemned to the ranks of assistantship, and to a low grade even of the subordinate position.

It is only in the two earlier examinations that a few hundred students have been rejected, and it is only in the early stage of a man's course that it is merciful to compel him to change his plan if he has adopted that for which he is naturally unsuited. When the student has taken his degree and become a man of business, no one would think of interfering further with his doings; but I repeat it is a pity for him as well as for the public, if after being well examined, his pharmacy becomes rusty from want of use.

Barnard Proctor.

11, *Grey Street*, *Newcastle*, *November* 24, 1874.

[*** We regret having failed to perceive that the words "an Ass: of Ph. Soc." were intended to express a joke.—Ed. Ph. Journ.]

Calamine.

Sir,—Many of your readers I am glad to find have perfectly understood the kind of calamine powder which I have recommended for general use; and some have been kind enough to send me good samples prepared from the natural article, in the way I pointed out. I have no doubt the object I have in view will be in great measure secured, but I had hoped that you would have lent your aid in bringing about a common understanding as to the kind of characters of the powder most desirable for general use, so as to avoid the present uncertain results which are obtained from the employment of calamine powder of the most varied descriptions.

I still hope that you have misunderstood me, therefore, let me restate my position. After a very extensive use for many years, I have reason to be fully satisfied with the use of a particular form of a certain drug and that particular form only, as a most valuable therapeutic agent. I consequently ask pharmaceutists, in your columns, to accept the result of my experience and to adopt the use of this particular form of drug. But I am met at once by your suggestion of the employment of another preparation which I have found to be injurious or objectionable in its action, and further by the statement, contained in the editorial note you appended to my letter last week—that the use of the drug belongs more to the cosmetic art than to therapeutics, an assertion that I for my own part repudiate *in toto*. It is true I employ a powder of a particular colour, but only because it is less objectionable than others.

To proceed, however, with the main matter. Now I never knew the pharmaceutist who was not anxious to discover exactly what the physician wants in regard to the nature and character of drugs, and to meet that want. But to use plain language your dealing with the case of calamine powder, involves a distinct setting up of yourself to be the judge of what the physician ought to use. I can't think you mean this in reality, and I will not condescend to make it a personal matter. I could easily name a particular preparation or preparer in my prescriptions to save trouble to myself. But I put the matter upon much larger ground. An important benefit is to be secured the physician and the patient, and much dissatisfaction avoided so far as both are concerned by compliance with my recommendation of the use of a particular kind of calamine—a recommendation let me add made as much in the interest of the pharmaceutist as the physician—and, therefore, I finally ask you to accept such recommendation, and to assist in bringing about such a desirable result as that to which I have referred. If there has been any misunderstanding I hope this communication will remove it. Tilbury Fox.

November 23, 1874.

[*⁎* Our correspondent appears to have fallen into the error of giving a general significance to our remarks instead of regarding them as applying only within the limits we specified.—Ed. Ph. Journ.]

The Qualifications of a Good Dispenser.

Sir,—In Mr. Haselden's very able article on dispensing in last week's journal, one or two samples of foreign prescriptions are introduced; they are such as might be met with in any pharmacy in most large towns with an appreciable influx of foreigners.

Assuming they might be of interest, I beg to place at your disposal two specimens of what we have brought to us almost daily for dispensing.

The authors of these prescriptions are generally Russo-Polish quack doctors of an ancient and almost extinct school. They not only perplex the dispenser by their execrable Latin, but also by the almost *recherché* absurdity of their combinations.

With all due care in manipulation it is often impossible to turn out an elegant preparation. Asellus.

℞ Lixivii Ioduret. drachm. duas.
Syr. Diacodii, drachm. sex.
V. fl. Naph. unc. octo.
Spt. Æther. Chlor. scrupulum.
M.D.S. ʒx tgl. 1 Essl.

L.V.

℞ Butyri Cacao, *uncias duabus.*
Sachari Albi, *drachmæ six.*
Syrupi Balsami Tolutani,
,, Capilli Veneris, *aa uncias uni;*
M.f.d. pro mei.

℞ Pulv. Millepedum, drachmæ 11.
Gummi Ammoniaci, *drachm jss.*
Aceti Morphini, *gran. duobus.*
Florum Benzoës *drachm. unum.*
Balsami Peruviani, *gran. dilut.*
,, Sulphuris Anisati.
Syrupi Opiati, aa. q.s.
Fiat masa pilularis granorum 1, consporgantur pulver. lycopoduum da. pro mei.

A Case for the Benevolent.

Sir,—Some time since, you kindly allowed me to make an appeal on behalf of Mrs. Newby, the widow of an aged chemist, in Brunswick Street, Hackney Road. This appeal has only produced £3 4s. 6d. Although the deceased was not a pharmaceutical chemist (and is therefore excluded by the rules of your benevolent fund), I cannot believe that your readers will willingly let his widow (who is over 60) starve—for this is the alternative if help be not speedily forthcoming, and I therefore make a special urgent appeal on her behalf. As before, subscriptions will be thankfully received for her by the Rev. Michael Kelly, St. Monica's, Hoxton, N. I have confidence that some "good Samaritans" will be found amongst your readers.

W. Bathurst Woodman, M.D.

6, *Christopher Street, Finsbury Square, E.C.*

Subscriptions already received:—

	£	s.	d.
Mr. Pinken, Newport, Salop...	0	5	0
,, Fredk. Cole, Stoke Newington ...	0	5	0
,, Slade, Llantrissant...	0	10	0
,, Reeves, Brighton	0	5	0
,, Taylor, Droitwich	0	4	0
An Ilfracombe Chemist	0	4	6
R. Sloman, Esq., Torquay	1	1	0
Mr. W. Adams, Plymouth	0	10	0
	£3	4	6

"*Dens.*"—(1) Spontaneous oxidation. (2) In reply to this question we can only refer to the words of the article printed on pp. 253 and 254 of the Pharmaceutical Society's Calendar. If you wish for an authoritative opinion you should forward the question to the Board of Inland Revenue.

"*Elston.*"—(1) Several formulæ for Glycerine and Lime preparations have already appeared in the present series of this Journal. (2) Much would depend upon the nature of the stains. If consisting of recent grease spots they could probably be removed with a little benzol or oil of turpentine.

"*Alpha.*"—Any of the standard books on chemistry, materia medica, and botany will enable you to study the subjects of which a knowledge is required for the Major examination. A list of such works is given in the pamphlet entitled 'Hints for Students,' which may be obtained from the Secretary.

X. Y. Z.—We should think that no decomposition would take place.

J. Simpson.—A green colour for show-bottles may be prepared by dissolving two parts by weight of sulphate of copper and four parts of chloride of sodium in a sufficiency of water.

G. H.—(1) The book mentioned is, we believe, out of print; try 'Roscoe's Elementary Chemistry,' published by Macmillan. (2) Either of the works on materia medica mentioned are sufficient for the purpose.

"*Barium.*"—The information may be found in any manual of Chemistry.

J. Noad.—The bichloride of iridium is easily soluble in water; the other chlorides have a soluble and insoluble modification.

J. F.—The equivalent refers evidently to the preparation in a pharmacopœia antecedent to the British Pharmacopœia. The preparation having been before the public for many years at the time of the first issue of the latter, probably the manufacturers were loth to alter the form of the label. The apparent inconsistency would, however, be explained by the insertion of the letters, P. L.

Dr. Fever.—Tallow is bleached by treatment with bichromate of potash and sulphuric acid; a description of the process is given in Ure's Dictionary.

Communications, Letters, etc., have been received from Mr. Barnes, Mr. Simpson, Mr. Mee, "Nemo," A. P. S., R. M.

AN ADDITIONAL METHOD OF TESTING GLYCERINE.*

BY DR. RICHARD GODEFFROY.

Professor of Practical Chemistry in the Vienna School of Pharmacy.

As is known, pure glycerine should be free from colour and smell, neutral, of specific gravity 1·26 to 1·27, capable of mixing with alcohol and water in all proportions, and free from all foreign substances.

The methods published for the examination of the purity of glycerine are somewhat tedious, for the glycerine must be tested not only with regard to its specific gravity, but also by means of all possible reagents for finding out of impurities which might be present. I believe that now I have found a method by means of which some of the testing operations are much simplified.

If pure glycerine be placed in an open platinum or porcelain crucible, and heated up to 150° Celsius, it will begin to boil. It can now be ignited, and will continue to burn quietly with a blue and not very luminous flame, without diffusing the least smell or leaving behind it the least residue.

When the glycerine has a specific gravity below that of pure glycerine, it will boil under 150° Celsius, but at the moment of boiling it cannot be ignited.

If metallic salts be mixed with the glycerine they will remain as residue in the dish; the same would be the case when more highly organized combinations are present; these remain in the cup as a black, charred, or soot-like residue.

I may mention that glycerine can be ignited very easily by means of a cotton wick, and continues to burn without smell; on extinguishing the flame there is no smell. The ordinary commercial glycerine of specific gravity 1·249 to 1·256 can easily be ignited by means of cotton: it is not necessary in this mode of ignition that the glycerine be anhydrous.

[*The discussion on this paper is printed at p.* 454.]

PRESERVATIVE EFFECT OF CHLOROFORM UPON VEGETABLE INFUSIONS, ETC.†

BY J. B. BARNES, F.C.S.

Early in the course of the present year, Dr. George Pritchard, of Greenstreet, Kent, communicated to me the fact that he had found, by the addition of chloroform to vegetable infusions, they were preserved for a considerable time.

This appears a subject to which some interest is attached; therefore I have brought it before the meeting, together with the result of some experiments, which I have made to ascertain the minimum quantity of chloroform, necessary to effect the preservation of infusions and some other substances.

On the fourteenth of last month two sets of infusions of calumba, chiretta, malt, senna, and roses, were prepared; each set was marked No. 1, and No. 2, respectively. To eight fluid ounces of No. 1 of each sort were added five minims of chloroform, and to the same quantity of No. 2 three minims; they were well agitated, set aside, and examined from time to time. Those of calumba, chiretta, malt, and senna, when fresh, were tested with litmus paper; they were decidedly acid, and it does not appear that the acidity has increased. All marked No. 1 are as good now after six weeks as they were when new; they are clear, retain their natural odour, and do not appear to have changed in the least. Of those marked No. 2, the infusion of malt, after four days, had lost its agreeable odour, was turbid, and frothed considerably when agitated. After a fortnight those of calumba, chiretta, and senna, showed signs of change; they had lost their good odour, were no longer bright, and quite unfit for use, the infusion of roses alone of this set remaining good. The result is that infusions of calumba, chiretta, malt, and senna will keep good for a reasonable time by adding *five* minims of chloroform o every eight fluid ounces; and *three* minims will suffice to preserve the same quantity of infusion of roses. I have no doubt that infusions of other substances, may be preserved by the addition of chloroform in the same proportion. It will be easy to add chloroform to concentrated infusions, so that when diluted, each sixteen ounces may contain *ten* minims of chloroform. There are upon the table two samples of mucilage of acacia, marked No. 1 and No. 2; No. 1 contains chloroform in the proportion of *one* minim to the fluid ounce, and No. 2 *two* minims; they were prepared six weeks ago, and both appear to be as fresh now as they were the day they were made.

At the same time *four* minims of chloroform were added to four fluid ounces of mucilage of tragacanth, well agitated and set aside, together with some of the same mucilage without chloroform, which, when tested immediately after it was prepared, proved neutral to litmus paper. These samples were again tested a few days since, and that containing chloroform was still neutral, whilst the other had become strongly acid, and quite unfit for use.

Having been successful so far, I thought it probable that by adding chloroform in the proportion of *four* minims to the pint, elder, orange, and rose water might be prevented from throwing down the flocculent precipitate which so commonly occurs in them, but it is not so; probably it might be if added to recently prepared water. Of course in this case the delicate odours must not be overcome by the addition of too much chloroform.

The question now arises, how does chloroform effect the preservation of infusions and mucilage of acacia and tragacanth? In my opinion it preserves them by its action on the fermentable substance held in solution, and this is strengthened by the property it possesses of preventing alcoholic fermentation. About three weeks ago I mixed two fluid drachms of yeast with three separate sixteen ounces of fresh infusion of malt, which had cooled; they were marked Nos. 1, 2, and 3. To No. 1 were added *twenty* minims, and to No. 2 *ten* minims of chloroform; no chloroform was added to No. 3. They were set aside in a warm place; after a while fermentation set up in No. 2 and No. 3, with the formation of alcohol, but No. 1 remains to this day unfermented.

Not only is the alcoholic fermentation prevented by chloroform, but when added in sufficient quantity to fresh milk, the lactic fermentation is also prevented. To two eight fluid ounces of fresh milk were added

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 2, 1874.

† Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 2, 1874.

respectively *ten* and *twenty* minims of chloroform; they were kept in a warm place, and occasionally agitated; after five days had elapsed that containing *ten* minims had developed lactic acid in quantity sufficient to separate the caseine, whilst that containing *twenty* remained fresh and good. It might be found convenient to preserve milk in this manner, always taking care to boil it just before using, in order to drive off the chloroform.

It is very probable that solutions of acetate and citrate of ammonia, citric acid, lemon juice, and many other organic substances may be preserved by chloroform.

About seven years ago Dr. Pritchard informed me that he was then using chloroform water in his mixtures, much to his own satisfaction and that of his patients.

[*The discussion on this paper is printed at p.* 455.]

CHLOROFORM AS A PRESERVATIVE AGENT IN INFUSIONS.*

BY F. J. BARRETT,
Dispenser at the Wolverhampton and Staffordshire General Hospital.

Nearly four years ago, on commencing my duties at this hospital, I found that the cost of rectified spirit for the preservation of concentrated infusions formed a very serious item of drug expenditure, and twenty-five per cent. of rectified spirit could scarcely be considered (apart from its preservative action) a necessary or even desirable adjunct to a concentrated infusion, I endeavoured to discover some more economical preservative. After several experiments I hit upon *chloroform*, and found it to answer the required purpose. As I cannot place my hands upon the notes I made at the time, relative to the length of time various infusions kept good with different proportions of chloroform, compared with the same infusions treated with rectified spirit, these remarks will, I fear, be comparatively worthless.

I found subsequently, on exchanging notes with a friend, a brother hospital pharmaceutist, that there was one trifling drawback to the importance of this discovery—namely, it had been found out many years before, and was in constant use in more than one hospital. I believe, however, that no record has been published of its use for this purpose, and Mr. J. B. Barnes will doubtless do good service in calling the general attention of chemists to its important preservative properties.

The following is the *modus operandi* adopted in this hospital laboratory:—We prepare a three weeks' supply at once (generally about four gallons of concentrated infusions of quassia, calumba, and gentian, and smaller quantities of others). A Winchester quart (four pints) is first half filled with infusion, then two drachms of chloroform is poured in and well shaken for two or three minutes, then another pint of infusion is added, and again well shaken, and lastly the bottle is filled, stoppered, tied over with leather, and stored in a cool place. In this way we have kept for two months a concentrated infusion, which, upon dilution with water, will remain unchanged as long as an infusion prepared in the ordinary manner. Certainly, there can be no possible objection to chloroform thus used, as one ounce of diluted infusion would only contain one-sixth of a minim of chloroform.

In making concentrated infusions containing volatile aromatics, we evaporate a simple infusion of the active ingredient by a steam bath to an eighth part of its bulk, and then infuse the aromatic substances in this till cold.

Besides using chloroform as a preservative in infusions, I have more recently used it combined with glycerine in place of rectified spirit, in the preparation of such fluid extracts as ergot, bael, liquorice, cinchona, greater periwinkle (*Vinca major*), and others. Very satisfactory preparations may be made in this way, which if not quite as elegant in appearance as the Pharmacopœia extracts, are at least much more economical and certainly as active, which, after all, in hospital work are the main points to be considered. We have some ergot extract now in use, which was made in July, and it appears to be quite as good as when first manufactured. I hope shortly to be able to send to the Journal full particulars of the way in which we prepare our liquid extracts.

Doubtless chloroform could be used most advantageously in many preparations in the place of rectified spirit, and it has the advantage when greatly diluted of being exceedingly palatable, so that it would not be objected to by the patient.

[*The discussion on this paper is printed at p.* 455.]

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 2, 1874.

EXTRACTUM GLYCYRRHIZÆ LIQUIDUM.*

BY CHARLES UMNEY.

At the evening meeting of this Society in April last, when the British Pharmacopœia Addendum, and its preparations, were under discussion (*Pharm. Journ.*, April 4, 1874), when speaking of the Fluid Extract of Liquorice, I questioned if the 11 per cent. of rectified spirit ordered to be present in the completed product was sufficient for its proper preservation.

About that time I set aside a pint of the fluid extract (in a cool room) in order to note any change that might take place.

Upon examination after some three or four months, I found the contents in a state of fermentation, which seemed to be progressing on each occasion I opened the bottle.

This week I found that not only was there fermentation, but a considerable yellow deposit, and in addition a partial gelatinization extending to almost half its volume.

I have not examined the deposit, but I should imagine that it is chiefly glycyrrhizin deposited by the action of the acid produced in the fluid extract by the fermentation of glucose, or other body capable of vinous fermentation, existing in the liquorice root with the glycyrrhizin, which itself is not susceptible of fermentation. Fluid extract of liquorice is a very desirable preparation; the process given in the Addendum for its production is thoroughly sound in principle; but its preservation can, without doubt, be improved upon.

Whether an increased quantity of alcohol is desirable, or a trial of glycerine or other preservative fluid, I am not prepared at the present moment to say.

I have, however, put aside several specimens in order to determine this point.

[*The discussion on this paper is printed at p.* 456.]

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 2, 1874.

ADULTERATION OF BEESWAX.*

BY ADOLPH W. MILLER, M.D., PH.D.

For a year or two past there has been offered in the United States market, and most probably elsewhere, an article termed "refined beeswax." It is unusually handsome in appearance, and is generally represented as being strictly pure. It may be known by all of it being of a uniform bright yellow colour, entirely free from the sedimentary stratum of impurities ordinarily found in country wax. Its surface is clean and glossy, having no foreign particles adhering to it.

The melting point of the refined wax was found by the author to be 146° F., that of pure wax being 156°, and that of paraffin from 137° to 140°. Its specific gravity is ·929, placing it again intermediate between beeswax, ·963, and paraffin, ·871. Being thus induced to suspect the presence of the latter body, he heated 100 grains of the refined article for fifteen or twenty minutes with one ounce of sulphuric acid to about 350° F., several ounces of water were then added, and, after cooling, a sheet of paraffin weighing 80 grains was obtained, the loss representing the beeswax which had been carbonized by the acid. In order to verify the experiment, it was repeated with a composition of four parts paraffin to one of wax, when analogous results were obtained. One hundred grains of pure paraffin, treated in the same manner, were recovered unchanged.

The only difficulty in the test is the separation of the carbonaceous matter from the paraffin. This is most conveniently removed by repeatedly melting the paraffin on water, at the same time gently stirring it.

There seems to be a considerable difference in the mode of contraction, while cooling, between beeswax and paraffin, and this may serve to detect the adulteration, at least when practised to this extent. Blocks of paraffin are decidedly concave on the top, and the specimens of adulterated wax were observed to be more or less concave on top in proportion to the amount of paraffin which they contained. Pure beeswax appeared to be level, the contraction acting in a horizontal direction and tending rather to the production of vertical fissures.

The optical behaviour is also different; pure wax is quite opaque, while this adulterated article is somewhat translucent, more particularly on the edges.

SOCIETY OF PUBLIC ANALYSTS.

A general meeting of the members of this Society was held on Tuesday, December 1st, at the City Terminus Hotel, Cannon Street, under the presidency of Professor Redwood.

The minutes of the previous meeting were read by the Secretary. A brief report was presented, stating what had been done by the Provisional Committee appointed at the inaugural meeting in August last, from which it appeared that the actual number of original members of the Society is now 63, only about 15 public analysts throughout the kingdom having failed to avail themselves of the opportunity of joining without election. Since the beginning of October, ten meetings had been held, the principal business transacted being the drawing up of a constitution for the Society, and the framing of a definition of adulteration which should be at once comprehensive enough to include all actual adulterations, and at the same time sufficiently elastic to prevent oppression or injustice. To this end a great number of proposed definitions, submitted by some of the most eminent chemists in the kingdom, had been carefully considered and digested, and they had also been laid before some experienced solicitors connected with local authorities, whose legal experience, it was thought, would be valuable. The result had been circulated amongst the members in a printed form, but several suggestions had been received since, which appeared worthy of consideration before the proposed definition was adopted. The remainder of the report referred to the election of officers for the ensuing year, and the financial arrangements of the Society; also to a contemplated arrangement with the publisher of an established scientific journal for the use of a certain portion of space periodically in the interests of the Society.

Mr. Wigner stated that he had received letters from many gentlemen throughout the kingdom, whose names he read, approving the objects of the Society, and regretting they were not able to attend.

Dr. Tripe proposed the adoption of the report, which was seconded by Mr. G. Turner, of Landport.

Mr. Rimmington said he doubted whether it would be wise for them at present to propose for the adoption of Government any definition of adulteration. He feared whatever they might do would only be subject to criticism, and might very likely be pulled to pieces without producing any useful result.

The Chairman said he thought the discussion on this point had better be raised later, when the proposed definition was brought forward; and the report was then unanimously adopted.

The Chairman then introduced the main business of the meeting, viz., the formation of a constitution for the Society. A printed copy of the one framed by the Committee had been circulated amongst the members, and its adoption he begged leave to move, being pleased to add that no alterations whatever had been suggested in it, though such had been invited.

Mr. Wigner then proceeded to read the suggested constitution and rules, in the course of which Dr. Tripe suggested that the number of honorary members should be limited; and in answer to the same gentleman, the Chairman explained the manner in which the votes would be taken. The objects of the Society were stated to be as follows:—

"1. To promote and maintain the efficiency of the laws relating to adulteration.

"2. To promote, and as far as possible to secure, the appointment of competent public analysts.

"3. To improve the processes for the detection and quantitative estimation of adulterations, and to secure uniformity in the statement of the results by holding periodical meetings for the reading and discussion of original papers on chemical and microscopical analysis, especially with reference to the detection of adulteration."

According to the proposed constitution, the Society will consist of members, honorary members, and associates, the members, in addition to public analysts, being analysts in actual practice, and the associates assistants of analysts, etc. A candidate for admission must be recommended in writing by four members, two of whom must testify to his fitness from personal knowledge. The election is to be conducted by means of voting papers, which may be forwarded by post; three-fourths of the votes, of not less than twelve members, being necessary for election. Members will pay an admission fee of one guinea and an annual subscription of one guinea; associates will pay an annual subscription of five shillings, and be elected for a period of three years only, at the expiration of which time they may be again recommended for election. The affairs of the Society are to be managed by a Council consisting of the President, two Vice-Presidents, the Treasurer, two Honorary Secretaries, and not more than six other members.

A brief discussion arose as to whether membership was open to all analytical chemists, whether public analysts or not, and the Secretary read the resolution passed at the former meeting, showing that this was the intention of the meeting.

The next point on which a difference of opinion arose was on Dr. Tripe's proposal to limit the number of honorary members, and on a vote being taken, it was decided by 11 to 3 that the number should not exceed twelve. With one or two verbal alterations and the addition of a provision for summoning extraordinary

* From the *American Journ. Pharmacy* for November.

general meetings on a requisition signed by eight members, the rules as printed were adopted on the motion of the Chairman, seconded by Mr. Wanklyn.

Mr. Cleaver and Mr. Piesse were appointed scrutineers to examine the balloting papers for the Council and officers of the Society, and whilst they were so engaged,

Dr. Tripe moved a vote of thanks to the Committee for their past labours, which was seconded by Dr. Muter, carried unanimously, and briefly acknowledged by the Chairman.

Mr. A. H. Allen drew attention to a compilation and classification of the evidence taken before the Adulteration Act Committee of the House of Commons during the last session, circulated semi-privately, he believed, by some gentlemen connected with the Grocers' Association, and read several questions and answers from the compilation referred to, which differed entirely from the authorized report as appearing in the Blue Book.

Mr. Estcourt (Manchester) also spoke of having noticed similar errors, some of which seemed to arise from something worse than carelessness.

The result of the scrutiny showed that the Council and officers proposed by the Committee had been elected by a large majority; the names being as follow:—

President, Professor Theophilus Redwood, Ph.D.; Vice-Presidents, A. H. Hassall, M.D., and J. A. Wanklyn, M.R.C.S.; Honorary Secretaries, C. Heisch and G. W. Wigner; Treasurer, T. Stevenson, M.D.; other Members of Council, Messrs. Allen, A. J. Bernays, C. Estcourt, G. A. Rogers, M.R.C.S., F. Sutton, and J. W. Tripe, M.D.

Mr. F. Sutton (Norwich) moved that the annual meeting of the Society should be held on the first Tuesday in the month of February each year, that the ordinary meetings should be held on the first Tuesday in the months of March, May, and November, and that a provincial meeting should take place in August or September.

Mr. Rimmington seconded the motion.

Mr. Allen suggested that the first week in the several months named be chosen, but that the day be left open. After some conversation, this was agreed to, and the resolution was passed unanimously.

A resolution having been passed for the immediate payment of a subscription in order to defray the necessary preliminary expenses, the meeting adjourned for refreshments.

A few interesting novelties in analytical appliances were shown in the refreshment-room.

On resuming business,

The Chairman said the next question for discussion was the definition of adulteration; a very important subject, which would be introduced by Mr. Heisch.

Mr. Heisch said the definition proposed had been already circulated amongst the members, and he hoped had been carefully considered; to show how far it was intended to be definitely adopted, he would read the resolution, which he should conclude by moving, viz.:—

"That the following having been unanimously agreed to by the Committee appointed for the purpose, is considered by this meeting as a fair definition of an adulterated article, and they recommend it to the Council of the Society as one which may advantageously be *adopted as a guide*."

The definition was as follows:—

Proposed Definition.

An article shall be deemed to be adulterated:—

A. In the case of food or drink:—

1. If it contain any ingredient which may render such article injurious to the health of a consumer.
2. If it contain any substance that sensibly increases its weight, bulk, or strength, unless the presence of such substance be due to circumstances necessarily appertaining to its collection or manufacture, or be necessary for its preservation, or be acknowledged at the time of sale.
3. If any important constituent has been wholly or in part abstracted, without acknowledgment being made at the time of sale.
4. If it be a colourable imitation of, or be sold under the name of, another article.

B. In the case of drugs:—

1. If when retailed for medicinal purposes under a name recognized in the British Pharmacopœia, it be not equal in strength and purity to the standard laid down in that work.
2. If when sold under a name not recognized in the British Pharmacopœia, it differ materially from the professed standard.

Proposed standards or limits for milk, skim-milk, butter, tea, cocoa, and vinegar were then given.

In the first place it would be observed that the Committee had not quite followed the instructions given them to draw up a definition of adulteration, but, acting under what they believed sound legal advice, they had endeavoured to lay down what should constitute an adulterated article, leaving it open for other things to be considered adulterated or not, in the discretion of analysts and magistrates. Instead, therefore, of attempting to define adulteration in the abstract, they had said such and such things should be deemed to constitute an article adulterated, though not saying that nothing was to be considered unadulterated which did not come under those conditions. The Committee had had before it a definition much more sweeping than that now adopted, and he had at first been inclined to support it; but on consideration it was found that a schedule of exceptions to it would have been required, and it was ultimately rejected on that ground, though even the present one was not quite free from the same objection. It was in his view very important to bear in mind the distinction between defining adulteration, and saying that certain things should be considered adulterated; because the latter left more discretion to analysts, and also to magistrates, who would in many instances be the final judges whether an article was adulterated or not. It had been found desirable to distinguish between drugs and articles of food or drink, and also to avoid the use of the word "add" in any shape. The Act was intended not only to protect the public health, but also to prevent imposition, and whether the adulteration arose from wilful fraud or from ignorance or carelessness on the part of the dealer, he believed the public were equally entitled to protection. The question of fraudulent intent would no doubt be considered by the magistrate in imposing the penalty; but such matters did not come properly within the scope of the analyst's functions, and they had therefore omitted any such words as either "add" or "fraudulently," simply defining an article to be adulterated if it contain such and such ingredients, or did not contain a sufficient proportion of certain others. Having read the definition as above given, he suggested that clause A. 4 might be added to B., and concluded by moving the resolution.

Dr. Dupré having seconded it, *pro formâ*,

Mr. Wigner read the various suggestions which had been received, the most important of which were, the addition of the words "foreign" in clauses 1 and 2, and the substitution of "fraudulent" for "colourable," in clause 4.

Dr. Dupré said these definitions, although not put forward as final, had not been adopted without very mature consideration, and after repeated discussion of a great many suggestions, most if not all of which had been either adopted or distinctly rejected after examination. Indeed, many suggestions which at first sight seemed very reasonable, appeared on further consideration totally inadmissible. Thus, the Committee had unanimously come to the conclusion that this was so with regard to the insertion of any such word as "fraudulently" or "wilfully," because it was hardly ever possible to prove a fraudulent intention, and the introduction of such words would practically render the Act a dead letter. Such points might very properly be considered by the magistrates, but had no place in a definition of adulteration, as applied to the article. Their object had been to make the definition sufficiently comprehensive to ensure the conviction of any one who so far tampered with any article as to make it injurious either to the health or pocket of the customer; but they had not found it practicable so to frame it as to include certain fancy articles, as they might be termed, which contained only an infinitely small amount of certain ingredients, and, if it had been practicable, he did not know that it would have been desirable. On the other hand, they desired to make their definition so elastic that it should not interfere unnecessarily or unfairly with the manufacturer or vendor. The proposal to add the word "foreign" to the first clause had been made in several quarters, but it had been distinctly rejected by the Committee, because its insertion would practically render it almost impossible to secure a conviction, there being such a vast number of ingredients present in very minute quantities, that it would often be difficult to convince a magistrate that the adulterant was really foreign to the substance, and that it had been improperly added. Objections had been taken to clause 1 that a teetotal analyst might be induced under it to certify that wine or beer was adulterated because it contained alcohol, which *he* deemed injurious to health; but this danger he thought entirely visionary. The insertion of the word "foreign" in clause 2 would be even more objectionable than in clause 1, and it might lead to great difficulty in the case of adulteration of milk with water; he suggested, however, that it would be improved by adding after the words "weight, bulk, or strength," the words "*or materially alters its apparent quality.*" The addition of alum to bread, or of Cayenne pepper to gin, unless in considerable quantities, could not be considered injurious to health, nor did it add to the weight or bulk, but it gave a deceptive appearance or flavour. The word "colourable" in clause 4 he thought might with advantage be omitted altogether. He was sure the Council would welcome any further suggestions, and he would urge the meeting not to come to any absolute decision upon the matter, but simply refer the matter back to the Council for final revision.

Mr. Sutton asked if it was intended to hand in this definition to the chairman of the Local Government Board, the advisability of which he much doubted.

Mr. Wigner said that was the ultimate intention, no doubt, but not at the present stage.

Mr. Sutton said there appeared to be a great difficulty in fixing upon a definition which would meet the views of everybody, even amongst themselves, and still less the views of magistrates who had to administer the law; therefore, until they were asked for it, he did not think they should volunteer one to the Government. He had no doubt that any fresh bill which might be prepared would be so framed as to cover all things which it was considered desirable to prohibit, and then probably the analysts would be asked for information on matters coming within their own province. His own opinion was that some of their brethren had been much too particular, had drawn the line too stringently, and had not sufficiently considered the difficulties with which traders had to contend. If this sort of thing were pushed too far it would produce a spirit of antagonism which would result in no good to anybody. His experience was that the public really cared very little what they ate or drank, for there was hardly a case to be found in which the prosecution had not been initiated by the officers appointed under the Act.

Mr. Rimmington agreed with Mr. Sutton, and thought they would make a great mistake in drawing up a definition which should either be handed to the Government or made public in any way.

Mr. Piesse begged to differ *in toto* from the last two speakers. In his opinion both the public and the analysts would benefit greatly by a definition being drawn up on a subject upon which the greatest ignorance generally prevailed.

Dr. Stevenson thought they would follow the wisest course in leaving this matter to the ultimate decision of the Council, though he saw no possible objection to the publication of the definition as at present framed. If they were as a body to ask for any alteration in the existing law, there could be no doubt they would be asked to state what their idea of adulteration was, and though they might not have framed their definition in strictly legal language, they ought to be in a position to state in plain English what their view of the question was. This definition was the product of a vast amount of labour and inquiry in all quarters, and he thought they could not do better than refer it back to the Council with their general approval.

Dr. Tripe thought their course was quite clear. In the infancy of the Society they should not go before the public saying this or that is our definition of adulteration, but they should lay down something for their own guidance, so as to secure unanimity amongst themselves. The proper course, therefore, was to refer the matter back to the Council, as had been proposed.

Mr. Wanklyn said they must face the question before them. To refer back these definitions to the Council was to provisionally adopt them, and he certainly could not see that they would be going too far in so doing. With regard to the clauses under section A., they had simply adhered to the Act as it stood and was being interpreted by the magistrates. A man was to be punished if he poisoned any article of food or drink, or if he diminished its value and cheated his customer, and these ideas were here carried out. He quite agreed in the remarks which had been made as to the impropriety of introducing the word "foreign," which would often prevent a conviction where it ought to be obtained, and also approved of the omission of the word "colourable."

Mr. Allen remarked that few gentlemen present probably were aware of the immense amount of labour which had been bestowed upon the framing of this definition. The Committee had obtained some twenty definitions from the leading chemists of the kingdom, and then having procured a list of the most frequent adulterations, had compared them, *seriatim*, with the definitions, to see which most fully met the case; they had then been revised by independent persons, and legal opinions also had been obtained. He himself had come up to London six times since the end of September on the matter, and others had spent an equal amount of time and trouble upon it. He did not think the Government would be able to deal with the question in so thorough a manner. He still thought the phraseology capable of improvement, though he had been pretty well convinced, contrary to his previous impression, that the insertion of the word "foreign" would be a mistake.

Mr. Rimmington, having read a definition which he had drawn up, containing the words, "the same being done covertly to defraud and deceive the purchaser,"

Mr. Heisch said that would be making the analyst judge and jury. They had decidedly come to the conclusion not to meddle with the question of intention.

Mr. Rimmington thought it was necessary to show the intention in order to prove adulteration.

Dr. Tripe said unfortunately his first two cases broke down on that very ground, but on fresh summonses being granted under section 2, instead of section 3, convictions were obtained.

Mr. Wigner said he would read the opinion of a legal gentleman on this very point. He said, "How is it to be determined that water in butter has been *fraudulently* added or retained by the retailer?"

Mr. Rimmington said it was to be determined by inference.

Dr. Stevenson said he had had some cases break down on the question of *fraud*, and practically it was found useless to take out a summons under that section. The personal imputation was so great that hardly any local Board would prosecute, and magistrates would admit every possible excuse rather than convict; whereas if it was simply a question of adulteration, a conviction was readily obtained, and very rightly in many cases. The old Act of 1860 was an illustration of this, for it remained a dead letter.

Mr. Wanklyn remarked that it was evident their duties were much simplified by the tacit admission of the magistrates, that persons who sold goods were bound to understand what they were dealing in. They had simply to testify as to the quality of the article, and, if it was not what it should be, the trader must suffer the consequences of his ignorance or carelessness.

Dr. Muter said it was evident to all who knew anything about the working of the Act, that it would break down if fraudulent intent had to be proved. He was concerned in the first case ever brought under the Act, which was withdrawn on that ground under the advice of Mr. Poland. He thought the definition a very good one.

Mr. Sutton wished it to be understood that he cordially approved of the definition for their own use, though he doubted the wisdom of too hastily publishing it or laying it before the Government.

The Chairman said he should like to make one or two remarks before putting the motion. In the first place, he thought it was very desirable, as had been so well explained to the meeting, that they should arrive as near as possible to a clear conception of what they thought would be a fair definition of an adulterated article. Having taken part in the discussions on this subject, and the more it was discussed the better, instead of becoming more confident in their ability to make, in every respect, a good, comprehensive, and explicit definition, he became more and more doubtful as to its possibility. In several respects his opinion had materially changed since he commenced looking at the question, and he regretted that even at the present time he was unable to entirely agree with the definition now put forward. He believed he had been the principal dissentient in the Committee, having entertained serious doubts from the first as to whether they had framed such a definition as it would be desirable to lay before the public. However, the resolution as proposed had avoided this difficulty, because they did not propose that the Society should be strictly tied down to the definition now brought forward; but all agreed in this, that it was desirable they should indicate as far as possible, in intelligible terms, what were the conditions under which articles should be looked upon as adulterated. He was not quite satisfied, and did not think he ever should be, with this amount of success, because if they were to have a definition, he, for one, desired one which should cover all articles which could be considered as adulterated, and if they fell short of this, and found they could not frame a definition which would be so comprehensive as to take in everything, but at the same time elastic enough for purposes of commerce and manufacture, he should be inclined to come to the conclusion that they had better not have one at all, but simply depend upon the Act itself, which specified in so many words that if an article were adulterated in whatever way, not defining what that way should be, the seller was subject to a penalty. It was quite possible they might come to that conclusion at last, but he had originally entertained a strong opinion that without much difficulty they might frame a definition which would be both stringent enough on the one hand, and elastic enough on the other, to cover all cases which they required to take cognizance of. At the same time he must confess that the more he looked into the subject the more difficulties he saw. He thought, however, they would show a great amount of weakness if, as a body, they drew back from the attempt to do all that could be done towards defining what constituted an adulterated article. He hoped they would endeavour to do this, but their first object must be to do it for their own use, so that they might be able to agree amongst themselves, and further be in a position to enlighten the public upon the matter; but they must not decide too hastily what use to make of the definition when accomplished. The one now proposed was framed in popular rather than in strictly legal or technical language, but it gave a very good general idea of what was intended, and if the Society agreed to the resolution which had been proposed, that it should be sent back to the Council for further consideration, he thought that would be the best course that could be adopted. The motion was then put and carried unanimously.

Section B., the discussion of which had been postponed until after Section A. had been disposed of, was next brought forward, when

Dr. Tripe proposed that in clause 2 the words "or its synonym" should be added.

Mr. Rimmington said he doubted very much, with regard to many popular medicinal agents, whether it was not better for the purpose the more they were adulterated. Take, for instance, such articles as laudanum or sweet spirit of nitre. He believed, if they were sold of the pharmaceutical strength, there would very soon be a great many inquests required. In his part of the country persons were in the habit of taking sweet spirit of nitre by the ounce or half-ounce, and they would have great difficulty in convincing ignorant persons that they only ought to take a teaspoonful. The same thing with regard to spirit; he thought the more water there was in it the better.

Dr. Tripe could not understand what the "professed standard" meant.

The Chairman said the name of the article, or the label affixed to it, might imply a standard. With regard to articles of medicine, not comprised in the Pharmacopœia, there was a generally recognized composition which would be the professed standard.

Mr. Wigner said if an article had no synonym it would be shut out altogether; and this was the case with many articles, such, for instance, as milk of sulphur.

Dr. Tripe said milk of sulphur was the synonym for precipitated sulphur, according to Garrod.

Dr. Stevenson said the professed standard did not mean that of the Pharmacopœia, but it meant that when the article referred to was something which had either an acknowledged standard as being a natural product, or was generally known as of a certain composition, it should come up to that standard. It would introduce a great amount of confusion in the definition if they adopted the word "synonym," because there were many articles which, though approximating to the preparations in the British Pharmacopœia, had no synonyms, strictly speaking. Milk of sulphur, for instance, was a recognized substance known to chemists as distinct from the substance known as precipitated sulphur, having long been prepared in a different manner. Paregoric, again, was not the same as compound tincture of camphor, which latter was really an imitation of paregoric. Of course if any article were the true synonym of one in the Pharmacopœia, the Pharmacopœia standard would be applied to it.

Dr. Tripe said he would withdraw his suggestion.

Mr. Piesse suggested the substitution of the word "its" for "the" before "professed standard," and a similar resolution to the last was then unanimously adopted with regard to section B. A somewhat lengthy discussion then ensued as to the latter part of the definition, and the proposed standards.

Various suggestions were made by members as to some of the details therein contained, and facts narrated as to the working of the Adulteration Act, particularly with regard to the sale of milk; ultimately a similar resolution recommending these standards to the Council for their guidance was adopted, but with the understanding that the word "limits" should be substituted for "standards." A vote of thanks to the chairman concluded the proceedings which had lasted over four hours.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 5, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

CHEMISTS AND THE ADULTERATION ACT.

WE are glad to notice that marked progress is being made towards the establishment of an organization which we have long pointed to as being a pressing desideratum, viz., a department of public chemistry. The appointment of official analysts, under the Adulteration Act, has contributed largely towards the realization of this object, and it is satisfactory to observe that those who hold this position are now associating themselves together for the purpose of mutual conference, and consideration as to the nature of the duties they have to perform, and the mode in which those duties should be carried out.

So far, it must be admitted that the promoters of the "Society of Public Analysts" are entitled to the thanks, not only of the public generally, but also of all those who are in any way affected by the operation of the Adulteration Acts, and as chemists and druggists may be liable to be so affected in many respects, we have thought it desirable to place before our readers a report of the proceedings at the meeting which took place on Tuesday last. From that report it will be seen that the constitution framed by the Provisional Committee since the inaugural meeting, last August, was in the main adopted by the meeting, that officers and a Council were appointed to conduct the business of the Society, and arrangements were made for periodical meetings, etc.

We also learn from the report that much time has been devoted by the Provisional Committee to the framing of definitions of adulteration, which should be at once comprehensive enough to include all actual adulterations, and at the same time sufficiently elastic to prevent oppression or injustice. We can well understand that this endeavour has been a work of considerable labour, and we fully recognize the propriety of such an inquiry being undertaken by public analysts, individually or collectively, as relating to a matter of special importance for them to consider; but we have grave doubts as to the policy of the attempt, on the part of public analysts, to lay down authoritative definitions of adulteration, inasmuch as this involves the consideration of many facts from other points of view besides that of the chemist.

In this respect we are somewhat apprehensive that the activity of the public analysts is likely to overstep the legitimate limits of their functions; for though some who hold that office would doubtless be capable of rendering valuable service in the determination of many questions that have arisen, or are likely to arise, in the application of the Adulteration Acts, it seems that such services might be more gracefully rendered on the requisition of the legislature than by volunteer action on the part of the analysts.

That this is the case will, we think, be sufficiently evident from the diversity of opinions expressed by the several speakers in the discussion of the proposed definitions, and from the result actually arrived at of referring the matter of definitions back to the Council for further consideration. For our own part, we are disposed to regard the the definitions in Section A. (see page 444) as being more calculated to raise difficult and disputable questions than to serve as a guide or assistance to magistrates who have occasion to try cases of alleged adulteration. Thus, for instance, in the very first definition it is stated that an article shall be deemed to be adulterated when it contains any ingredient which may render such article *injurious to the health of a consumer*. The words we have put in italics raise questions that are not only wholly outside the office of the analyst; but, as matters very often more of opinion than of fact, are also susceptible of being viewed very differently by different authorities and under diverse circumstances. The want of precision here referred to is no less than that in the wording of the Act itself, for though we know that Act was passed for the purpose of repressing the practice of adulterating articles of food and drink to the great hurt of the health and danger to the lives of Her Majesty's subjects, experience of its working has afforded too many illustrations of its greater capability to perplex magistrates than to protect the public. We are decidedly of opinion that no good can be effected by any such mere paraphrase of the intent of the Act as this first definition.

In regard to the second definition in this section, there is not only a total absence of any indication as to what proportion of "substance that sensibly increases" the weight, bulk, or strength of an article is to be admissible, as in the case of mustard, cocoa, etc., or beyond what quantitative limit such acknowledged and declared admixture is to be regarded as constituting adulteration; but it would also, we think, often give rise to questions whether, in reference to quantity, substances whose presence in certain articles is "due to circumstances necessarily appertaining to their collection or manufacture" are to be attributed wholly or only in part to such legitimate origin. The third definition, though relating to a noteworthy case of fraud, viz., debasement of articles, has, in our opinion, nothing to do with adulteration, except to mystify and confuse the signification of the term, and the same may be said of the fourth definition in this section, relating to fraudulent substitution of one thing for another, such, for instance, as the sale of chicory for coffee, which cannot, with reasonable regard for the utility of language, be regarded as a case of adulteration.

The definitions relating to drugs, in section B., are, if anything, more faulty and defective than those relating to food and drink; but we do not think it is necessary to point out these shortcomings to our readers.

Altogether these proposed definitions appear to reflect in a great measure the defects of the Adulteration Acts themselves, and to show the necessity of further thorough consideration of the subject of adulteration by the legislature, aided by competent and impartial advisers as to the numerous technical questions involved. Whether or not we may hope for such a consummation in the interest, not only of the public but also of the honest tradesman, is a question that the future must answer, as it must determine whether it be possible for a Committee of the House of Commons to override, on the one hand, the influences of trade interest, and, on the other, the contagion of exaggerated panic.

PRACTICAL AND THEORETICAL EXAMINING.

In a letter to the medical journals, Dr. Crisp has supplied an interesting addition to the biography of the late Dr. Lankester, as well as a valuable contribution towards estimating the relative values of practical and theoretical examinations. He says that when Dr. Lankester presented himself at the College of Physicians for examination for the licence, he had obtained honours in ten of the classes at University College, and six years previously had passed the examination for the extra licence of the College, which gave him the right to practice as a physician seven miles out of London He thought, therefore, that he would only have to undergo one examination in which he would be expected to answer practical questions. Dr. Lankester, however, was rejected, notwithstanding that one of his examiners had six years previously testified to his competency to fill creditably the office of Physician to a London Dispensary. The opinion of Dr. Lankester upon his rejection is expressed in the following passage from a pamphlet published by him :—

"If I were a young man who had only had the five years' study which the College requires, I might consistently have been sent back for a year ; but what must be thought of the value of the College examination which supposes that the knowledge it requires may be got up in twelve months, but could not be gained by eighteen years of hard study and diligent observation? At the same time, however, I am not ignorant of the fact that there are gentlemen in London who in less than a year would engage to prepare me, as they have done hundreds of other members of the College, in such a manner as to ensure my passing their examinations. I have never, however, condescended to the practice of cramming in the four examinations that I had previously submitted and passed. I conscientiously regard myself at this moment as fitted to practice my profession, and if the College examinations are of a nature rather to test the schoolboy's qualifications which may be got up by a cram than those which have been gained by reading and experience at the bedside, I can only express my regret that public confidence should have been given to examinations which every member of the College must feel are not worthy of it."

MILITARY PHYSIC.—A CURE FOR SCURVY.

General Sheridan's name is pretty widely known as that of an able officer in the United States military service, but probably few are aware that he gained his first laurels in combating disease. The *Pall Mall Gazette* states that when a young officer he was in charge of an isolated post in Texas, where scurvy in a serious form attacked the men under his command. No lime juice or vegetables were to be had; but Sheridan had heard that the juice of the Mexican agave had antiscorbutic properties. He therefore organized an expedition to search for the plant, and a grove of it being discovered about a hundred miles distant, a supply of it was procured, the juice expressed, and the men compelled, not without many wry faces and some protests, to take it in liberal doses. But the military doctor and pharmacist was successful, and from that time the disease was effectually stayed.

THE EXCISE AND THE SALE OF "BITTERS."

An influential meeting of the chemists and druggists of Hull was held on the 24th ult., to take into consideration the fact that an Excise prosecution had been instituted against one of their number, for selling, without a spirit licence, a compound, known as "Pick-me-Up," or "Morning Tonic." In the opinion of the meeting, the compound is a medicinal tincture, being a modification of the Compound Tincture of Gentian of the Pharmacopœia, which has, under various names, been openly and generally sold by the trade for many years as a tonic. The commencement of such a prosecution, without previous notice, was therefore thought to be a harsh and oppressive proceeding, and a resolution was passed requesting the Committee of the Hull Chemists' Association "to take such steps, in the general interests of the trade, as they may deem necessary, in defending the case and obtaining a clear definition of the law upon the subject." We have been informed that the case comes on for hearing on Tuesday next.

ACCLIMATIZATION OF MEDICAL PLANTS.

In a report upon the attempted naturalization of various plants at Nismes, in the South of France, furnished by M. Maumenet to the *Bulletin de la Société d'Acclimatation*, it is stated that the Japan wax tree (*Rhus succedanea*) has lasted through six seasons, though it has been cut to the ground by the frost more than once. The *Laurus camphora*, after giving hopes, has proved too tender. *Andropogon squarrosus*, an exceedingly fragrant grass, has withstood the most severe seasons. All attempts to naturalize the *Eucalyptus globulus*, however, have failed.

Professor Attfield has been elected Honorary Member of the Pharmaceutical Society of Victoria, "in consideration of great and unwearied efforts in the cause of pharmacy."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 2, 1874.

MR. T. H. HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Brown, Frazer, Greenish, Hampson, Owen, Radley, Rimmington, Robbins, Sandford, Savage, Schacht, Stoddart, and Sutton.

The minutes of the previous meeting were read and confirmed.

The following being duly registered as Pharmaceutical Chemists were respectively granted a diploma stamped with the seal of the Society:—

Adams, William ....Barnstaple.
Stamps, Frederick..................West Bromwich.

Elections.

ASSOCIATES.

The following having passed the Minor Examination, were elected "Associates" of the Society:—

Farquhar, James ....Aberdeen.
Simpson, Charles Alfred ....Fenton.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination were elected "Apprentices or Students" of the Society:—

Eunson, John ....Kirkwall.
Jones, W. Thomas..................Merthyr.
Stukeley, Edward Charles ......Gloucester.

An Associate of the Society was restored to his former status upon payment of the current year's subscription, and a fine of half-a-guinea.

The following names were ordered to be restored to the Register of Chemists and Druggists:—

Theophilus Challener............Aldridge Road, Perry Barr, near Birmingham.
George Edward Wood ....60, City Road, Hulme, Manchester.
Henry Hick ....1, Annakins Court, Blake Street, York.

Finance.

The report of this Committee was received, recommending the payment of various accounts, and the acceptance of estimates from Messrs. Butler & Tanner for printing the Calendar and Register for 1875. The report and recommendations were adopted.

Library, Museum, and Laboratory.

The report of this Committee stated that the following books were recommended to be purchased:—

'Phillips' Metallurgy.'
'Brown's Manual of Botany.'
'Flückiger and Hanbury's Pharmacographia.'
'Steudel's Nomenclator Botanicus.'
'Spottiswoode's Polarization of Light.'
'Beale's How to Work with the Microscope.'

The Librarian had prepared a list of duplicate books which had been ordered to be sent to the Secretary of the North British Branch, in order that, if desired, the spare copies might be forwarded to Edinburgh. The average attendance in the library during the month had been, during the day, 14; in the evening, 8. The number of books circulated had been 124 in London, 27 in the country.

The Curator had reported that the first portion of the museum catalogue was now ready for the printer. He also presented a list of duplicate materia medica specimens, which he suggested might be sent to the North British Branch. Three specimens of vegetable products, from Burmah, had been received from the India Museum for the Society's Museum.

Professor Attfield had reported that there had been 53 entries in the laboratory since the commencement of the session, and that 49 students were now working.

The report was received and adopted.

Provincial Education.

This Committee reported that it had held a meeting at which it was agreed to recommend that an application from the Manchester Chemists and Druggists' Association and School of Pharmacy for a grant of £50 be acceded to.

Mr. Robbins moved the adoption of the report, which was seconded by Mr. Owen.

The Vice-President said he had not been able to attend the meeting of the Committee on the previous evening, and he thought it would be more satisfactory to the Council at large if Mr. Brown would state the grounds on which he had induced the Committee to recommend so large a grant to one place. If the money were granted, he had no doubt there would be at least twenty other places which would have an equal right to a similar sum. The money was required, he believed, to supplement the payment to lecturers, and therefore it would be wanted in successive years, and the Council must be prepared for similar applications in future. He would not move any amendment at present, because he simply asked for further information.

Mr. Schacht thought it right, as a member of the Committee who had made the recommendation, to reply to the question just put. The Committee considered that the Manchester Society had for a great many years been making considerable efforts in the direction of pharmaceutical education; that they had more or less succeeded, with a great deal of sacrifice and expenditure not only of time, but of personal energy, in carrying out their scheme. Since 1868, they had done so without any extraneous aid, but it appeared that their arrangements now required increased outlay for the remuneration of the lecturers; and though they wanted nothing for rent of premises, library, or appliances, all these expenses having been met by local effort, they required assistance to meet the cost of the lectures. It was shown that the scheme was a particularly good one, specially adapted to the wants of their own students. Looked at merely as an experiment, it would be a wise thing to aid it, and they were not placed in this position, inasmuch as the machinery had been in operation for some time, and had been attended with very satisfactory results. True, he thought a more numerous students' list might have been shown, but the instruction was not given gratis; the young men were required to pay as well as to study, and the whole scheme seemed exceedingly well thought out. On these grounds the Committee felt that it had no other course, in the best interests of pharmaceutical education, than to recommend the grant being made. No doubt, it seemed somewhat large, but the district was large, and taking all things into account, he did not think they could do better than agree to it, it being understood, however, that no pledge was given as to repeating it next year.

Mr. Hampson asked if a grant for such a purpose was consistent with the regulations.

Mr. Brown said the application was made under the general provision "for the general purposes of advancing education where satisfactory evidence is given that the Association from which the application proceeds is really promoting that object, and needs assistance." He desired to express his obligation to Mr. Schacht for to a great extent relieving him from a distasteful duty; but the position in Manchester was this: they had already established educational arrangements, established a fair library, and a collection of materia medica specimens. On previous occasions when grants had been asked for by other associations, it had generally been at the commencement of the effort; but in Manchester they had carefully avoided making any such application until they had been established for some years, and had made some progress. He wished they had made better progress, and possibly they would have done so had they received a larger amount of aid, but still he thought they had shown a fair result for the amount at their disposal. He had certainly, in first bringing forward this matter, stated that this would have to be an annual grant, but this statement he begged leave to withdraw. He hoped local efforts would be so stimulated by the liberality which he trusted would be shown by the Council, that in future they would do more than they had done, and eventually succeed in establishing in Manchester a really worthy representative of the Pharmaceutical Society. They already had 80 members and 77 associates, but the expenses had absolutely run away with all the subscriptions. They were fortunate in obtaining the services of a very able teacher, who had hitherto relied on the fees received from the students, but it was felt that this remuneration was miserably inadequate to his services, and it had been resolved to supplement it by a fixed payment. Rent, however, and other expenses being very heavy in Manchester, they had no funds at their disposal out of which to pay the teacher, and under these circumstances they had determined to apply to the Society for assistance. The sum asked for, though large, was asked on a definite principle, viz., to meet the amount which they had guaranteed to pay to the teacher in addition to the fees he received from the pupils. This principle might not be applicable to every case, but it was a definite and comprehensible one; he did not think pharmaceutical students in the provinces any more than in London should be put off with any teaching short of the best, and for that kind of teaching they must be prepared to pay liberally. He did not like to promise anything beforehand, but he believed those associated with him in Manchester would agree in the hope that this was only the beginning of somewhat greater things, and that they might eventually establish in that large centre a school of pharmacy on a permanent foundation, and perhaps substantially endowed by local voluntary munificence.

Mr. Stoddart said Mr. Brown had removed the only difficulty he felt on the subject, because he did not think they could pledge themselves to an annual grant.

Mr. Brown stated in reply to Mr. Savage that they had 26 pupils, 80 members, and 77 associates; the members paid 10*s*. per annum, and the associates 2*s*. 6*d*. A good reading-room was provided, which was open every evening in the week, and there were also a library and a materia medica museum. The association was designed to benefit apprentices and assistants, and therefore the subscription was fixed at a merely nominal amount. There were classes in botany, chemistry, and pharmacy, and a special teacher of botany, Mr. Grindon, was engaged, who was paid by Mr. Siebold out of the 50*l*. fee which the Association guaranteed him. The fee for the whole of the classes was three guineas. He did not think good teaching should be offered at too low a rate, nor did his experience lead him to think that young men would object to pay fairly for first rate instruction. He expected that in future sessions there would be a large increase in the number of students attending the classes.

Mr. Savage thought the information was very satisfactory, and had pleasure in supporting the resolution.

Mr. Sandford said he should have much pleasure also in voting for the grant of £50, and also in considering the twenty other cases which the Vice-President had referred to, when they were brought forward. It was the very thing which he had long wished to see, for he had been disappointed that Mr. Schacht's proposition that grants should be made to provincial associations had not been taken such advantage of as might have been expected. He hardly agreed, however, with the principle on which Mr. Brown put forward his claim, namely, for £50 to pay the expenses of the lecturer, and would rather give it to the Manchester School without saying to what particular purpose it should be applied. If a society was doing all it could for education, it was entitled to assistance, whether for lecturing or other purposes. He did not think they should too narrowly interpret the regulations which had been laid down, but should assist any local Association where the work was well done.

Mr. Hampson said he did not like to give a silent vote on this matter. He came from Manchester, and had the deepest sympathy with what was being done in that district in education and other matters, but this was a very great step. He could not oppose it, because they were spending money on education in London, and therefore Manchester had an equal claim upon them. He had hoped, however, that these applications for aid would have died out, and that in the course of time students would have been ready to pay the market value for the knowledge they wished to obtain. This sort of thing enabled students to get education at a cheapened rate, and, on that ground, he objected to the formidable precedent now laid down. Still, as he said, he could not oppose the grant so long as they continued to cheapen education at Bloomsbury Square. There was one other point which he ought to mention, namely, that whilst aiding education in Manchester they were also aiding its local association, the purposes of which were not circumscribed by education. As they had been told, the Association was utilized, and properly so, for general purposes, and that he took to be a point to be considered in applications of this kind. However, whilst they continued to give help to local association, the Manchester school certainly deserved £50, or even £100, because the members had put their hands freely into their pockets to aid in the establishment of a high-class school of pharmacy.

Mr. Radley was very pleased to find that Manchester had made this application, and hoped it would be an encouragement to other places.

Mr. Atherton said a somewhat similar application was made from Sheffield three years ago, but was refused on the same grounds on which they were now going to make a grant to Manchester. He was very glad to see that the Council was getting more liberal, because this was the very ground on which he had always been anxious that money should be given—not that the rooms should be filled with diagrams and apparatus, to which the grants had been formerly confined, but that the money might be devoted to any purpose which advanced education.

Mr. Baynes thought the remarks of Mr. Sandford would produce a feeling of general satisfaction wherever local effects were being made for the advancement of pharmaceutical education. In his own district, they had felt it was almost useless to apply to the Council, because that body required such a strong case to be made out, and the assistance granted was so limited. He believed one result of making substantial grants to any society would be that they would take care to have value received, and that local societies would feel impelled to produce the best possible results, not only for the sake of the money they desired to obtain, but as a matter of pride, for they could not take the money without showing a fair balance-sheet in return.

Mr Frazer said he had taken very much interest in this question from the time he entered the society, and begged, therefore, to say only a few words, though he had been already anticipated by previous speakers. He hoped the idea which had been thrown out, that this application was only the first of many, would be realized, and believed that the reason applications were so few was, because the sums granted were so small. It was not worth the while of towns, such as Manchester or Glasgow, to make applications for small sums; in fact, he had himself prevented the people in Glasgow applying when it was only usual to grant about £10, but he should certainly not discourage them in future. He did not think there was any danger of expending too much money in this way, because each case would be dealt with on its own circumstances, and if they found that thirty or forty towns applied, and more money was required than they had to spare, the amounts must be proportionately diminished.

The Vice-President said he did not think any apology was due from him for having raised this question, and after the very important discussion which it had elicited, he felt very much pleased that he had done so. He had no desire to oppose provincial education in any direction, particularly in Manchester, and should be very happy to support the resolution.

Mr. Brown desired to say, in reply to a remark of Mr. Sandford, that, as Mr. Hampson had shown, there were reasons why any sum granted should not be given for general objects. Every provincial association must have some objects beyond the mere provision of educational arrangements, and its rooms would naturally be utilized in case of any political action being taken in connection with the Society or the general body of the trade. Such action might or might not be opposed to the feeling of the Council for the time being, and therefore he should not like to see the Society make grants for the general purposes of the local associations. As he had said at the outset, if this liberal grant were made, it would certainly involve a serious responsibility on the part of the administrators of the funds of the Manchester Association; but that he was prepared to undertake, and he hoped the £50 now granted might be seed thrown into good ground, and spring forth and bear fruit satisfactory to all. He might perhaps be accused of some inconsistency, inasmuch as on former occasions he had opposed the giving of small grants to local associations, but he was still opposed to these small grants, because they were of no use. He did not think any association which was so small that a £10 note could be of very great importance to it, had much to anticipate from its future work. It would be much better for such a society to wait until something had been accomplished, and then come with a definite object in view, and ask the Council to help it to something which it could not obtain by its own efforts. That brought him to the principle on which he asked for the grant, which was a definite one, and one which might be applied to provincial associations. The great vice of many such associations had been that they simply prepared young men to pass the examinations, but that was opposed altogether to the theory and practice of the professors of the Society, and was a vicious principle. What was wanted was a system of teaching extended over a considerable period, and to provide proper teachers for such a purpose proportionate payment must be made. Therefore, having exhausted local effort, he thought application might reasonably be made to the Society for assistance. In order to avoid rising again, he would venture to anticipate the favourable vote of the Council, and thank them for their liberality.

The President, before putting the motion, said he most heartily concurred in the grant, and in the observations which had been made by Mr. Sandford that they had hitherto been rather too stringent in their regulations.

Mr. Sandford wished to explain that he did not intend in any way to aid local societies for any political purposes, but he presumed that any case which came before the Committee would be examined on its merits, and if the Association was doing good educational work, the Council was bound in principle, if it had the means, to aid such Association.

The resolution was then carried unanimously.

Appointment of Examiners.

The following Pharmaceutical Chemists were appointed Examiners of the Society for the ensuing year, subject to the approval of the Privy Council:—

England and Wales.

Allchin, Alfred	London.
Barnes, James Benjamin	London.
Benger, F. Baden	Manchester.
Carteighe, Michael	London.
Corder, Octavius	Norwich.
Gale, Samuel	London.
Haselden, Adolphus F.	London.
Linford, John Samuel	London.
Martindale, William	London.
Moss, John	London.
Schweitzer, Julius	London.
Southall, William	Birmingham.
Taylor, George Spratt	London.
Umney, Charles	London.

Scotland.

Ainslie, William	Edinburgh.
Buchanan, James	Edinburgh.
Gilmour, William	Edinburgh.
Kemp, David	Portobello.
Kinninmont, Alexander	Glasgow.
Noble, Alexander	Edinburgh.
Tait, William	Edinburgh.
Young, James Robert	Edinburgh.

Benevolent Fund.

The Benevolent Fund Committee, in its Report, recommended that the following grants be made:—

£10 to the widow of a chemist and druggist, aged 53, who had received a similar grant in January last.

£15 to a former chemist and druggist in Essex, aged 75, who received £10 in March last.

£15 to a chemist at Liverpool, aged 58, completely incapacitated by paralysis. Applicant had previously received £10.

The consideration of another application from a widow with several children, was deferred for further information and inquiries as to the possibility of getting one of the children into an orphan asylum.

The Committee also recommended for adoption some amendments in the regulations of the Fund.

Some discussion arose as to a clause which proposed to give a vote for every subscriber of 2*s.* 6*d.* per annum, and ultimately, on a division, it was struck out, and the scale of votes ordered to remain as at present, viz., one vote for 5*s.*; two for half-a-guinea; four for a guinea, and so on.

Clause 4 was altered on the suggestion of Mr. Brown, it having originally provided that each pension should be of the value of £30. He pointed out that in some cases a less amount might be desirable, as, for instance, in the case of continuing the pension to the survivor of an aged couple.

Some discussion arose as to how the amount of the pensions should be fixed, and various difficulties were suggested.

Mr. Brown said he did not at all contemplate that the Council would grant pensions of less than £30; probably it would continue doing as it had been, but he did not wish its hands to be tied. He also suggested the addition of the words, "and any other particulars the Council may require," to clauses 6, 7, and 31.

The result of the discussion was to leave the Regulations in the following form:—

"1. The objects of this fund are:—

"To provide pensions for distressed persons who are or who may have been Members or Associates of the Society; for Pharmaceutical Chemists; for Chemists and Druggists; or for the widows of such persons.

"To afford occasional grants of money to distressed persons who are or who may have been Members or Associates; or Pharmaceutical Chemists; or Chemists and Druggists; or their widows or orphan children.

"2. At the first Meeting of the Council after the Annual General Meeting in every year, they will determine as to the expediency (financially) of electing pensioners in the month of October following.

"3. If the Council deem it discreet to elect pensioners, their decision will be made known by advertisement in the *Pharmaceutical Journal and Transactions*, and such other papers as the Council may direct, stating the number of annuitants to be elected.

"4. No pension shall exceed £30 yearly.

"5. Candidates for election must be at least fifty years of age.

"6. Petitioners for relief from this fund shall produce a certificate of moral character, and such evidence of their age as shall be satisfactory to the Council of the Society; shall state the time and place or places in which they have been engaged in business, whether on their own account or otherwise; how their misfortunes originated and when; their present means of subsistence, and from what source it arises; and the number of persons (if any) dependent upon them for support; and any other particulars the Council may require.

"7. Widows shall produce evidence of their age, the certificate of marriage, and the certificate of the burial of the husband, or such evidence as shall satisfy the Council on these points; the period during which the husband was in business, and where; the cause of misfortune; the present means of subsistence, and from what source it arises; the number of children (if any) dependent on them for support; and any other particulars the Council may require.

"8. In all petitions for assistance from this fund except those specified in clauses 9 and 31, the truth of the statements shall be certified by at least four members of the Society, or donors to the fund of *five guineas*, or persons who have subscribed not less than *half-a-guinea* per year for the three preceding years, and who are personally acquainted with the facts of the case.

"9. Widows or orphans applying for relief, and unable to obtain the required evidence under Rule 8, the Council will receive and consider in lieu of such evidence the testimony of four respectable householders, to whom the circumstances of the applicant may be known—provided that two of the persons so certifying are subscribers or donors to the fund.

"10. The Council, after due investigation, if satisfied that the case is an eligible one, will decide on the amount and character of the relief to be afforded.

"11. When the Council shall decide that any case is fitting for Annual Pension, the case shall be recorded in a book to be kept for that purpose, and immediately after the decision as to the expediency of electing pensioners (but not previously), notice shall be given to the persons whose names are so recorded.

"12. Pensions will be terminated by the Council in case of misconduct on the part of the recipient, or if the improved circumstances of the pensioner at any time shall appear to the Council to disqualify him or her to receive the benefits of this fund. In the case of widows, the pension will cease when they marry again.

"13. If at any time it shall become evident that the election of any annuitant has been secured by fraud or by false representation, such election shall be forthwith declared void by the Council.

"14. In case of a candidate being unsuccessful at the first election, credit shall be given for the number of votes at that and the four next succeeding elections, but not beyond that time.

"15. At every election of annuitants, five scrutineers shall be elected from the voters present to conduct the election, who shall report to the chairman the number of votes polled for the respective candidates.

"16. The chair at such elections shall be taken by the President, Vice-President, or a member of the Council for the time being.

"17. The votes shall be taken by polling papers, which shall be sent to every member and associate, and to life and annual subscribers entitled to votes under clauses 19, 20, 21, 22, 23, and 24.

"18. The polling-papers of members, associates, and subscribers whose payments are in arrear shall be withheld until the subscriptions be paid.

"19. Persons contributing *five shillings* annually shall have *one vote* at each election of annuitants.

"20. Persons contributing *half-a-guinea annually* shall have *two votes* at each election of annuitants, and persons contributing *one guinea annually* shall have *four votes*, the right of voting at such elections being increased in the proportion of *two votes* for every *half guinea* subscription.

"21. Persons contributing *five guineas* at one time shall have *two votes for life* at each election of annuitants, and persons contributing *ten guineas* at one time shall have *four votes*, the right of voting at such elections being increased in the same proportion by the same rate of contribution.

"22. Firms or corporations contributing *five guineas* at one time shall have *two votes* at each election of annuitants for the period of *ten years* from the date of such contribution, and firms or corporations contributing *ten guineas* at one time shall have *four votes* at each election of annuitants for the same period, the right of voting at such elections being increased in the same proportion by the same rate of contribution.

"23. Persons or firms giving donations of *less* than *five guineas*, shall have *two votes* for every *half guinea* subcribed at the ensuing election of annuitants.

"24. One executor paying a legacy of *fifty pounds* shall have *five votes* for life at each election of annuitants, and if it exceed £100, every one of the executors shall have the same privilege.

"25. The polling-papers and tellers' lists shall not be open to the inspection of any person without permission from the Council.

"26. Should a scrutiny be demanded or any complaint made in reference to the result of poll, the same shall be submitted to the consideration of the Council at their first subsequent meeting, and their decision shall be final.

"27. Every Member of the Society and every Associate of the Society in business on his own account, not in the receipt of nor an applicant for relief out of the Benevolent Fund will be entitled to two votes, and every Associate not in business on his own account, nor in the receipt of, nor an applicant for the like relief, to one vote.

"28. Every person entitled to vote in more than one class of voters shall be entitled to the votes due to him from each of such sources.

"29. In the event of an equality of votes, the chairman shall have the casting vote.

"30. Should any polling paper not be properly filled up or signed, the same shall be rejected by the scrutineers on their casting up the votes.

"31. Applications on behalf of orphans shall state their age and afford satisfactory evidence of the marriage and burial of the parents, and whether any means of subsistence have been left them; if so, its amount and the source from whence it arises, accompanied by a certificate signed as required by clauses 8 or 9; and any other particulars the Council may require.

"32. In the case of an orphan left under circumstances of urgent distress, the Council may, if they think fit, provide a home by purchase in one of the public asylums for orphans."

The report and recommendations were then unanimously adopted, and the purchase of £400 Consols to the Benevolent Fund account was ordered.

The SECRETARY announced that the subscriptions to the Benevolent Fund during the last year had already exceeded those of the former year by more than £150, and that in no case had a subscriber of 10*s.* 6*d.* reduced his subscription to 5*s.*, as some gentlemen had anticipated would be the case on lowering the amount of subscription necessary to confer a vote. He regretted, therefore, that the proposal to still further lower it had been overruled.

The VICE-PRESIDENT said the more liberal policy adopted during the past year had evidently produced a good effect. They had found an abundant return for casting their bread upon the waters, and he hoped the same course would be pursued.

A Common Room for Students.

The President read a petition which had been sent in, signed by 53 students attending the classes in the Society's School of Pharmacy, asking that they might be allowed the use of a room in the building for the purpose of conversation and discussion on matters connected with their studies.

Mr. Brown said the Council might refer this matter to the House Committee, but he was quite sure they would be desirous of granting the application, and he would therefore move that the petition be granted, so far as the arrangements of the house permit, and that it be referred to the House Committee to carry it out.

Mr. Schacht seconded the motion, and expressed his pleasure at the tone of the petition, and the earnestness on the part of the students which it evinced. They must all sympathize with them in their endeavours to perfect the educational work of the Institution.

Mr. Hampson hoped the House Committee would do its utmost in the matter.

The President did not think there would be any difficulty in providing a room for a certain portion of the day, but whether it could be spared the whole day he could not say. The Committee would certainly do its best to arrange matters satisfactorily.

Mr. Sandford said there were several things to be considered in connection with this question. Whatever room was granted to the students must be open to all members and associates, but many students were not connected with the Society at all. This matter arose from what had been said on a former occasion with reference to conversations taking place in the museum, to the interruption of study; but he believed the kind of conversation referred to in the petition would be perfectly admissible in the museum, and that the curator had himself stated that he should be very unwilling to stop any conversation of the kind. They must really consider whether, by granting the use of a room as was now asked, they would not be tending to empty the library and museum where young men should be studying. He, therefore, deprecated the passing such a definite resolution as Mr. Brown had proposed.

Mr. Frazer said this matter grew out of the regulation sanctioned last month to prevent conversation in the museum. It had occurred to him, since the last meeting, that the officer of the Society ought to be able to prevent any abuse of the privilege of conversation, and that the museum might with this restriction be used as heretofore.

Mr. Greenish said the regulation with regard to the museum was a perfectly proper one, as he had previously explained. He hoped the petition would be granted.

Mr. Betty suggested that the matter should be referred generally to the House Committee.

The resolution was ultimately agreed to in the following form:—

"That the Council desires to accede to the petition of the students so far as the arrangements of the house will permit, and that it be referred to the House Committee to carry out the necessary arrangements."

Foreign Societies.

Mr. Greenish asked the Council to order a copy of the *Pharmaceutical Journal* to be sent regularly, expense free, to three societies on the continent, viz., those of St. Petersburg, Bohemia, and Sweden. From the Russian Society they would get a journal in return, and from the others they would receive laboratory reports, and he hoped original papers for the Journal and the evening meetings. Professor Dragendorff, of the Pharmaceutical Institute at Dorpat, would also be glad to receive the Journal, and would send in return the printed papers prepared by some of his more advanced pupils, which would be a valuable addition to the library. Mr. Greenish added that the Russian Pharmaceutical Society had paid the Council the compliment of electing its two delegates to the late Congress honorary members.

Mr. Sutton thought they ought to send copies of the Journal to all recognized foreign societies, such as those at Copenhagen and St. Petersburg.

A resolution for forwarding free copies, as suggested by Mr. Greenish, was unanimously agreed to.

Report of Examinations.

November, 1874.

England and Wales.

	Candidates. Examined.	Passed.	Failed.
Major	2	2	0
Minor	15	4	11
Total	17	6	11

Five Certificates Received in Lieu of the Preliminary.

1 Society of Apothecaries.
1 University of Cambridge.
1 " " London.
2 " " Oxford.

PHARMACEUTICAL MEETING.

Wednesday, December 2nd, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read and confirmed, the following Donations to the Library and Museum were announced, and the thanks of the Society were awarded to the donors:—

To the Library:—'Companion to the British Pharmacopœia,' tenth edition, from Mr. Peter Squire (the author).

To the Museum:—Specimens of Boldo and Jaborandi, from Mr. Morson; a photograph of annual and biennial Henbane, from Mr. R. Usher; a specimen of Tabashir, from Dr. G. C. Wallich; fine Crystals of Arseniate of Soda, from Mr. Geo. Green; a specimen of Cinchona Bark, containing Paricine, from Mr. W. Southall; specimens of Liquid Kino, from *Pterocarpus Indicus*; Burmese Varnish, from *Melanorrhœa utilitissima*; crude turpentine from *Pinus Khasyana*, from Dr. Forbes Watson; and the following specimens from Mr. D. Hanbury:—Yellow pareira brava; root bark of *Calotropis procera*; root of *Calotropis gigantea*; root of *Toddalia lanceolata*; leaves of *Tylophora asthmatica*; white pareira brava; calumba root, sliced and dried in London; cinnamon chips; cascarilla wood; gum of *Feronia Elephantum*; cortex thymiamatis; barba-timao bark; Guayaquil sarsaparilla; English coriander seed; English, Dutch, and Mogador caraway seed; Soymida bark; *Cassia vera* bark; Margosa bark; seeds of *Brassica juncea*; ishpingo; thick cinnamon bark; fruits of *Diospyros embryopteris*; schœnanthus; oleo-resin of *Hardwickia pinnata*; wood of xylobalsamum; pale catechu from *Acacia catechu*; root of *Xanthorhiza apiifolia*; root of *Cissampelos pareira* from Ceylon.

Boldo.

Professor Bentley exhibited some specimens of a plant which he said was now exciting some attention, from yielding the new drug called Boldo. But for the severe weather, he should have had the plant itself to exhibit at the meeting. He did not propose to enter into the merits of the medicine, his object was simply to show some recent specimens of the plant yielding it. The plant was now coming into the market, or at least would come into the market soon, as a drug. The name of the plant was *Boldoa fragrans*, or, properly, in accordance with the practice of botanists to take the prior name, it should be called *Peumus Boldus*. However, that was a matter of very little importance in a practical point of view. To those who were anxious to see the plant growing, he should be happy to give an order to view it at the Botanic Gardens. The plant at the Gardens was probably the largest in this country, being about twelve feet in height. All the characters of the plant might be seen from the present specimens. There were also present some flowers which had been described in the *Pharmaceutical Journal* about a fortnight since. The plant belonged to a small order called by botanists *Monimiaceæ*, allied to the nutmeg order to some extent, and also to the laurels. He should like to remark that the flowers were not, as described in the Journal, racemose, but what botanists called cymose, which was an important botanical distinction. One great peculiarity of the plant was the aromatic odour of its leaves. These leaves and young branches were reputed to possess tonic properties, and to form a valuable remedy in liver complaints, and certainly, from the testimony which had been given to their value, boldo was a substance, at all events, well worth trying. Whenever any substance came freshly to us, there was a possibility of its being spoken of too extravagantly, and it was the duty of persons in this country and on the Continent to test its properties. He could not say that he was himself satisfied at present that the efficacy of boldo as a medicine was in any degree established. There was a very valuable thesis published in Paris, and it would be found in the Journal; and he hoped that attention having been called to this drug, a supply of it would be obtained, and that it would be extensively tried in the hospitals. It had been tried to some extent in Paris, but not sufficiently to enable one to pronounce positively as to its merits. It was used for other purposes besides diseases of the liver, but at present we had no very detailed account of its physiological action, although it was evidently somewhat powerful, because if taken in certain doses it acted as a powerful emetic. It was, therefore, doubtless a substance which possessed some activity. The leaves contained a large quantity of volatile oil; their odour, when rubbed, was something like a tolerably common English plant, a small shrub, commonly called sweet gale, the *Myrica Gale*.

The President thought that the smell was something like that of verbena. He said that they were very much obliged to Professor Bentley, as they were always to any gentleman who brought new substances before them, particularly such as were likely to be tried in hospital or general practice.

Amorphous Phosphorus.

Mr. Greenish said he wished to make a remark arising out of the minutes of the last meeting. He said then that a medical man who had been in the habit of prescribing amorphous phosphorus had given up that substance for pure phosphorus. In a letter to the *Pharmaceutical Journal*, he had been asked by Mr. Postans for information as to the reason why amorphous phosphorus had been so given up. He had made inquiry, and found that the reason was the gritty character of that substance when administered mixed with syrup. He would also take that opportunity of remarking that notwithstanding all that Professor Redwood had said, he must adhere to his statement that they had no elegant form yet for the administration of phosphorus.

The Chairman said that, as Dr. Redwood was not present, they would, of course, abstain from discussing that question.

An Additional Test for Glycerine.

The Chairman said the first paper was a contribution from Professor Godeffroy, Professor of Practical Chemistry in the Vienna School of Pharmacy. This paper had been supplied to the society at the request of Mr. Greenish, who met the writer at St. Petersburg, and consequently this was one of the first fruits of their visit to the International Congress. He hoped that they would be supplied with many papers from similar sources.

The paper was read by Mr. Greenish, and is printed at p. 441. It gave rise to the following discussion:—

Mr. Greenish said that he had had three samples of glycerine tested by this means in his house by his son. The samples were Price's, Sarg's, and a German glycerine. Price's glycerine burnt, leaving simply a little sooty matter, but no other residue; Sarg's left a small quantity of residue and rather more charred matter. The sample of German glycerine, the maker of which he did not know, left a residue containing salts of lead and lime.

Mr. Robbins said he thought that this was a very good test for glycerine, but it was not entirely new. If he remembered rightly, the same test was published in the *Pharmaceutical Journal* some years ago. He happened to know a gentleman in the city, who bought a large quantity of glycerine at one of the exhibitions, when it was very dear, as only Price's glycerine was sold in the English market. The glycerine so bought was foreign, and was exhibited at the exhibition as something quite equal in every respect to Price's, and it was sold at a very much lower cost. The city firm sold it to its customers under the belief that it was selling pure glycerine. Some of it was examined, he believed, by Dr. Draper. There was then no known test for glycerine, but the examiner happened to try several methods, and this among the number. He found that the foreign glycerine was charred immediately, and that it consisted largely of grape sugar. He stated that pure glycerine would burn, and that it could be all distilled away without leaving any residue whatever.

Professor Attfield said that the paper which had just been read was partly new, and he thought that it was new to the extent to which it professed to be new. Respecting papers of this kind, there was no doubt that these international courtesies were very pleasant. This was not the first time that the presentation of a paper by a foreigner had taken place in England, and papers and notes by English pharmacists had occasionally been presented to scientific societies on the Continent. It was extremely desirable that such courtesies should be kept up. They promoted good feeling between the members of a common calling in different countries. With regard to the test itself, there could be no doubt that it had been known for a long time that glycerine was combustible, but it had not been generally recognized that glycerine, when heated, gave off a combustible gas, though the discoverer of glycerine himself alluded to the fact. At the same time, he thought it had not been generally understood that glycerine would so decompose without any unpleasant odour, and without leaving any residue whatever. The detection of sugar in that way had been, no doubt, suggested before. It seemed to him that Professor Godeffroy, from his remarks, offered this method as a sort of rough and ready test to be applied by any man who was not a chemist, in order to ascertain whether his glycerine was contaminated to any great extent. It would be pretty obvious to chemists that glycerine containing any large quantity of water, or any substance which would be likely, when heated, to yield water, could not ignite until that volatile substance had been expelled. But still, in offering a rough and ready mode of testing glycerine, it was desirable to call attention to that fact. Then, again, it would suggest itself to any chemist that glycerine, being a combustible body, any non-volatile residue which it contained would remain behind when the glycerine was burnt; but still it was desirable to point out that fact in offering a rough and ready test to persons who did not know much about chemistry. Again, with regard to substances which were not volatile, but which were combustible, Professor Godeffroy drew attention to the fact that such substances, if present in glycerine, would probably yield a residue of carbon when the glycerine was burnt, as in the case of sugar, or any other such substance. It was also important to draw attention to the fact that pure glycerine, when burnt, did not yield a residue, because in all works of reference on chemistry it would be found stated that glycerine yielded a residue. Chevreul, and Frémy, Gmelin, and the earlier workers with glycerine, all stated that when it was heated it yielded a combustible gas, and after ignition a residue of charcoal. If any one would try the experiment on the remarkably pure glyce rine which was to be met with now, putting about an ounce of it into a capsule and letting it burn away, he would find that practically there was no residue. Four or five hundred grains would scarcely yield a tenth of a grain of carbonaceous residue. He presumed that the glycerine which was experimented with in early days was scarcely pure, and hence the statement that it yielded a residue of carbon. Then the fact to which Professor Godeffroy called attention, as to the combustibility of cold glycerine by the aid of a wick, he (Dr. Attfield) did not think had been noticed before. As remarked by Professor Godeffroy, even glycerine containing water would burn. The speaker had placed in a vessel on the table some glycerine containing 10 per cent. of water, and it would be seen that it would burn by the aid of a wick. There was also some perfectly pure glycerine, which was very viscid, and hence it did not burn very well, but they would see that it would burn; and, of course, as they might expect, when it got slightly warm, and had become somewhat thin, it would burn very well. In a third capsule was some glycerine, which was warmed and ignited by Professor Attfield. It burnt away slowly with a slightly luminous flame, leaving a mere trace of carbonaceous residue.

Mr. Barnes said that there was an account contained last week in the *Daily News*, in the last article on the exhibition, in which it was stated that glycerine was burnt for giving light.

Mr. Moss said it would scarcely do to test all samples of glycerine by ignition in a platinum dish, for that some of the cheaper kinds were contaminated with lead salts, and at the temperature attained by the flame from an open Bunsen burner playing against the dish, these would be reduced by the carbonaceous residue and an alloy of lead and platinum be formed, to the serious detriment of the dish. If the Bunsen burner were used with the rose, he thought it would be found that even the best samples of glycerine would give a much greater proportion of carbonaceous residue than one-tenth of a grain from half an ounce. Professor Godeffroy said that pure glycerine (s.g. 1·26) will boil at 150° C. It seemed to him (Mr. Moss) that an error had crept in here somehow. A few bubbles escape at that temperature, but certainly the boiling (if boiling it were) at once ceased, and the temperature rapidly rose to 230° to 240° C. when ebullition fairly sets in. In an experiment made an hour previously, the lowest temperature at which the escaping vapour could be ignited was between 185° and 190°, tried with the temperature falling as well as with it rising.

The Preservative Effect of Chloroform upon Vegetable Infusions, etc.

A paper on this subject, by Mr. J. B. Barnes, F.C.S., was read. It is printed at p. 441, and gave rise to the following discussion:—

Mr. Gerrard said that he had that morning received a communication from Mr. F. J. Barrett, the pharmacist of the Wolverhampton General Hospital, which he would read. It was somewhat confirmatory of Mr. Barnes's remarks. This communication is printed at p. 442.

Mr. Umney said that he feared there was one serious objection to the use of chloroform in the dilute infusions in the proportion given by Mr. Barnes. In the ordinary dose in which infusions were taken, namely, from one to two ounces, such a proportion of chloroform would be almost equal (in chloroform) to fifteen or twenty minims of spirit of chloroform of the British Pharmacopœia, which would be an ordinary dose. It seemed to him that this was the chief objection to this method of preservation. Such a quantity of chloroform could not be used without materially altering the character of the infusions.

Mr. Gerrard said that Mr. Barrett had found that the sixth of a minim was sufficient to preserve one ounce of infusion for a period of several months.

Mr. Wilson said that the objection of Mr. Umney might be obviated to some extent in the case of some infusions by heating the infusion to the temperature of boiling water before using it.

Mr. Haselden said that he was very pleased to find that Mr. Barnes had once more brought forward the subject of infusions. Some years ago the question of how they might preserve fresh infusions, and yet not interfere with the processes of the Pharmacopœia, was constantly the subject of their attention. He confessed that he saw no difficulty whatever in the employment of chloroform in the proportion of five minims to eight ounces of infusion, except one, and that was a very serious objection. It was the question of whether the physician would like the pharmacist to give chloroform with every infusion he ordered, when he himself had no intention that such a thing should be administered. At the same time, when they considered that two prescriptions out of three contained spirit of chloroform, it would not be a matter of very great difficulty if the physicians were aware that fresh infusions were prepared with the assistance of chloroform. If such infusions were introduced into the Pharmacopœia, that would at once remove the difficulty. If the medical man did not wish chloroform to be contained in the infusion, it would be the simplest thing in the world to order a fresh infusion to be made, and to intimate to the patient that the prescription would require time to be made up. About seven or eight years ago infusions were very seldom prescribed. Medical men seemed to forget that there were such things as fresh infusions and concentrated infusions. That was about the time when the first British Pharmacopœia was brought out; but he was glad to see that about two or three years ago medical men had returned to the employment of infusions, and dispensers now very frequently found in the prescriptions infusion of calumba, gentian, quassia, and various other infusions. At the time that so much talk took place about preserving fresh infusions, the addition of spirit was suggested; the addition of tincture, and the boiling of infusions, and tying them over, as in the making of preserves, were also suggested. He believed that all those plans had been carried out to a certain extent, but they were never found to be very efficacious. Physicians would not mind their patients waiting a little for the infusion to be made, if it was so understood. They were constantly prescribing infusion of orange peel. He supposed they meant simple infusion of orange peel, and not the old compound infusion. The infusion of orange peel took a very short time to prepare, but would keep good only twenty-four hours. The time for its preparation was too short unless it were made from fresh orange peel; but seeing that the infusion was often prescribed at a time when fresh orange peel could not be obtained, and the infusion had to be made from dried peel, the time given by the Pharmacopœia was scarcely sufficient to get the full flavour of the orange peel. and therefore a longer time would be desirable. That ought to be borne in mind by the Pharmacopœia Committee. But to come back to the subject, he did not see any objection to the use of chloroform to preserve infusions, provided that the medical profession were made aware of the fact, and would agree to the practice.

The President said that what Mr. Haselden had said was important. They must get the sanction of the medical profession before the use of chloroform in infusions could be adopted; but he preferred the fresh infusions as at present prepared.

Mr. Moss said, that with regard to Mr. Umney's objection to the use of chloroform, it must be remembered that a twenty minim dose of Spiritus chloroformi contains nineteen minims of rectified spirit, which would certainly not be without effect when that remedy was administered. The spirit would not be in infusions preserved as suggested by Mr. Barnes.

Mr. Greenish said that there was some difficulty with regard to fresh infusions, but he still held to the opinion that there was nothing like them. He had seen a great many very good concentrated infusions, but when he came to dilute them, he found that they did not equal the fresh infusions. He felt very much indebted to Mr. Barnes for bringing this subject before the meeting ; but upon putting those bottles to his nose, he (Mr. Greenish) found that there was such a strong smell of chloroform that it would be quite impossible to use such infusions in ordinary dispensing.

The CHAIRMAN quite agreed that there was nothing like a fresh infusion. With respect to chloroform, of course, nothing could be done without the sanction of the Medical Council. He did not know whether any one present had tried the use of glycerine as a preservative. He did not think that it would be so objectionable as chloroform, and perhaps it might sweeten the infusion a little, and make it somewhat pleasanter.

Mr. URWICK said that the consent of the Medical Council would have to be obtained to the use of glycerine.

The CHAIRMAN : I quite agree with you.

Mr. URWICK said he had heard many say that they found a difficulty in the use of infusions, but he had never done so. He had never used concentrated infusions, but he always kept a supply of the others, and managed very well. They were far superior to the concentrated, and he should like to see the latter altogether banished.

Professor ATTFIELD said, that as the pharmaceutical aspect of the matter seemed to be worked out, he should like to say a word or two on the action of the chloroform, irrespective of the value which it might have as a preservative of infusions. Mr. Barnes in his note said that in his opinion the chloroform preserved infusions by its action on the fermentable substances held in solution ; but the question was, what was that action ? They had been told many times that infusions could be kept if the air was prevented from getting to them, and therefore it seemed as if the alteration of the infusions was due to some process in which the air had some action, and it was presumable that the oxygen of the air would attack the infusion, and also that bodies floating in the air might find their home for growth in the infusion. So long ago as 1850, the action of chloroform as an antiseptic was noticed in a pamphlet by Aujendie of Constantinople. He (Professor Attfield) did not know that the writer mentioned infusions, for he did not think he was a pharmacist ; but he went pretty fully into the action of chloroform in preventing alteration in meat and similar substances. This writer, and more particularly M. Robin of Paris, considered that the action was simply the prevention of oxidation. M. Robin went so far as to assert that the influence of chloroform when inhaled as an anæsthetic was to prevent the oxidation of the blood by the air.

Mr. MARTINDALE suggested that it was most probable that chloroform acted like carbolic acid or other antiseptics in checking the growth of septic germs which might exist in infusions. He believed that Mr. Barrett once used carbolic acid for preserving infusions, but that substance, to the extent to which Mr. Barrett used it, was very dangerous in consequence of its poisonous action. It would be interesting to know the effect of the addition to infusions of salicylic acid, which appeared to resemble carbolic acid in its antiseptic property.

Mr. GREENISH said that Mr. Barnes alluded to one subject which he thought was extremely interesting, and that was the keeping of waters and solutions. Mr. Rimmington, who had paid some attention to that subject, was present. He (Mr. Greenish) and Mr. Rimmington often found fungoid growths in the solutions, as in solution of arsenic and solution of strychnine. In the latter case almost the whole of the strychnine would be taken up by the fungoid matter. It was possible that chloroform might be useful in preserving such solutions, but it was a very large subject.

Mr. RIMMINGTON said that he had no doubt at all that the changes which took place in all vegetable infusions arose from fungoid growths, and that the only action performed by chloroform or any other preserving agent was to prevent such growth. Of course the nature of the growth which took place would vary with the infusion and the circumstances in which it was placed, but from his own experience he felt confident that the growth of fungi in vegetable infusions was the cause of their decomposition, and that any means which would prevent the growth of such bodies would secure the preservation of the infusion.

Mr. BARNES said that he did not suggest that chloroform should be added to infusions. He merely recorded the fact that it had preservative properties. He should not suggest its use unless it were sanctioned.

THE PRESERVATION OF THE LIQUID EXTRACT OF LIQUORICE ROOT.

The remarks on this subject (printed on p. 442), by Mr. C. Umney, gave rise to the following discussion.

The PRESIDENT said that they were very much obliged to Mr. Umney, and he supposed that they might look forward to having, in the course of two or three months, a paper on the result of what Mr. Umney had now put aside.

Mr. MARTINDALE said that a sample of the preparation which he had made in May last, and kept in a cool place, had completely gelatinized. A sample kept in a warm place had changed as Mr. Umney had described.

Mr. UMNEY said that he had noticed, on a large as well as a small scale, the decomposition which he had described. He had used large quantities of liquorice root since April, and he had seen the fermentation going on in the fluid extract when stored in bottles containing three or four gallons, and in a cool place.

Mr. GREENISH asked what temperature Mr. Umney's sample had been exposed to.

Mr. UMNEY said that it had been made in the cold, then raised to 212°, so as thoroughly to coagulate the vegetable albumen, evaporated by a water-bath, at a temperature of about 170° or 180° Fahr., and, finally, filtered. This was the process given in the Pharmacopœia, which was thoroughly sound in principle, and only required, he believed, more spirit to make it perfect. Most of them knew that 11 per cent. of spirit would not preserve preparations of this class.

Mr. MARTINDALE said that he thought that the preparation was too strong.

The meeting then adjourned to the 3rd February, 1875.

PRELIMINARY EXAMINATION.

The undermentioned certificates, in lieu of this Examination, were received by the Board of Examiners at their meeting on the 9th of October :—

Certificates of the College of Preceptors.

Aplin, Isaac W. ....Yeovil.
Glanville, George ....London.
Norburn, Albert Edward.........London.

Certificate of the Royal College of Surgeons of England.

Dyer, Edward Henry ....Horncastle.

Certificate of the Society of Apothecaries.

Savory, Arthur Ledsam ....London.

Certificate of the University of Durham.

Hurworth, Andrew Maitland ...Boston.

Certificate of the University of Oxford.

Fry, Henry ....Leicester.

NORTH BRITISH BRANCH, EDINBURGH.

The first scientific meeting for the session 1874-5 was held in the Society's rooms, 119a, George Street, on Thursday evening, 26th November, at half-past eight o'clock ; Mr. Gilmour, President, in the chair. There was a very full attendance.

The President made the following remarks:—

"One of the first duties which it becomes me to discharge to-night at this the first meeting of another session is to thank you very cordially for the honour you have done me in placing me in the presidential chair. In doing this I cannot but feel how much better it would have been had you chosen one with an older head and greater experience than I can lay claim to, to fill this important and honourable position. It is one I have always looked up to, particularly when filled, as it has been of late years, by men whom we all honour (and who are worthy of all honour), as one of great responsibility, and nothing would have induced me to comply with the call you have thus given me, had I not felt assured that I would have both your sympathy and co-operation in every duty which I might be called upon to discharge. Especially, gentlemen, do I ask this of you to-night in the somewhat peculiar and difficult duty which now lies before me in formally opening another session's scientific meetings. In doing this there are one or two things which I think it becomes me, before commencing more immediately the business of the evening, to take notice of as a cause for congratulation in our present position and prospects. And one of the first of these which commends itself to us is that we meet to-night in our new rooms with no small degree of comfort and pleasure. It is not necessary that I should here narrate all the steps which were taken after finding the old premises small and otherwise unsuitable, to find others, or how, after long and anxious search, your Council happily fixed on those we now occupy. But it is certainly matter for congratulation that we have been fortunate enough to secure rooms at once suited for all the purposes for which they are required, and convenient for all who may find it necessary to frequent them. And with this enlargement of our space it is pleasant also to anticipate a probable demand upon all the extra room which we have thus available. For some time it has been apparent that the Council of the parent Society has been not only willing but even anxious to supply our every want, and place us in a position hitherto unattained and unattainable by us. This, together with events which have more recently taken place, cause me to look forward with confident expectation to a not distant day when we will have both a museum and library worthy at once the name and the Society to which they belong.

"It is with great pleasure (coming more immediately to our winter's work) that I call your attention to the arrangements which have been completed for the admission of pharmaceutical students to a winter's materia medica course of lectures, in addition to the usual classes. I do not at the present time wish to enter upon the question either of education or examination, but this I would say; that whilst education will ever commend itself to every right-minded student more for its own sake than as a mere help by which they are enabled to pass the examinations, still we cannot shut our eyes to the fact that such examinations do now lie before them in their path; nor can we avoid the further probable fact that they will bulk very largely in all their calculations and plans; and it is therefore, I think, fit and proper we should hold out every facility and inducement to them to take advantage of arrangements such as those which are thus made for them every session. In getting them to join such classes, we have the best guarantee that they are obtaining an education which will not only enable them to pass creditably their examinations, but an education which will prove useful to them in all their future career.

"I have also much pleasure in further calling your attention to the list of able lecturers which our indefatigable secretary has secured for our winter's scientific course. Interesting as many of the lectures have been in past sessions, I feel assured that this winter's will prove as interesting and successful (if not more so) than that of any previous year, and I need not say that I confidently anticipate your countenance and support to the different lecturers who have thus so kindly promised their services on these occasions. The names of the gentlemen who have kindly promised papers are—Dr. S. Macadam, Dr. M'Kendrick, Mr. Sadler, of the Royal Botanic Garden; Dr. Craig, and Dr. Moinet."

At the close of these remarks Mr. Gilmour delivered a most interesting lecture, of which the following is a short abstract:—

Theory and Experiments in the Development of Science.

It was my wish to bring before you something which, whilst it would enable us to spend a pleasant hour, would at the same time prove of some lasting benefit to us in the way of improving and adding to our knowledge; but only those who have been in such a position as that in which I am now placed can understand the difficulty of the task, turn in what direction we may. Accident, however, determined what thought did not, and so having my attention turned for another purpose to some aspects of modern theory, I thought I might utilize a few of my thoughts in another direction of the same subject, and present them to you to-night. I need not call your attention to the fact of how largely science bulks in the thoughts of men as well as in the literature of the present day, or how important are the issues which it threatens to involve in its speculations. Time was when science was the goal of theory, but in these days it seems to have become the starting point only, and we are caused often to wonder if it can explain any phenomena, or if its province has degenerated into explaining that they are inexplicable either as to their final or proximate causes, and this, too when nature is giving out her secrets with a prodigality unknown during the past six thousand years of her history, and when, in addition, experiment and research have more abounded than in any previous age. He must, I think, be but an indifferent observer of the times who does not see all this; and more than an indifferent observer who does not occasionally stop to inquire into the cause and the probable ultimate influence which it may exert not only, and not so much upon himself as an individual, as upon the community, or nation, or world at large, to which he belongs, and of which he forms a living, thinking, responsible unit. I do not intend taking up this aspect of the question at this time, interesting though it be. I have a firm faith in the great truth so beautifully expressed by the poet, that

> "I doubt not through the ages one increasing purpose runs,
> And the thoughts of men are widened with the process of the sun's."

Only it becomes us in this widening process not to attach undue importance to individual action, or opinion, or wisdom, in case we succeed like many in our day in elevating, for the time being, every theory into fact, and every individual bearing the name philosopher into a god, knowing good and evil,

It is my intention to-night to speak upon science with more immediate reference to the spheres of theory and experiment in its development, first, because I hope to induce some of the young men now before me to turn their attention to the whole subject, if not for the purpose of becoming men of science, at least of becoming men of true principles, discerning clearly and soundly betwixt the true and the false in the great war at present raging betwixt new science and old orthodoxy; and second, and principally, because I firmly believe this to be one of the first and most important duties which we should be able to perform, to wit, the weighing and estimating betwixt good, honest, sound theory—theory which has first been the outcome of proper observation and deduction, and then the object of careful and proper experiment—and that abortive thing, born of mere ingenuity, with which at present the whole world of thought is surcharged.

How is this assay, it may be asked, to be accomplished? Mainly, I reply, by a clear and intelligent idea of the principles from which theory originates and is developed. All theory, we may take it for granted, owes its formation to the desire of the human mind to inquire into and understand the mysteries, or phenomena, or by whatever name we may name the unknown of nature. In this process of inquiry there are but two ways in which we may proceed with investigation, viz., from observed phenomena backwards to proximate or first causes, or the antithesis, from first causes upwards to effects. But whether we proceed to make investigation by this analytical or synthetical process, we ought never to forget or overlook the fact, that the probabilities are, we may have, after all, begun with defective principles. "Lay the theoretic conception" (says one of the greatest theoretic speculators of the present day), "lay the theoretic conception at the root of matters, and determine by rigid deduction what are the results which must of necessity grow out of this root." But what, let us ask, is this root or where are we to find it? Not, certainly, on the one hand, in any phenomena, isolated and viewed from one stand-point alone where all are related, and all are less or more affected by each other; nor certainly, on the other hand, in any causes or even facts that in their nature are less than unchanging and unchangeable. Our very premises, as I have already said, may be variable, uncertain, defective.

And if this is the case of the start-point, how much more is it with this whole process of deduction, however rigid? The deduction lies away beyond the reach of the external, but its confirmation lies in it, and hence to the fallacy of reasoning we have to add all the uncertainty of experiment. Not that experiment in itself is uncertain. It is the grand touchstone to which all theory must be brought for proof and verification, but this very verification may be, after all, of mere negative importance, if not positively misleading, as attaching only *a value* to theory, and not the demonstration of its exclusive truth. With all these barriers, need we wonder if the development of science has been painful and laborious, or if theory has abounded over experimental knowledge? Nay! it is only when we call them all up before us, and correctly estimate them, that we are enabled rightly to understand and appreciate the progress which science has made and is now making.

Without unnecessarily obtruding these different points, which I have thus so briefly summarized, it is my wish to bring them before you to-night, as it were practically, in tracing the development, through theory and experiment, of a branch of physical science, leaving you to draw your own deductions and conclusions. For many reasons optics commends itself to us for this purpose, but principally because it is a science entirely of modern growth.

The lecturer then rapidly sketched some of the theories of the ancient philosophers regarding light, showing more immediately how barren their whole results were, and how little research had accomplished even down to the sixteenth and seventeenth centuries, when Galileo and Kepler succeeded in making several important discoveries, not only in optical instruments, but also regarding light itself. These discoveries, in the new revelation which they brought, as it were, to men's minds, as well as in their very incompleteness, set men to theorize and investigate, and so prepared the way for the advent of the great founder of the science, Newton, whose theories, and experiments, and discoveries, as well as mistakes, the lecturer then proceeded to narrate. From the discovery of the composition of light and the experiments in verification of it, the subject was minutely traced up to the discovery of achromatism by Dolland, and onwards to the substitution of the slit by Wollaston, instead of the round hole which philosophers had up to his time used, and in consequence, the foundation of that most important of all modern discoveries—viz., spectrum analysis, by the discovery that the colours of the spectrum were not continuous; occasion here being taken to show that no science could possibly be confined rigidly to one groove, but would branch out in every direction, shedding light all around.

After touching on the nature and theory of colours, the phenomena presented by thin films and grooved surfaces were next dwelt upon, and the corpuscular and undulatory theories brought to bear upon them for explanation. The interest of the audience from this point onwards as the rival theories were brought to the test of experiment, was most marked, and never flagged as the lecturer went on to demonstrate how the undulatory theory not only accounted for, but even anticipated phenomena in a way which the corpuscular theory could not, and thus obtained over it.

In concluding, reference was made to the length of the waves for the different colours, and the mode explained how they were calculated, and a diagram was shown, illustrative of the difference betwixt Newton's light particle and a wave of light, etc.

The lecture was illustrated throughout by means of some very beautiful and interesting experiments, thrown upon a large screen by means of the oxygen light, and Mr. Baildon at the close proposed a hearty and cordial vote of thanks to Mr. Gilmour for the very able manner in which he had treated his subject, referring especially to the successful and striking way in which he had conducted his experiments.

Mr. J. R. Young, in seconding the vote of thanks, expressed the pleasure and gratification with which he had listened to the paper, and hoped that ere long Mr. Gilmour would continue the subject, and give the Society another evening.

The Secretary drew the attention of the meeting to the following presentations which had been made to the Museum and Library, all of which were placed on the table for examination:—

Museum:—Forty-five specimens in jars illustrative of the vegetable department of the United States Pharmacopœia; twenty-seven mounted specimens of plants for the use of students; thirteen specimens of dried plants for portfolio; seven specimens of woods and roots, all presented by the Society in London; specimens of boldo leaves, from Professor Archer, Edinburgh; specimens of boldo leaves on the stalk, from Messrs. T. Morson and Son, London; pure Nepaul pepper from Western India, by Mr. H. Hyne, London.

Library:—Prior on the Popular Names of British Plants, from Mr. Daniel Hanbury, London; Smithsonian Annual Report for 1871-2, from the United States; eight numbers of the Pharmacist, from Chicago; fourteen numbers of the Proceedings of the Royal Society of London, from John Mackay; complete list of the awards by the Juries of the International Exhibition at Vienna, from J. Mackay; list of the Athenæum Museum of Vienna; fourteen numbers of the Journal of the Chemical Society in London, from J. Mackay.

Thanks were voted to the various donors.

The New Regulations of the Board of Examiners.

Mr. Mackay then proceeded to make some remarks on the recent alterations in the examinations. He explained that he did this by special request, as not a few misapprehensions appeared to be entertained as to the real operation of these changes, for, notwithstanding the explicit manner in which the new regulations had been laid down in the printed syllabus of the Society, there yet appeared to be a considerable difficulty in the minds of many, regarding them. Mr. Mackay begged to be distinctly understood that he had no official explanation to give, but simply to indicate his own individual opinion as to the manner in which the alterations would probably be carried out. Alluding to the Preliminary or the first examination, he reminded the meeting that at the close of the year, Selecta c̄ Præscriptis and the London Pharmacopœia would be omitted from the Latin examination, and a translation of a portion of the first book of Cæsar only required. In addition to the arithmetic, a knowledge of the metrical system of weights and measures would also be expected. He then referred to the Minor examination, and spoke of the slight alterations in the departments of prescription reading and pharmacy; but referring to the subject of chemistry, he stated, from numerous letters and verbal inquiries, he found that the nature of the practical examination about to be exercised in this department was not understood, and impressed many with the idea that the new requirements would be much more strict than the old ones. Now, the real changes were to this extent, that a practical knowledge in chemistry would be required to be shown by actual manipulation. When, therefore, better understood, the present fear of this portion of the examination must be at an end, because if bottles containing certain salts in solution, or otherwise, properly labelled, were placed in the hands of the candidate with a request that suitable reagents be employed to prove the presence of such substances, the difficulty to many would be rather lessened than increased, as compared with having various chemical reactions committed to memory. Of course, no books or memoranda will be allowed in this examination, and the various changes will require to be written down and shown by equations or diagrams. He then drew attention to the fact that on and after 1st January, 1875, every candidate must have attained the age of 21, before coming up for his examination, and in addition to this, and looking forward two years, evidence would be required that each candidate had been employed in practical dispensing for at least three years.

In speaking of the Major examination, Mr. Mackay intimated that the written examinations would now be done away with entirely, and that instead of eight departments, the new regulations only comprised four. Of these four, materia medica and botany remained unaltered, but there will now be considerable laboratory practical work in connection with chemistry and materia medica. Books and memoranda will, however, be allowed during the six hours in the laboratory. This work will include proving by experiment the percentage of alkali and acid in solutions given and not labelled; testing for the presence of metallic and alkaline salts, and proving in each case the base and combining acid. Also, it will be necessary to show an acquaintance with the various scale preparations, and prove their presence by testing when in solution; to be able to determine the purity or impurity of medicinal powders, and if of the latter, the kind and extent of such adulteration; and to show an acquaintance with the various alkaloids; and to know practically volumetric analysis. In the *vivâ voce* examinations, which will be supplementary to this practical one, and be continued the following day, the candidate will require to know the various chemical salts, crystals, and liquids, and give an explanation of some of the processes in chemistry and in the arts. He will also be required to show an acquaintance with the atomic theory, latent and specific heat, polarized light, electricity, and magnetism.

The foregoing, when taken along with the printed statement issued by the Society in connection with the new regulations, may give a general idea as to the preparation required for the Minor and Major examinations.

Mr. Mackay again reminded the meeting that the remarks he made in no way committed any of the examiners either in London or in Edinburgh, as each member of the Board had full power to examine on his own particular subject, in any way he thought best, in order to bring out the knowledge which the Society required each party to have before he gained his diploma as pharmaceutical chemist, or was put upon the register as a chemist and druggist.

The thanks of the meeting were voted to Mr. Mackay for his remarks, and carried with acclamation.

Parliamentary and Law Proceedings.

Prosecution under the Adulteration Act.—Adulteration of Pepper.

On Friday, November 27, at the Borough Court, Bradford, Inspector Booker summoned several persons for selling adulterated pepper. The town clerk (Mr. M'Gowen) conducted the prosecutions, and Mr. F. M. Rimmington, the borough analyst, was in attendance. In none of the cases were the articles used for the adulteration injurious to health, but the adulterations varied from 20 to 30 and from 40 to 75 per cent. The principal commodity used to mix with the pepper was peameal, which may be had at about 1*d.* per lb.

The first case was against Roger Walker Barker, grocer, Leeds-road. Inspector Booker proved the purchase of the pepper, and Mr. Rimmington stated that it was adulterated with 40 per cent. of peameal and ground rice. Mr. Hutchinson, who appeared for the defendant, said that his client had purchased the pepper from a highly respectable person, Mr. W. C. Swithenbank, the central Mills, Armley, near Leeds; that he paid a good price for it, and that it was guaranteed on the invoice to be pure. He submitted that the defendant ought not to be held liable for the adulteration; but the magistrates held that the defendant certainly was liable, and he could have had the pepper analysed before selling it on the payment of 2*s.* 6*d.* to the borough analyst. A fine of 10*s.* and 8*s.* costs was imposed.

The next case, in which the pepper had been obtained from the same wholesale firm, was against Joseph Addy, grocer, 189, Leeds-road. The case was proved by the Inspector and the borough analyst, and Mr. Hutchinson was told by the magistrates that he need not argue the matter again, as the case was on all-fours with the other, and the same fine and costs would have to be paid.

Margaret Staincliffe, 6, Vicar-lane, had to pay a similar penalty and costs for selling adulterated pepper, which had come from a London firm, and had been sold to her by a Bradford house. The solicitor urged that it was very hard on poor shopkeepers like the defendant. The town clerk remarked that they would have no difficulty in getting their money back from the wholesale dealer when the article was guaranteed. They could have it analysed, then bring an action against the wholesale dealer, claim substantial damages, and he had no doubt they would get a verdict.

Mr. Hutchinson said he had instructions from his client to proceed at law to vindicate his position, and to recover damages for the injury he had sustained.

In the case of Luke Barber, grocer, 141, Leeds-road, the pepper bought was proved by Mr. Rimmington to be fully three-fourths peameal. It had been obtained as pure from Messrs. H. Glover, Sons, and Co., Leeds-road, Bradford. Mr. Ralph Fawcett, a member of the firm, put in an invoice, and said that they had bought about a ton of pepper from Messrs. R. Robinson and Son, Valley Mills, Beeston, near Leeds, and it was "warranted genuine" on the invoice. The defendant was similarly fined to the others.

John Noble, grocer, 51, Bridge-street, bought his pepper from an eminent firm as pure, but had not got a guarantee to that effect. Mr. Rimmington said that this sample contained from 20 to 30 per cent of tapioca starch, and rice flour. Like penalties and costs were inflicted.

James Sharp and Co., 94, Godwin-street, had bought a quantity of pepper from Messrs. Topham Brothers, but it appeared that it was adulterated with from 20 to 30 per cent of peameal. As in the other cases, a fine of 10*s.* and 8*s.* costs was imposed, and the town clerk, in conclusion, told all the defendants who had a guarantee that they had their remedy elsewhere, but the inspector only knew the persons who sold adulterated articles.—*Leeds Mercury.*

Extensive Poisoning by Arsenic.

It is reported that upwards of fifty persons connected with the works of the West of England Fire-clay Company, near Calstock, in Cornwall, have been made ill by drinking water from a tank into which some arsenic had been thrown, it is supposed, maliciously. Three of the sufferers are said to be in a dangerous condition.

Alleged Attempt to Poison by Corrosive Sublimate.

On Tuesday, at the Worship Street Police Court, William Cherry was charged on remand with attempting to murder his wife by poison. The particulars of this case were reported last week. After some further evidence had been given, the magistrate decided upon committing the prisoner for trial.

Notes and Queries.

[419]. PHARMACY IN NEW ZEALAND.—I shall be much obliged to any reader who will give me any information, in this Journal, as to the state of pharmacy in New Zealand, and what is the average assistants, salaries ?—R. M.

[420]. PEARSON'S SOLUTION.—Can any reader inform me whether the solution known as Pearson's solution was introduced by Dr. Richard Pearson, of Birmingham, or Dr. George Pearson, of Doncaster? The time of its introduction was probably early in the present century.—H. Kerr.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Board of Examiners.

Sir,—The Council has an undoubted right to challenge the Board of Examiners if there are any weak members on it, but after the really Herculean efforts on the part of that Board in July and the preceding months, it does not appear very gracious to do so.

It cannot be too fully borne in mind the examiners must be taken from a class of thinkers and workers, with natures very different and often quite incompatible with those qualities which often place men on the Council; and with that learning, thought, and patient study which can alone command the respect and veneration of students, there is often an intense sensitiveness which a word used heedlessly in debate cannot fail to wound.

All I desire is to see on that Board men who can ably take the places of many who have left it, and the Society will not suffer.

Medical pupils revere most both as teachers and examiners men who have successfully, and with some mark, done what the students themselves aspire to—men who have put themselves on the world's judgment, and have won its approbation and support in their respective callings.

George Mee.

79, Grosvenor Road, Highbury New Park, London, N., Nov. 25, 1874.

Liverpool Chemists' Association.

Sir,—At Mr. Siebold's request, I hasten to correct a slight exaggeration of my remarks in introducing him to his audience at the last meeting of the Liverpool Chemists' Association, as reported in your issue of the 28th ult.

The words used were ". . . . a gentleman whose enthusiastic devotion to scientific pharmacy has raised him to the position Mr. Siebold now holds. As representative of our art at one of the principal scientific colleges in the world, and with our kindred association at Manchester," etc., etc.

On such an occasion, perhaps, a little license is allowed, and I would have preferred to let the matter rest, but Mr. Siebold's usual love of accuracy forbids our secretary to anticipate for him the honour referred to; and as this paragraph has caused Mr. Siebold (to whom we are much indebted for his very excellent lecture) some unpleasantness, which I sincerely regret, I must ask you kindly to insert this in your next issue.

Alfred H. Mason.

Liverpool, December 1, 1874.

[*** Mr. Siebold held an appointment, as lecturer on pharmacy at Owen's College, before the Manchester School of Pharmacy was separated from that institution.—Ed. Pharm. Journ.]

A. T.—See a paper entitled "A Cheap Disinfectant," read by Mr. E. C. C. Stanford before the British Pharmaceutical Conference in 1872 (Pharm. Journ. [3] vol. iii. p. 237), and another by Mr. Wanklyn on the "Action and Relative Value of Disinfectants" (vol. iv. p. 205).

A.—A formula for Syrup of Lasto-Phosphate of Iron and Lime was published in vol. iv. p. 610.

B.—According to the preface of the British Pharmacopœia the avoirdupois ounce would be implied though it is possible the Apothecaries' may be intended.

Lytta.—(1) Liquor Epispasticus, B. P. (2) The "Papier nitré" of the French Codex is prepared by steeping unsized paper in a cold saturated solution of potassium nitrate in water, and afterwards drying it.

"*A Student.*"—In the Minor examination a candidate is required to determine practically, by means of tests, the presence in solution of the chemicals in common use, and to explain the reactions which occur in each case.

S. Nockolds.—You will find a full description of croton chloral in the *Pharmaceutical Journal* for Oct. 31, p. 341.

J. Parker.—Yes, if required.

F. Booth.—Parrish's Treatise on Pharmacy, published by Baillière, Tindall, and Cox.

C. M. P.—The context would indicate the sense in which the words are to be construed.

"*Inquiro.*"—We are unable to answer your questions.

H. Mortimer.—See an article in the present series of the *Pharm. Journ.*, vol. i. p. 225.

A Country Pharmacist.—The Council would be unable to adopt such a course as that you recommend, without the sanction of Parliament.

R. H. R.—"Posological Tables," by Dr. W. Handell Griffiths. Published by Baillierè, Tindall, and Cox, King William Street, W.C.

P. B.—(1) It acts as a mechanical purifier. (2) No. (3) Analytical tests for distinguishing hydrates, carbonates, bicarbonates, etc., will be found in any good manual of chemistry.

"*One who takes an Interest in the Society,*" who writes to complain that he has been unable to obtain modern manuals of botany from the Library of the North British Branch, had better communicate personally with the Secretary in Edinburgh, who will most likely do what he can to oblige him.

"*Minor*" is referred to the rule respecting anonymous communications.

"*A Case for the Benevolent.*"—In the letter of our correspondent, Dr. Bathurst Woodman, published in last week's Journal, he has fallen into an error, which escaped our notice at the time. Mrs. Newby was not excluded from assistance by the rules of the Benevolent Fund, as Dr. Woodman states, because her husband was not a Pharmaceutical Chemist, but in reality because he was not a Registered Chemist and Druggist. We may take this opportunity of remarking that grants from the Benevolent Fund are not confined to Pharmaceutical Chemists, but are equally available for all registered Chemists and Druggists, their widows and orphans.

"*Pills.*"—We think it would be more digestible in the natural condition, if fresh and good.

Communications, Letters, etc., have been received from Mrs. A. Thompson, Mr. Durrant, Mr. Finch, Mr. Postans, Mr. Fairlie, Mr. Clarke, Mr. Robinson, Mr. Taylor, Mr. Mortimer, Mr. Booth, Mr. Parker, Mr. Holdsworth (Victoria), A., P. B., H. M. W., R. H. R., Bristoliensis, A Student, A Country Pharmacist.

NOTICE.—In consequence of the length of the official reports we are compelled to defer the publication of several communications.

THE USES OF AGAVE AMERICANA.

BY JOHN R. JACKSON, A.L.S.,

Curator of the Museums, Royal Gardens, Kew.

Some attention has lately been drawn to the common Agave (*Agave Americana*) on account of its supposed efficacy as an antiscorbutic. As noticed in this Journal last week, General Sheridan, whose name is as a household word in the United States, is said to have used the juice with great success amongst his men, who were suffering from scurvy in a small isolated post on the Texas border. The disagreeable smell of the juice, which has been compared to that of putrid meat, causes a person at first to turn from it in disgust, but after a while the odour is overcome, and a liking for it takes the place of the previous dislike. From the compulsory doses of this juice taken by Sheridan's small army, the effectual stay of scurvy is attributed. In Mexico the plant is very highly valued for its medicinal properties, the belief in which, amongst the Mexican peasants, has been handed down from a remote period of history. Thus, the gum found in the lower part of the stem is used as a cure for toothache, whilst the juice of the leaf is applied to bruises and contusions. This juice forms a large article of internal trade in Mexico. The plant is known as the "Maguey," or "tree of wonders," and even at the present time, in some parts of Mexico, it is considered one of the most important productions of the soil. The discovery of the juice of the plant as an intoxicating beverage is said by some to date back to the days of the early inhabitants of the Mexican continent. In an interesting report on the history, culture, and trade in the plant furnished to the Foreign Office some short time since, we read that "more modern tradition has fixed the epoch of its discovery as having been about the year 1045 to 1050, under the reign of the eighth King of the Taltec tribe, named Tepancaltzin, at whose court a relation of his, named Pepantzin, presented himself, and informed him that his daughter had discovered that a sweet and aromatic liquid sprung forth from the Metl plants in her garden. The King ordered her into his presence, and she brought him a 'Tecomatl,' or vase of the liquid she had discovered, which he tasted, and then ordered her to bring him more; and subsequently, becoming enamoured of the maiden, whose beauty was great, and whose name was 'Xochil,' or flower, he married her; of which union a child was born, to whom was given the name of Meconetzin, or 'Son of the Metl;' or, Maguey, in allusion to the circumstance which was the origin of his parents' first interview."

Leaving its very remote history, there seems "no doubt that the divers properties of the plant itself were known many years before the discovery of Mexico by the Spaniards, for not only is it mentioned as furnishing thorny scourges, as well as whips made of the fibres of the plants' leaves for the multitudes who annually met to celebrate a festival in honour of the god, Texcatlipuca, in the great Temple of Tenochtitlau (the modern Mexico), but the use of the juice became so general that many severe laws against the drunkenness resulting from it were issued by the ancient Mexican kings; mention being made of a widow who sold it promiscuously having been put to death by order of the king, Netzahualcoqatl; only women suckling infants, old people, and soldiers upon the march being allowed to drink it." Several varieties of the plant are cultivated in Mexico, each being known for the greater or lesser quantity of the juice it produces, its colour, whether yellow or greenish, its thickness, or sweet or bitter taste. These variations as to the properties or consistency of the juice depend a great deal upon the nature of the soil, and of the range of temperature; thus it is the least mucilaginous in a somewhat clayey soil, and is cultivated with the greatest success at an elevation of about 9,000 feet. Though the plant is cultivated very largely in many parts of Mexico, it is in the plains of Apam that the greatest Agave district is situated; more than 600 square leagues are here almost covered with the plant, either in its wild or cultivated state. The mode of propagation is by removing the young plants or suckers from the old ones, and after spreading them on the ground for two or three months to partially dry them, so that they may not rot, instead of starting into growth, they are planted in rows, and barley sown between them, which is considered rather to assist their growth. In a good soil the agave plant requires a period of from ten to twelve years before attaining maturity. "The plant upon attaining its full growth, which is easily discernible by its height and the prodigious extension of its leaves, brings forth a tall stem crowned with yellow flowers, and then a certain amount of pruning becomes necessary so as to form a kind of reservoir in the centre, and what is technically termed a "cara" or "face," around it, so as to cause the juice to flow towards the same spot, and to facilitate the extraction of it by removing some of the interior leaves and thorns."

To collect the juice, or "pulque," as it is called, as soon as the leaves begin to turn yellow a small concave aperture is scooped in the core of the plant, and an elongated tube-like gourd, the air in which is exhausted by suction, is thrust into the aperture; each labourer carries with him, strapped to his back, an impervious sheepskin bag, into which the gourd tube is emptied as soon as it is filled. From 50 to 60 plants are usually allotted to the care of one man, and from these he extracts, on an average, about 110 to 120 arrobas of juice, called honey-water, per week. After each plant has been exhausted of its juice—and often two collections are made in one day—the apertures or incisions are carefully covered up with leaves and stones to preserve them from the attacks of cattle, dogs, and a kind of jackal, common in the country. The pulque manufactories on the plantations, to which the juice is removed after collecting, consist of long, covered, and well-ventilated galleries, in which are rows of vats made of bullocks' hides stretched over a framework, and covered with lime; the juice is emptied into these vats, and allowed to stand for about thirty-six hours, when fermentation ensues, and its yellow transparent colour changes into a milky white. After fermentation the juice or pulque is ready for use, and is then sent off to the City of Mexico, Puebla, or the nearest market within a radius of 20 or 30 leagues; the pulque very commonly undergoing a considerable dilution of water by the way at the hands of the carriers who convey it in sheepskin bags upon mules or donkeys. The quantity of it which thus annually enters the City of Mexico alone may be estimated on an average to be about 2,000,000 arrobas, and that which enters Puebla to be about 500,000 arrobas, and the cost of transport alone has been calculated, taking the approximate average of 1 real as that of each arroba, to represent the sum of 312,000 dollars; not less than 20,000 mules and donkeys laden with the beverage entering the city every month by the gate leading to the Maguey districts. To the quantity paying duty must also be added a considerable quantity which is smuggled in, and including this it may be calculated that about 50,000,000 bottles are now annually introduced into the City of Mexico.

"From a chemical analysis of pulque it is found to contain, in different proportions, according to its quality, alcohol, mucilaginous fecula, sugar, water, and potash. It has been observed that the drunkenness produced by it under its different varieties is of a less violent description than that produced by another common beverage of the country, 'chinguirito' (brandy made from the sugar-cane), and that *delirium tremens* is rarely produced by the immoderate use of the former, though often by that of the latter. It is also affirmed that the pulque drinker is commonly long-lived, whilst the reverse is the case with regard to persons addicted to 'chinguirito,' and that the former beverage, notwithstanding its somewhat acid taste, is, probably on account of the fecula contained in it, peculiarly beneficial to women suckling their infants, and to those people whose constitutions require a wholesome stimulant."

Besides this pulque which, as we have seen, is the chief product of the *Agave* in Mexico, a strong spirit is prepared from the sap, known as mezcal, also a kind of brandy of 80 degrees of strength, a sweet, thick substance resembling honey, a concentrated gum used in medicine, brown sugar, loaf sugar, sugar candy, and vinegar of very excellent quality, so that the *Agave*, the value to us of which is mostly for its fibre, is, in fact, one of the most important economic plants of Mexico.

EXTRACT AND FLUID EXTRACT OF GUARANA, WITH GENERAL REMARKS ON THE MANUFACTURE OF MEDICINAL EXTRACTS.*

BY J. B. MOORE.

Paullinia has, within the last few years, attained considerable local popularity, and has been extensively prescribed in some parts of the United States.

Physicians, however, appear to be very unsettled, not only in regard to its physiological action and therapeutic application, but also in regard to the dose in which it should be administered. Upon inquiry among his medical friends who have used guarana in practice, the author received very conflicting reports of its therapeutic value. While some extolled it highly, others condemned it as worthless and almost inert. Unfortunately, physicians frequently make a great mistake in their experiments to test the effects of a remedy, and to ascertain its true physiological action, by too often prescribing the remedy under trial associated with other active medicinal agents, effects being often credited to the new remedy that are due to those with which it is associated. To judge, with any degree of accuracy, of the effect of a remedy, it should be prescribed alone or with comparatively inert substances.

The author had occasionally received prescriptions for it in powder, for the last two or three years, but it was not until recently that he had it prescribed in the form of fluid extract; and not having any of the latter on hand, and knowing of no published formula by which to make it, he concluded it would be well to devise a formula and process for its preparation. The expensiveness of guarana, however, made it rather an uninviting subject for experiment; but as he was fortunate in his first conception of its character, and the proper strength of menstruum required for its exhaustion, he encountered but little difficulty in framing what he considers to be a suitable formula, as follows:—

℞ Pulv. Paulliniæ . . . . . ℥xvi troy.
Alcohol. Fort.
Aquæ . . . . āā q. s.

Mix three measures of stronger alcohol with one of water, moisten the powder with the menstruum, and pack it in a glass funnel prepared for percolation, and gradually pour the menstruum upon it until one pint of tincture is obtained. Set this aside in a shallow vessel to evaporate spontaneously to twelve fluid ounces; continue the percolation with the same menstruum until two pints more of the tincture are obtained, or until the powder is exhausted. Evaporate this portion by means of a water-bath, at a temperature not exceeding 140°, to four fluid ounces. Mix this with the reserved tincture and filter through paper.

This formula is stated to yield a perfectly reliable preparation, which is transparent, of a deep reddish-brown colour (almost identical in appearance with the fluid extract of gentian), with a bitter, astringent, not unpleasant taste, leaving an after-taste on the palate strongly resembling that of coffee. The menstruum employed in the above process is found to thoroughly exhaust the drug of its virtues, and the proportion of spirit retained in the finished product holds in perfect solution all its soluble active matter. A sample of this fluid extract, made over three months remained still in excellent condition, showing no signs of change, and entirely free from deposit.

In an emergency a solid extract of guarana may be made by carefully concentrating the fluid extract, by means of a water-bath, to the proper consistence. But, as this medicine is likely to be often prescribed in the form of pills, a definite formula and process for making a solid extract would be preferable. The author therefore offers the following, which he says affords an excellent solid extract of the drug, unimpaired by process of preparation, if the directions given for its manufacture be observed:—

℞ Pulv. Paulliniæ . . . . . ℥xvi troy.
Glycerinæ . . . . f℥ss.
Alcohol. Fort.
Aquæ . . . . āā q. s.

Mix three measures of stronger alcohol with one of water, moisten the powder with the menstruum, pack it in a glass funnel prepared for percolation, and gradually pour the menstruum upon it until one pint of tincture is obtained. Set this aside in a shallow, open vessel in a warm place. Continue the percolation with the same menstruum until two pints more of tincture are obtained, or until the drug is exhausted. Evaporate this by means of a water-bath, at a temperature not exceeding 140°, to a syrupy consistence. To this add the reserved portion and the glycerine, and continue the evaporation at a temperature not exceeding 120°, until the whole is reduced to the proper consistence. During the concentration, in making this extract, the liquid should be stirred almost constantly, and especially is this necessary at the close of the process.

The author appends the following remarks on the manufacture of extracts:—

In the manufacture of all extracts, both solid and fluid, the important precaution of stirring during the evaporation should be observed, as it is by the neglect of this that the products in such cases are so often injured by heat. When it is observed, the concentration proceeds more rapidly and satisfactorily, and the medicinal virtues of the drug under treatment thus enjoy a comparative immunity from the injurious influences of heat.

In making fluid extracts, when reserved portions are to be concentrated to a given point, by either artificial or spontaneous evaporation, preparatory to receiving the product of the remainder of the percolate, it is very

* Abstract of a Paper in the *American Journal of Pharmacy*.

important to see that the concentration does not proceed too far. The evaporation should be closely watched, and the moment it has reached the desired point, the liquid should at once be transferred to a bottle and tightly corked, to await the product of the remainder of the process. The neglect of this apparently trifling point is often the cause of entire failure, or at least of great inconvenience, and not unfrequently leads to the production of imperfect and faulty preparations; as, owing to the uncertainty of the composition of the liquid after evaporation has once been permitted, its loss cannot be supplied with any degree of accuracy, especially when it is a liquid of a compound nature; such, for instance, as alcohol. Formulæ are in this way sometimes blamed for imperfections when it is the carelessness or inattention of the operator that is at fault.

Much care is also necessary in the concentration of the *last* portion of the percolate in making fluid extracts; where the liquid to be evaporated is a simple, as water, ether, chloroform, etc., the same care is not requisite to guard against excessive concentration, as the loss, in such cases, may be supplied by the addition of fresh portions of the respective liquids. Nor is it so important even when alcohol is the liquid under treatment, if, in the operation, *all* of the alcohol is supposed to be expelled, because then water may be used to make up the loss, but if the spirit is to be only partially driven off, then care is absolutely necessary, for reasons above stated.

If the attempt be made, under such circumstances, to supply the waste occasioned by excessive evaporation, it may be the means of causing précipitation or other untoward result, when this portion of the percolate is added to the reserved portion. It is the object of the suggestions offered in this paper to impress indelibly, if possible, upon the minds of all inexperienced pharmacists the importance of these little points that are so essential to success in all pharmaceutical manipulations, yet which are so often overlooked, both by writers and teachers.

When a hydro-alcoholic liquid is to be evaporated, and it is important that all the spirituous portion should be expelled, this will be only imperfectly accomplished if the liquid is not diligently stirred. The agitation throws fresh portions of the liquid constantly to the surface, and thus favours the liberation of the alcohol.

By the above process the author obtained from nine hundred and sixty grains of powdered guarana, three hundred and thirty grains of extract of a good pill consistence, which is about one-third, or thirty-three per cent. of its weight.

This yield was the result of a carefully-conducted experiment, in which no glycerin was used; although he does not think that the presence of the glycerin would influence the result much, as it simply takes the place of the water that would otherwise be retained in the extract to give it consistence. This small proportion of glycerin, he thinks, will be sufficient to preserve the extract in good pill consistence for an almost indefinite period. He has a sample of extract of gelsemium made in January, 1869, and another of extract of opium, made about eighteen months ago, to which was added about the same proportion of glycerin, and these extracts at the time of writing were in as good condition as when first made.

Mr. Moore is of opinion that pharmacists would find the addition of from five to ten per cent. of glycerin to all extracts prone to harden in keeping, would save them the annoyance so frequently experienced in dispensing from this cause. He has been in the habit, also, of incorporating a small portion of glycerin with blue mass just when it begins to stiffen and become inconvenient for forming into pills; he adds just enough to restore it to a good pill condition.

In the United States Dispensatory, page 1670, edition 1870, guarana is directed to be given in substance, in the dose of from one to two drachms, while of the extract only from eight to ten grains are directed to be given *during the day*, in pill form. Here there seems to be a great and unaccountable disparity of dose between the extract and the powder. Either the dose of the powder is unnecessarily large or that of the extract is much too small. The dose in which the powder is directed, the author thinks, is no doubt excessive, and that the proper dose of guarana, in substance, would be from fifteen to thirty grains. Taking this as a basis, the dose of the fluid extract would be from fifteen minims to a half fluidrachm, or from about twenty-three to forty-five drops, as a fluidrachm was found to contain about ninety drops, as dropped from the lip of an ordinary six-ounce prescription bottle; while the dose of the solid extract would be from five to ten grains, to be repeated every two, three or four hours, or three or four times a day, according to circumstances.

The fluid extract of guarana is most agreeably administered mixed with simple syrup or the syrup of orange, in the proportion of from fifteen to thirty drops to a dessert-spoonful of the vehicle.

In the treatment of various nervous affections, headaches, etc., Mr. Moore thinks it probable that bromide of potassium, valerianate of ammonium, hydrate of chloral, valerian, morphia, belladonna, hyoscyamus, and tincture of hops will be found to be its best adjuncts and most eligible associates in a prescription.

As syrup seems to be so pleasant a vehicle for guarana, a syrup of guarana would probably be a very desirable and useful preparation of the drug, and Mr. Moore is about commencing some experiments with the view of framing a suitable formula for such a preparation. The dose of guarana in substance is so large, and it requires so strongly alcoholic a menstruum for the solution of its active principle, that the proportion of spirit in a tincture would possibly be objectionable, and would be injurious, therapeutically, in the class of diseases in which guarana would be likely to be most generally employed.

ACTION OF BROMINE UPON SOME ALCOHOLS.*

BY M. HARDY.

The action of bromine upon alcohol has been long studied. In 1832, Loewig recognized that bromal is one of the products of the reaction. He prepared it by pouring gradually three or four parts of bromine into one part of absolute alcohol, kept cool with ice; after standing for a fortnight, he distilled off three-fourths of the liquid, and then added water to the residue, and thus obtained crystals of hydrate of bromal. Schoeffer caused bromine vapour to pass into a relatively small quantity of alcohol, and, as products of the reaction, obtained bromide of ethyl, hydrobromic acid with a little bromine, a small quantity of acetic ether, bromal, bromoform, tetrabromide of carbon, and a substance which was decomposed by water, giving bibromacetic acid.

Schoeffer's process, like that of Loewig, caused the formation of a quantity of secondary products, and did not manifest clearly the transformation which alcohol undergoes in the presence of bromine. This may be accomplished by dropping into a long-necked vessel containing absolute alcohol a suitable quantity of bromine in successive portions, so as to avoid too great elevation of temperature, sealing the vessel in a lamp flame, and heating it during several hours to 100° C. in a water-bath. When the reaction has terminated no gas is evolved upon the opening of the vessel, and the liquid, perfectly decolorized, forms two layers, which may easily be separated. The upper layer contains hydrobromic acid in solution in water; the lower contains bromide of ethyl and bromal, a portion of the latter being free and a part combined with a molecule of alcohol, forming a compound similar to the alcoholate of chloral described by M. Per-

---

* *Comptes Rendus*, vol. lxxix., p. 806.

sonne, and which the author proposes to call alcoholate of bromal.

$$3(C_2H_6O)+8Br=$$
$$\underbrace{C_2H_5Br}_{\text{Hydrobromic ether.}}+\underbrace{C_2HBr_3O,C_2H_6O}_{\text{Alcoholate of bromal.}}+4HBr+H_2O.$$

$$2(C_2H_6O)+8Br=\underbrace{C_2H_5Br}_{\text{Hydrobromic ether.}}+\underbrace{C_2HBr_3O}_{\text{Bromal.}}+4HBr+H_2O.$$

These substances separate upon distillation.

Propylic Alcohol.—Propylic alcohol, heated to 100° C. with bromine in sealed tubes, separates into two layers; the one consists of water holding hydrobromic acid in solution, the other of propyl hydrobromic ether and propyl alcoholate of propyl bromal. The propyl alcoholate of propyl bromal is a slightly yellow liquid, giving upon analysis figures corresponding to the formula—

$$C_3H_8O,\ C_3H_3Br_3O.$$

Butylic Alcohol.—Butylic alcohol submitted to the action of bromine under the same conditions gives a similar reaction, but the separation into two layers takes place after a more prolonged ebullition. The lower layer consists of water and hydrobromic acid; the upper of butylhydrobromic ether, butylalcoholate of butylbromal, and a non-volatile residue which carbonizes at a high temperature. The butylalcoholate was distilled by the author in a current of carbonic acid, and gave upon analysis numbers corresponding to the formula—

$$C_4H_5Br_3O,\ C_4H_{10}O.$$

In this distillation butylbromal was not obtained, and in rectifying under a pressure of 40 centimetres only the butylalcoholate separated.

Amylic Alcohol.—The reaction of bromine upon amylic alcohol likewise yields water charged with hydrobromic acid and a denser liquid. The latter consists of amyl hydrobromic ether, easy to separate by distillation, and a liquid which separates upon cooling after a portion of the ether has been distilled off. This liquid, mixed with sulphuric acid, was submitted by the author to distillation under diminished pressure, when a slightly coloured liquid passed over, which gave upon analysis figures that induced him to consider it to be a molecule of amylbromal, combined with one or two molecules of amylic alcohol.

JABORANDI AS A DIAPHORETIC AND SIALOGOGUE.*

M. Albert Robin has communicated to the Therapeutical Society (*Gazette Hebdomadaire*, November 20) an account of his investigations into the effects of this drug, in which he has been engaged in Professor Gubler's ward at the Beaujon. Under its influence the urea is at first diminished in quantity in consequence of the quantity of the urine being diminished; but after some days both these are increased, and the same may be said of the chlorides and the uric acid. This last has not been found either in the sweat or saliva, but the urea has been met with in the proportion of 3·12 grammes per litre. In a case of albuminuria the amount of albumen diminished during the first twenty-four hours from 17·20 grammes to 15·40; but the diminution was not permanent except in one case, in which it continued reduced from 14·40 to 12 grammes. The temperature increases in ten or twenty minutes, rising from 37° to 39° or 39·8°; the pulse also increases (from 96 to 105, for example). During the sweating the temperature falls to 37·7°, 37·6°, or 37·2°, and, when this is terminated, to the original 37°. For the next two days after the administration both pulse and temperature remain lower than the normal rates. When the sweating commences, "a true experimental asystolie" is produced, the tension diminishing notably; but next day the tension is reproduced and becomes sometimes more considerable than in the normal state. The *jaborandi* therefore seems to act on the vaso-motors, diminishing tension by paralysing them and facilitating the passage of the blood through the capillaries of the skin. In several cases in which it was given in minutely divided doses, there was neither sweating nor salivation, an abundant diuresis taking place, so that the urine increased from 750 to 1380 grammes. The effect of *jaborandi* on animals is very marked: guineapigs are seized with salivation, weeping, and diarrhœa, true ecchymoses being found in the intestines, and dogs become instantly salivated, their gastric secretion being also much increased.

M. Gubler observed that he had recommended M. Robin to employ the divided doses, in consequence of his having observed that diuresis occurred the next day or day but one after taking a large dose. He supposed that if the portion of the *jaborandi* which remained in the system after three days proved thus diuretic, this effect might be at once produced by giving small divided doses. A small quantity thus does not suffice for influencing vascular tension, acting only on the kidney. M. Gubler believes that the sweating determined by this drug depends upon the diminution of the tension which it causes, but that a complete equation cannot be established between this diminution of tension and the sweat. Another factor is the secretory irritation of the glands—an irritation acting on the kidney, and inducing diuresis.

* From the *Medical Times and Gazette.*

WILLIAM PROCTER, JUN.*

At the Semi-Annual Meeting of the Philadelphia College of Pharmacy, held September 28th, the "Committee on Deceased Members" presented an interesting memoir of the life and services of the late Professor Procter, whose death has already been recorded in this Journal. The memoir is too lengthy to reprint *in extenso;* but the following are the principal points:—

William Procter, Jun. (the "junior" being added to distinguish him from an uncle bearing the same name) was the ninth and youngest child of Isaac and Rebecca Procter. His father, who was a member of a Yorkshire family which had early associated itself with the Society of Friends, had emigrated from England while still a young man. William Procter was born in the city of Baltimore on the 3rd June, 1817. When from six to ten years of age he attended a Friends' school in Baltimore, taught by a lady of rare gifts and attainments. He was studious, gentle and companionable, and greatly beloved by his teachers and class-mates. His powers of observation were very early developed, and, as a child, nothing escaped his notice; he would interest other boys in stones that he would pick up in the streets, or in general subjects that would arrest his own mind. Mineralogy was his especial delight and study at this early age; while other boys would spend their weekly holiday in play, he would start early, with a lunch in his pocket and a steel hammer in his hand, and spend the whole day with a companion in the "quarries" north of the city, or in the "deep cuts" of the iron district, or at the "Bare Hills." The boys at school were always interested in his specimens, and many a young mineralogist received his taste and first lessons from this young teacher.

The husband of his eldest sister being disqualified by sickness from attending to his business—that of a cooper—William was at an early age taken from school to look after the affairs of his sister, and in the cooper's shop he acquired a knowledge of tools and a dexterity in the use of them which served him many a useful turn in after life.

Visiting Philadelphia with his mother, he became

* Abstract of a Memoir in the *American Journal of Pharmacy.*

acquainted with Joseph Turnpenny, who was then learning the drug business with the late Henry M. Zollickoffer at the corner of Sixth and Pine streets. Visiting the store with his friend, he found subjects congenial to his taste, and he determined to make that business the occupation of life. In 1831, at the age of fourteen, he entered the store of Henry M. Zollickoffer as an apprentice. Whilst in this position he received valuable counsel from his loving mother, the nature of which may be estimated from the following letter sent to him soon after his apprenticeship :—"Seventh month, 6th, 1831—I must tell my dear William how rejoiced I was to receive his very nice letter, not a single blot or mistake in it; continue, my dear boy, to be thus particular in everything thee does (I mean to do everything well), and I have little doubt thee will succeed in giving satisfaction to all with whom thee may have to do. Let it be thy study to endeavour to please (thy employer), not only when in the store about thy every-day business, but in everything. There are many ways of gaining the affection of those we are with by being kind and obliging to all, and if thee can lend a hand of help in any way, no matter how small the act is, never be backward, but with cheerful alacrity be always ready; this will cost thee very little, and by a kind and courteous deportment in the store and out of it thou wilt gain the love and good-will of all around thee. True politeness, my son, is a lovely accomplishment, but above all, never, never equivocate to screen thyself from censure, but if thou shouldst get into any difficulty be open and candid. Let honesty and integrity be visible in all thy actions, and thus, my son, I think, thou wilt never want a friend in man, and thou wilt have a friend in thy Heavenly Father, who can, and will, if thou love Him as thou ought, do more for thee than all the world beside. Therefore, my dear boy, 'seek Him now in the days of thy youth;' it is never too early to begin. There is another point on which I wish to remark—that of keeping everything thee may ever know relative to thy master's business entirely within thy own breast; sometimes by tattling or telling little matters to others it has often been a cause of a great deal of mischief and uneasiness, if not unhappiness; therefore thou wilt be guarded on this subject; never trust even thy own dear friends with anything relative to thy employer's business which thou might suppose he would not be willing for everybody to know; and always stand open to reproof; I have no doubt, if necessary, it will be administered in meekness and in love." The letter from which we have made this abstract, so replete with wisdom, is found among the letters which he preserved of that period.

From 1831 to 1836, he was quietly pursuing his duties as an apprentice, residing in the family of Henry M. Zollickoffer, his employer, endearing himself to all by his cheerfulness, brightness, and alacrity in all his duties. In 1836 he commenced a diary. In one of the early entries of this year, we find he records the death of his mother, at the age of sixty-three years. He says, "I have indeed lost another and only parent, who has watched over me with truly parental care and tenderness. All my hopes of repaying her unceasing kindness are now at an end, and all my dreams of pleasure about the days when I should become a corner-stone to her have vanished for ever."

In March, 1837, he passed a successful examination as a candidate for the diploma of the Philadelphia College of Pharmacy. The subject of his thesis was "Lobelia Inflata," a paper of great merit, in which he demonstrated the presence of an alkaloid, lobelina, on which the medical activity of the plant depends.

In May, 1840, he was elected a resident member of the College, and from that period the volumes of the *American Journal of Pharmacy* contained many contributions from his pen.

Whilst continuing unostentatiously in his position at Sixth and Pine Streets, his mind was keenly sensible to the deficiencies of his early education, and he strove by a diligent course of study and reading, to acquire a knowledge of the subjects kindred to his profession. His habit was to rise early, and devote the morning hours to his self-culture. 'Turner's Chemistry,' 'Ure's Dictionary,' and 'Dalton's Chemistry,' appear to have been his text-books. His custom was to keep notes of his reading, and indicate by signs whether a particular subject had been pursued to the satisfaction of his mind, or whether farther examination was desirable. His reading was attended with experiments in pneumatic chemistry, and an examination of the properties of the elementary substances. Electricity, galvanism, and electro-magnetism were attractive branches to him, at the time when Davy and Faraday were opening the portals which lead to a knowledge of these once mysterious agents of nature. He attended lectures given by Drs. Hare, Mitchell and Bache, in the winter of 1840, and expressed his gratification with Dr. Hare's experiments on electricity, and the solidification of carbonic acid, by Dr. Mitchell. He writes in his diary, "I obtained a piece of solid carbonic acid, and, returning home, repeated Dr. Mitchell's experiments on freezing mercury; my thermometer, after falling to —40°, suddenly contracted, and was frozen." He also constructed an electro-magnet, capable of supporting a one-fourth pound weight, and a table blowpipe to enable him to construct apparatus of glass.

In his twenty-third year, an offer made to him to enter into a chemical works in Baltimore was declined, and his engagement with Henry M. Zollickoffer was renewed. His leisure time was now divided between literary and scientific pursuits; his vacations, were occupied in occasional journeys for recreation and improvement. One note-book gives an account of a trip to Washington, and the country bordering the upper Potomac; another was to Ohio, returning by Niagara Falls; another by sea to Boston.

In 1841, he accepted the position of secretary to the committee on revision of the Pharmacopœia, and made numerous experiments for the committee, the chief of which were on the production of ether and Hoffman's anodyne. His first experiments on ether he records as failures; but says, "I have got on the track to obtain a good article of Hoffman's anodyne."

The years 1842 and 1843, continued his engagement at Sixth and Pine Streets. His leisure hours were improved by continuing his study of chemistry, taking up also botany, and learning the French language. General literature received considerable attention from him during this period. 'The Life of Washington,' 'Johnson's Life,' 'Alison's History of Europe,' and moral philosophy, are recorded as forming part of his reading. In 1842, he made a journey through central Pennsylvania to Pittsburgh, continuing westward as far as Cleveland. He returned by the way of the lakes to Niagara, then through the lake district of New York, and home, by the way of Elmira and Williamsport.

In February, 1844, he purchased the property at the south-west corner of Ninth and Lombard Streets, and commenced making alterations to render it suitable for a store.

We cannot do better than give his own recorded words at this important period, when about to embark in life on his own account:—"I am about to leave Sixth and Pine Streets, after so long a residence. What singular events occur! Little did such a prospect appear probable some years ago. Steadiness and calmness of mind, how important to the proper appreciation of life! This I daily become more convinced of, and find cause to note the want of it in my own case. Reflection steadily and calmly directed to moral and intellectual improvement, with all the rigour of justice, and all the affection of mercy. How few can truly govern themselves! I have made little progress in this all-important power, and have too frequent cause to regret acts of indiscretion and weakness."

On the 12th of May, 1844, he opened his store, and was behind his own counter. Long accustomed to the routine of an old-established business, he did not escape the trials which assail the mind while waiting for some indication of prosperity. Three months after opening his store, he writes, "It has been a time of singular discomfort to me, the anxiety incident to opening a new store, and the much time unemployed has been very burdensome. I need more faith and confidence in the course of events."

A circular issued on opening his store, bearing date Fifth month, 13th, 1844, says, "In reference to that important branch of the business, embracing the compounding of medicines and physicians' prescriptions, he believes that a regular education at the Philadelphia College of Pharmacy, and twelve years' experience in one of the first establishments of this city, will enable him to give satisfaction." The names of Drs. Wood, Bache, Jackson, Mütter, Hartshorne, Meigs, Harris, Rutter, and Henry M. Zollickoffer, are given as references.

The neighbourhood of Ninth and Lombard Streets, at that time, would not have presented many attractive prospects to the generality of beginners, so well qualified as William Procter, jun., for the higher branches of pharmacy. The square on the south side of Pine Street, between Eighth and Ninth Streets, was then an open lot. South street was the boundary of the city proper, and beyond this limit, for a long time, the acts of unrestrained "rings" of lawless associations presented but little inducement to a settlement in that part of the city of the well-to-do citizen.

Quietly, however, William Procter, jun., pursued his course, attending to his own business, and abiding his time. The unemployed time he speaks of, was far from being *misspent;* his active habits and inquiring mind were not content with waiting for the routine of counterwork. His attention was directed to the improvement of many of the formulæ of the Pharmacopœia, devising new preparations, and to original investigation on many subjects. As time passed on, the vacant lot was occupied by first-class residences, on Pine and on Ninth Streets. A consolidated police force restored order in the districts, and the business at Ninth and Lombard Streets began to assume proportions more befitting to the capacity of its proprietor.

Closely occupied during the day in the affairs of his business, he was always ready in the evenings to enjoy the society of his friends. Practical in his habits of conversation, a close and correct observer, well informed in all the branches of science which were allied to his profession, he was a pleasant and profitable companion. Naturally retiring, and somewhat reticent with strangers, he appeared to them grave and not susceptible to lively emotions; but to these who know where lay the secret spring which unlocked this exterior, the inner man was found with all the freshness of boyhood, and, with almost child-like confidence, his real life was spread before them.

There was no subject which enlisted his attention so much as the advancement of Pharmacy. The minds of many of the members of the College of Pharmacy had long foreshadowed the time when lectures on this subject would be added to the curriculum of the College. In 1845, the subject assumed a definite shape, by the presentation, at a meeting of the College, held in September of that year, of a memorial, signed by William Procter, jun., A. J. Duhamel and Edward Parrish, and accompanied by the following resolution, "That a committee of nine be appointed to consider the propriety of creating a new professorship, the occupant of which should be called the professor of theoretical and practical pharmacy." After an *animated* discussion (as the minutes inform), the resolution was adopted, Daniel B. Smith, then President of the College, acting as chairman of the committee. At a special meeting of the Board of Trustees in the following June, William Procter, jun., was unanimously elected Professor of Pharmacy.

In October, 1847, Mr. Procter delivered his introductory address to the class, which was published by request of the College. This address will be found in vol. xix. of the *American Journal of Pharmacy*, and will well repay any student of pharmacy for a careful perusal of it. The following extract which we make has not lost any of the timely words of warning then uttered. He says:—

"Some individuals enter the lists of pharmacy under delusive impressions, or are placed there by guardians who are equally misguided, illy prepared by education or endowments for so responsible a vocation. It is a sad spectacle to behold such giving their early years and youthful energies to a profession not suited to their tastes or inclinations—pursuing it, perhaps, until, on the threshold of manhood, when they find themselves about to be cast upon the ocean of society in a vessel with whose qualities and powers they are too slightly familiar to enable them to cope with the difficulties which assail them. Many who are unsuccessful as apothecaries might have arisen to respectability and competence in other pursuits more harmonious with their inclinations or natural gifts. It too often happens with these that, repelled by ill success from their legitimate calling, they are induced to bow before the image of empiricism in the hope of a golden reward, and prostitute that knowledge that they never should have acquired to the invention of nostrums, and forcing them into notice."

At the commencement of the course of lectures on pharmacy, there was some misgiving, in the minds of some students, whether they would find an equivalent for their time, and the money-cost of the course. Such, however, soon found that there was a science and method in the dull routine of even the mortar and the spatula which they had not dreamed of, and, by the time the course had ended, they discovered a necessity for the exercise of mental as well as manual dexterity behind the counter, if they purposed encountering an examination on their fitness to prepare and dispense pharmaceutical products.

In the preparation of his lectures no amount of labour was too great to deter Professor Procter from bringing before his class practical illustrations of his subjects; oral instruction he deemed very imperfect in his branch, unaccompanied by full demonstrations. This necessitated the expenditure of time and personal exertion which few could realize who were not conversant with his habits of thoroughness and conscientiousness in the discharge of his duty as a teacher. During several years of his professorship his health was not strong, but his active mind rose above his bodily infirmities, and made the physical subservient to the determined will which animated him. While aware of the necessity of taking care of himself, the severities of winter rarely prevented his being found at his post at the appointed time. He commanded the respect and affection of his class, and his opinions had a weight of authority with them which has rarely been disturbed by after experience.

In 1846 William Procter, jun., was associated with Professor Joseph Carson as co-editor of the *American Journal of Pharmacy:* for two years previously he had assisted Professor Carson in its editorial management. In 1850, Professor Carson resigned his position, and Professor Procter assumed the sole editorial charge. In 1853 the Journal was enlarged by the issue of six numbers annually in place of four. In 1871 the issue of the Journal was made monthly. Professor Procter inaugurated the monthly issue, and after editing the April number resigned his position, and was succeeded by Professor John M. Maisch. He had contemplated a relinquishment of his editorial duties for some time, and in a written communication to the College, some months previously, had advocated a monthly issue of the *Journal*, and requested to be relieved from the editorship as early as the College could find a suitable successor.

For twenty years the *Journal* had been under his management in its editorial department, and how successfully that management was conducted, the volumes issued during that period are the best testimony. The original matter from his pen, and his judicious selections, gave to it a value and standing among American pharmacists, and made it the most complete history extant of the progress of pharmaceutical science in the United States. As an editor, he was just to all contributors, pleasant in criticism, never indulging in the personal or sarcastic, ever ready to expose fraud and empiricism, loving truth and sometimes proclaiming it when it was a disagreeable duty. After resigning the editorship his time was so much occupied by his business that his name does not appear as a contributor directly to the *Journal;* in April, 1871, we have an article from his pen "On Pharmaceutical Titles" —the last of the long series. The general index of the *Journal* exhibits seven columns, numbering some 550 items, under his name, exclusive of extracts and editorials.

In October, 1849, William Procter, jun., was married, at Mount Holly, N. J., to Margaretta, daughter of Amos and Elizabeth Bullock.

During this year was issued from the press his American edition of Mohr and Redwood's Practical Pharmacy, enriched by additions from his own pen. The work never went through a second edition, attributed in a great measure to the cost of proper illustration, which the publishers were not willing to incur, and without which much of the value of the work would have been lost.

In October, 1851, there was assembled in the City of New York a convention of pharmaceutists, in pursuance of a call made by the New York College of Pharmacy, for the purpose of considering the law relating to the inspection of drugs at the Custom House, and to fix upon some standard which would enable inspectors to act with uniformity and discernment. This convention was impressed with the advantages which would be derived by the pharmacists of the United States from an association national in character, whereby, through personal intercourse and exchange of experience, the practice of pharmacy throughout the United States would be more harmonized and the general standard of education elevated. It was therefore "resolved that a convention be called, consisting of three delegates from each incorporated and unincorporated pharmaceutical society, to meet in Philadelphia on the first Wednesday in October, 1852." This convention assembled in the old College building, in Zane Street (now Filbert Street), and there was inaugurated the American Pharmaceutical Association, the President of the College, Daniel B. Smith, acting as its first presiding officer. From the time of its inception William Procter, jun., enlisted all his activity in promoting its welfare, and his name will be found in all its proceedings down to the meeting in Richmond, Va., in 1873. In 1852 he was a member of its first executive committee. He was corresponding secretary from 1852 to 1857, first vice-president in 1859-60, and was elected president at the session of the Association which convened in Philadelphia in 1862. In 1866 he was appointed one of the delegates to represent the Association at the International Pharmaceutical Congress to assemble in Paris in the following year. He was absent from the annual meetings of the Association but once (while in Europe), and contributed largely to the interest of its proceedings by answers to queries which he had accepted, and by his volunteer papers.

In 1859 Mr. Procter lost his wife, and in 1864 was married to Catharine, daughter of Robert and Sally Parry.

In 1866 he resigned the chair of Pharmacy, and was succeeded by Professor J. M. Maisch; an interchange of professorships was afterwards effected between Professors Maisch and Parrish, Professor Parrish taking the chair of Pharmacy, and Professor Maisch that of Materia Medica.

Many years of close attention to his varied and assiduous duties rendered a season of relaxation and change necessary. In the summer of 1867 he determined to take a trip to Europe. Leaving New York by steamer in April, he landed at Queenstown, and after a hasty run through Ireland he crossed over to England, and proceeded to London, and afterwards to the Continent. In the fortieth volume of the *American Journal of Pharmacy* is published his notes of travel, containing much interesting information to the intelligent pharmacist.

The business at Ninth and Lombard Streets increased with the progress of the city in that direction, and rendered necessary more ample accommodations. The first enlargement of his store was made in the winter of 1861, brought about at that time by an accident. He was distilling ether from a preparation, and having his attention called away, the water in the condensing apparatus became warm, and allowed ether vapour to escape into the store; mingling with the close atmosphere of the room, an explosive mixture was in time formed and ignited by the gas lamp under the still. The explosion forced the glass of the bulk windows into the street, but did no injury to the interior arrangements of the store, or to those engaged in it. Again, in 1870, more room was found necessary, and the whole of the remaining portion of the first floor was thrown into the store. In making these alterations, convenience for dispensing and proper arrangements for storage of articles was the first consideration, but little attention was given to the modern drawing-room style of some pharmaceutical establishments.

In 1847, Quevenne's Iron was introduced, and becoming popular, Mr. Procter devoted considerable attention to its manufacture, and produced an article which gained a high reputation in the market. The manufacture having been taken up by others possessing more room and greater convenience, he, after a few years, abandoned it.

When pepsin came into use, the varying qualities in the market induced him to make experiments on its production; he devoted considerable attention to it, and, during the last year of his life, he was quite extensively engaged in its manufacture. The subject of pepsin closed the last lecture which he delivered to the class.

In 1872 the chair of Pharmacy became vacant by occasion of the death of Professor Edward Parrish. The season for the opening of the course of lectures was so near at hand that the minds of the trustees of the College turned instinctively towards William Procter, jun., as the man to relieve them from embarrassment. The trustees were well aware that he had an earnest desire for retirement, and canvassed well the field for one who could, at so short a notice, take up the course on practical pharmacy. At the request of the Board of Trustees of the College he consented to fill the chair, and delivered the course of lectures in the winter of 1872-73. It was known to his friends that the position was intended by him to be but temporary, and that he contemplated retiring at the close of the following session. The lectures for 1873-74 progressed as far as February 9th, and but a few more remained to finish up the work which he intended should terminate his professorship. On the evening of February 9th he delivered his usual lecture, and on returning home expressed the great satisfaction which the attention of the class had given him. At a late hour he retired in apparently usual health; shortly after falling asleep, a disturbance in respiration aroused the attention of members of the family, and before medical assistance could be called, life had ceased. He died aged 56 years and 9 months, leaving a widow, and two children by his first wife.

In person, William Procter, jun., was of medium stature, with dark hair and black eyes, bespeaking an active, earnest mind. For many years after he commenced business his health was delicate, and fears were entertained that he laboured under pulmonary difficulties; such, however, proved not to have been the case, and the symptoms were probably connected with the incipient stages of disease of the heart, which finally terminated his life. His motions were quick, and evidenced the energy with which he was endowed. In manner he was unostentatious and retiring, but when he felt himself known and understood he was genial and playful. He was an observer rather than a talker, but possessed the ability of expressing himself in clear and pleasant language. As a lecturer he chose the didactic to the exclusion of the ornate style of speaking. The jewels of his character were integrity, sincerity, and a just sense of duty to his fellows. Educated in the religious belief of the Society of Friends, and holding their views during his life, he made no profession of sectarianism, but had an extended charity for the views of those who differed from him. Although he rarely alluded to religious subjects, those possessing his confidence were aware that the Bible had not been overlooked among his books. He was happy in the use of his pen, and his essays are marked by clearness of expression and a carefulness of detail, which leave no room to doubt the meaning of the writer. His investigations evidence a faithfulness in research and a completeness which has made his name an authority.

William Procter, jun., became a member of the Philadelphia College of Pharmacy in 1840; in the succeeding year he was elected to its Board of Trustees, and held that position during his life. In 1855 he was made Corresponding Secretary of the College, and continued to serve as such for twelve years. In 1867 he was elected first Vice-President of the College. His interest in the affairs of the College continued unabated during the thirty years of his connection with it; so closely was he identified with its progress, that its history during that period is almost a narrative of his life.

He served on all committees appointed for the decennial revision of the Pharmacopœia for the past thirty years, and his services were engaged in assisting Doctors Wood and Bache in several of the later editions of the United States Dispensatory.

A complete review of the published essays of Professor Procter would occupy too much space for this memoir, and we can only allude to a few of them. In his published thesis in 1837 on *Lobelia inflata*, he demonstrated the presence in the plant of an alkaloid, described the salts formed by union of the principal acids with the alkaloid, and proposed the name lobelina for the active principle.

Three years previously, S. Colhoun, M.D., Professor of Materia Medica in Jefferson Medical College, Philadelphia, published in the *American Journal of Pharmacy*, vol. v., the investigation of an acidified extract from Lobelia, which foreshadowed the presence of an alkaloid, but he did not succeed in isolating the principle. Professor Procter was aware of Doctor Colhoun's investigation, and referred to it in his supplementary paper, published in 1841, his not having done so in his thesis being, as he states, a "casual omission." In November, 1850, Mr. William Bastick read a paper before the Pharmaceutical Society of Great Britain on *Lobelia inflata*. He referred to Doctor Colhoun's paper, but evidently was not aware of Professor Procter's researches in 1837 and 1841. Mr. Bastick isolated the alkaloid, and described it, and his name is associated in the books with its discovery. In January, 1851, Professor Procter wrote to the Editor of the *Pharmaceutical Journal*, London, as follows:—"For some reason, these (my) essays appear to have been entirely overlooked by the press and writers on your side of the Atlantic, and now that the drug in attracting the attention of your medical men, its chemical relations are exciting the curiosity of your pharmaceutists. I should not have taken the trouble to bring their existence to your notice, had I not observed the paper of Mr. Bastick in your Journal for December, in which he states his ignorance of any previous researches having the same tendency as his own." The *Pharmaceutical Journal* then published Prof. Procter's essay, placing him thirteen years in advance of Mr. Bastick as the discoverer of lobelina.

In the same year with the publication of his thesis, we have "Remarks on an oil obtained by distillation from wild cherry bark, and evidences of its similarity to oil of bitter almonds." In 1838, a paper "Demonstrating the existence of amygdalin in several species of the genera *Prunus* and *Amygdalus*." In 1839, "Observations on dextrin and diastase," and "On *Lobelia cardinalis*," showing the presence in that plant of an alkaloid differing in some respects from the alkaloid found in *Lobelia inflata*. In 1840, a paper "On the power of saccharine substances in protecting from decomposition solution of protiodide of iron." In 1841, an essay "Supplementing his thesis on *Lobelia inflata*, and showing that the alkaloid therein described, represents the plant in medicinal qualities." In 1842, "Observations on the volatile oil of *Gaultheria procumbens*, proving it to be a hydracid analogous to salicylous acid." In 1843, "On the volatile oil of *Betula lenta* (sweet birch), and on gaultherin"—a substance playing a part similar to amygdalin—and which, by its decomposition, yields an oil identical with oil of gaultheria. In 1847, "On the reduction of oxide of iron by hydrogen." In 1849, "Remarks on the oleo-resinous ethereal extracts, their preparation, and the advantages they offer to the medical practitioner." In 1851, among numerous contributions, we have an essay "On the botanical and chemical character of sassy bark (the doom plant), of Western Africa." In 1852, a continuation of the essay on sassy bark, and "Observations on the volatility and solubility of cantharidin, in view of an eligible pharmaceutical treatment of Spanish flies." In 1853, fluid extracts began to attract attention, and in this and the succeeding year he contributed several papers on that subject; also, one "On the pharmacy of the phosphates." In 1858, "An essay on the hypophosphites." In 1859, "On polygalic acid," and "On the existence of nicotina in green tobacco." In the same year, he read before the American Pharmaceutical Association, in Boston, an elaborate essay on fluid extracts, suggesting formulæ for their preparation, and presented specimens of over thirty fluid extracts prepared according to his suggested formula. In 1866, we have an essay "On *Liquidambar styraciflua* and its balsamic resin," "showing the principle contained in the resin to be cinnamic acid."

The papers contributed by Professor Procter to the American Pharmaceutical Association are numerous, and marked by his usual carefulness and accuracy of investigation. Of these, his essay "On Ergot" (suggesting the use of acetic acid in its preparation), "On aconite root," "Atropia from American belladonna," "On extract of *Cannabis Indica*," "On *Sassafras officinale*," may be mentioned as not included in the preceding review. One of his latest papers was entitled "Suggestions to beginners in Pharmacy," and was reprinted in the last volume of this Journal, p. 974.

One of his last official acts before this in connection with the College, was in September, 1873, as Chairman of the Committee on Deceased Members, to read a memoir of their late associate, Elias Durand.*

Medical Evidence in Australia.—His Honour Mr. Justice Lilley, says the *Brisbane Courier*, during the hearing of the trial of the South Sea Islanders for manslaughter, gave a ruling upon a question in connection with medical testimony which has often cropped up in our courts. A chemist and druggist, Mr. Block, of Beenleigh, was called by the Attorney-general, to give evidence as to the cause of death; but Mr. M'Devitt, who was retained on behalf of the prisoner, objected to the question on the ground that the witness was not a properly qualified medical man, and that therefore his statement would be merely a matter of opinion, and would not, even if admitted, be of any weight. His Honour, in giving his decision on the point, held the evidence to be perfectly admissible, and said he wished it to be understood that he should never consider it necessary that witnesses giving medical testimony must be duly qualified medical practitioners; but in all such cases he should hold the proper course to be to examine the witness as fully as possible as to his experience in such matters, and then to let the evidence go to the jury for what it was worth.

---

* See *Pharm. Journ.*, vol. iv., p. 571.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 12, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DOCTORS AND DRUGGISTS.

THERE has been a time in the history of many social and political discussions, when the force of the arguments has swayed to one side, not so much because there has been any freshness in the arguments as because they have received the adherence of former opponents. Often such periods have been followed by a complete revolution in public feeling with respect to the particular question. The "no-popery" man of yesterday has to-day joined in abolishing religious tests; the protectionist has lived to expound the virtues of tree trade: until one wonders how with such a present consensus of opinion, the reform could have been so long delayed. One subject which has peculiar interest for the readers of this Journal appears to be now approaching a similar phase. Long have chemists and druggists been supplied *ad nauseam* by the medical journals with admonitory sermons upon the sacredness of medical ground, and the profanity of the chemist and druggist who approaches it with shoes either off or on. But there has been almost an entire ignoring on their part of all suggestions that proper bounds should be put round about the mount. Without putting it into so many words, the literary leaders of medical opinion have allowed it to be inferred that with respect to the callings of the doctor and the druggist, the former was at liberty to act towards the latter upon the principle—or *unprinciple*—of the old saying, "What's yours is mine, and what's mine is my own."

We are, therefore, glad to receive, almost simultaneously, two articles written so far apart as London and Montreal, and published in medical journals, in which a disposition is shown to discuss this question more impartially. The "faint and almost imperceptible line" which, in many parts of London, separates medical practitioners from druggists, is the theme of the *Medical Times and Gazette*. The evidence of the glaring lamp, the ostentatious display of diplomas—and, it might have been added, of druggists' sundries and patent medicines,—is regarded by our contemporary as demonstrating in many instances that the medical man has been impelled by the force of circumstances to lay aside the dignity of his profession and assume the position of a tradesman. The main excuse put forth in extenuation or explanation of this state of affairs is virtually the old one—

"Virtutibus obstat
Res angusta domi."

In this case the "straitened means" appear to be of two kinds, those of the practitioner and those of the locality by which he is surrounded. We only note this excuse to remark that, if available at all, it has a wider application.

If the method of obtaining a competence by the members of the medical profession must be "modified by their environments," chemists and druggists can hardly be expected to maintain a hard-and-fast line. On the other hand, if it be remunerative for practitioners dispensing from private surgeries to receive little, if anything, more for advice and medicine than would be paid for the medicine alone to a respectable chemist, there should be some margin of profit for the less expensively educated—but still respectable—chemist and druggist, whose charges are modified by his "environments."

En passant, we take exception also to the special application of a sneer of our contemporary at the enterprising young chemist, who gifted with a higher education than his predecessors, uses a "Greek compound," or "Greek and Latin conglomeration," to make his new combination pass muster with the drug-drinking public. It may have been temporarily forgotten that perhaps the most widely advertised instance of this kind is claimed as the invention of a gentleman whose name occurs in the Medical Register.

We are glad to find that the *Medical Times and Gazette* recommends the medical practitioner to withdraw as much as possible from this undignified contest of "pull doctor, pull druggist," and would look upon his victory in the contest as an unfortunate alternative. In that case it considers the taint would advance into higher circles; "men dispensing from private surgeries will extend their not uncommon practice of retailing drugs, and the good name of the medical profession in large towns will run the risk of being defamed by that familiarity which proverbially breeds contempt." We thoroughly concur in these remarks as being in accord with what has been repeatedly urged in these pages; and we believe that the medical profession would best serve its purpose in this matter by assisting to educate the public to draw a sharp distinction between the doctor and the pharmacist. Undoubtedly, as our contemporary remarks, the existence of the present state of affairs in the medical profession shows a "levelling down" which is in unfavourable contrast to the "levelling up" of pharmacy during recent years. We therefore rejoice that one leading medical organ at least should have the courage and wisdom to protest against medical men forgetting that they claim, by virtue of social position, by education, and by admission into a learned profession, to be superior to dealers in drugs, and that it calls upon them therefore to guard against that injury to the whole body which might easily accrue from "introducing a purely and ostensibly commercial element into the exercise of a dignified profession."

The other article we have referred to appeared in the *Canada Medical Record.* It owed its origin to local circumstances; but the underlying principle is the same as that affected in this country. Having come to the conclusion that reform is necessary, the *Record* proclaims that the physician and druggist should each work for one end: the one proving the therapeutic value of drugs, the other preparing them of such uniform quality and purity as to render observations made with them perfectly reliable. It therefore believes it to be the duty, as well as the interest, of medical practitioners to leave the latter portion of the work to the control of pharmaceutists, and thus to get rid of the onerous task of dispensing their own medicines. It points out that although it is impossible to combine both duties properly, there are men in Canada who practise as physicians and at the same time superintend drug stores. Such hybrid combinations are condemned as being injurious to both parties, and a hope is expressed that before long stringent means will be adopted to prevent them.

We cordially endorse these opinions, and share the hope of our contemporaries.

THE LIBRARY AND THE CONVERSATION ROOM.

It will be remembered that at the last meeting of the Council of the Pharmaceutical Society, a letter from the students at present in the Society's School of Pharmacy was read, asking that they might be allowed the use of a room in the building for the purpose of conversation and discussion on matters connected with their studies. The Council expressed its desire to accede to the request as far as the arrangements of the house would permit, and referred it to the House Committee to carry out the necessary arrangements.

We learn that the Committee has accordingly decided that on and after Monday next, the 14th inst., the Committee Room adjoining the Library shall be open for the purpose every evening from 5 until 10 o'clock, except on Saturdays, and that all persons connected with the Society, and all persons who have obtained permission from the Secretary to use the Library, shall have the privilege of using this Room. The Conversation Room, as well as the Library, will be under the supervision of the Librarian.

It has also been decided that in future the Library shall be open continuously from 9 a.m. until 10 p.m., daily, Saturdays excepted, when it will be closed at 2 p.m.

CHEMISTS AND DRUGGISTS' ASSOCIATION OF IRELAND.

We learn from an Irish correspondent that the chemistry class in connection with the above Society is now in full operation, under the able guidance of Professor Tichborne. A spacious room has been fitted up as a laboratory and lecture room, and contains all the necessary apparatus and conveniences. The classes meet on two evenings a week, viz., Tuesdays and Fridays, at 8 o'clock. Up to the present time more than sixty students have joined the classes, and it is expected that very shortly that number will be increased to about a hundred. Attfield's 'Manual of Chemistry' is the class book used in the chemistry class. The classes in botany and materia medica will not commence until February. Donations in the form of specimens, etc., will be very acceptable to the Society, and may be addressed to the Honorary Secretary, Mr. William Hayes, 12, Grafton Street, Dublin.

At the usual monthly meeting of the Society, held in the lecture room on Tuesday evening last, about twenty new members joined the Association.

EDINBURGH UNIVERSITY BUILDINGS EXTENSION.

An important meeting was held at Willis's Rooms, St. James's, on Monday last, for the purpose of making known in London a project for extending and improving the buildings of the University of Edinburgh, which buildings, in consequence of the widely extended area traversed in modern academic teaching, have become very inadequate. For instance, although the University of Edinburgh was the first British school to introduce practical instruction in Chemistry into the medical curriculum, no provision has yet been made for carrying on satisfactorily this and similar important branches of scientific training. His Royal Highness the Duke of Edinburgh presided, and stated that it was estimated that £100,000 would be required, towards which the sum of £70,000 had been subscribed, and he appealed for public support in providing the University with practical appliances for scientific research and instruction, so that it might be able to retain a foremost place among the educational institutions of the nation.

The resolutions were moved and supported by the Earl of Derby (Lord Rector of the University), Dr. J. Oswald Dyke, Professor Huxley, Professor Allman, Dr. Lyon Playfair, M.P., Mr. Hugh Matheson, Mr. Beattie, Mr. Cowan, M.P., and Sir J. Kay-Shuttleworth. Several large sums were subscribed at the close of the meeting.

The Duke of Edinburgh, who described himself as a matriculated alumnus and an Honorary Doctor of Laws of the University, amusingly illustrated the want of room in the lecture theatre, by narrating how on one occasion his hat was only by hasty removal saved from receiving the liver of a shark, under dissection by Professor Allman. Such a contingency, His Royal Highness seemed to think, would have been worse to endure than the smells produced by Dr. Lyon Playfair in his lecture theatre.

At a meeting of the Town Council of Dewsbury, held last week, Mr. F. M. Rimmington, of Bradford, Pharmaceutical Chemist, was appointed Public Analyst for that borough.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

December 8th, 1874.

Present—Messrs. Ainslie, Buchanan, Gilmour, Kemp, Kinninmont, Noble, and Young.

Professor Maclagan was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Two candidates were examined. Both passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Frazer, Samuel McCall .... Glasgow.
Currie, Robert Kirkwood............... Glasgow.

MINOR EXAMINATION.

Ten candidates were examined. *Six* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists :—

Edwards, Frank Dunn.................. Usk.
Cutler, William Herbert............... Bristol.
Cummings, Charles .... Glasgow.
Royse, John Frederick .... Stockport.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The following Certificate was accepted in lieu of this examination.

Certificate of the University of Glasgow.

McKenzie, Andrew .... Invergordon.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The second meeting of this Association (session 1874-5) took place in the large room of the Church Institute on the evening of Wednesday, November 11th, when, as on several previous years, it assumed a social character. Invitations were given to all the chemists and their assistants in the town, and were responded to by about one hundred, who sat down to a tea at half-past eight o'clock.

A number of microscopes and other scientific instruments interesting to the pharmacist, which had been kindly lent for exhibition by Mr. Fairley, the Borough Analyst, Mr. Pocklington, Mr. Abbott, Mr. Yewdall, and Messrs. Harvey and Reynolds, were after tea inspected with much apparent interest.

The President then, after welcoming the guests to the annual social gathering, delivered the following address:—

"Gentlemen, I congratulate you, as well as myself, that your Committee has been enabled to make such arrangements for our entertainment this evening, that it will be unnecessary for me to trouble you with any lengthened presidential address ; with your kind permission I will, however, venture to make a few remarks on one or two points which have suggested themselves to my mind. In the first place, then, let us ask ourselves, what is, or ought to be, the future work of associations like our own ? If we look around us towards the horizon of the pharmaceutical world, what do we see there ? 'A cloud no bigger than a man's hand !' For amongst the voices of the prophets, we may hear in accents louder than a whisper, 'The curriculum of pharmaceutical education is coming.' And the mouth which utters the momentous announcement is none other than that of Mr. Giles, of Clifton, seconded by our esteemed friend and neighbour, Mr. Siebold, of Manchester. Personally, I incline to the opinion, that taking the drug trade as a whole, and knowing that in country districts, and the poorer districts of large towns, the remuneration to be obtained by a chemist and druggist is but very small—I say I incline to the opinion that it would not be advisable to inaugurate so extreme a measure as that advocated by the gentlemen named. However, whether the little cloud grows larger, or fades altogether from our view, one thing is certain, scientific knowledge must be obtained somehow and somewhere, in order to pass the necessary examinations. Then I believe these local associations must become the centres for such educational means. Leeds already holds important advantages over her near neighbours. She is capital of the great West Riding of Yorkshire. Her school of medicine ranks high in the esteem of the medical profession. The recently inaugurated Yorkshire College of Science has its home, as you know, in our midst. Why should not Leeds also become the centre of pharmaceutical education for Yorkshire ? It is very likely that the College may materially assist towards such a settlement of the matter. Already it has its professor of chemistry, who delivers courses of lectures during the day, whilst our own able teacher, Mr. G. Ward, F.C.S., lectures to his students in the evenings ; and, although there will not probably be professorships in botany, materia medica, or pharmacy, yet I believe the Council would favourably receive any proposal from our Association, for the establishing of lectureships in such branches of science. Such lectures would doubtless have a certain prestige, and attract students to our town."

The President also made a few remarks on the recent controversy on Professor Tyndall's address at Belfast ; he thought the Professor had been rather hardly treated, considering his admission, "that beneath all there is a power perfectly inscrutable to the intellect of man."

Mr. Abbott followed with a short speech, in which he forcibly urged upon his hearers the value of a practical system of study ; and Mr. Ward and Mr. Brown, in proposing and seconding a vote of thanks to the exhibitors (which was carried by acclamation), vigorously put before the meeting the advantages connected with the Association.

A party of glee singers sang a selection of music at intervals during the evening, and contributed materially to the enjoyment of the meeting.

The third meeting of this Association (session 1874-5) was held in the library on Wednesday evening, November the 25th—the President, Mr. F. Reynolds, in the chair—when a paper was read by Mr. Jas. Abbott on "The Preservation of Syrups."

Mr. Abbott said the syrups of the Pharmacopœia included cane and grape sugars as preservative agents; all contained organic matter ; and organic matter was liable to change. He described the mode of germination and the whole life-history of Penicillium, Aspergillus, and Mucor, our commonest moulds, and illustrated them by diagrams and on the black-board. These, he said, were the cause of fermentation, etc. ; the spores were wafted about everywhere, and, if we could by any possible means keep them out of our syrups, we should be free from a great pest. It was false economy to use anything but the best sugar crystals in making syrups. They should be well boiled, put hot into clean small bottles, which should be filled to the lips, and the corks pushed in through the liquid. If stored in large bottles, the first time any was taken out, the enemy, fungus spores, etc.—mould—entered and luxuriated even in darkness : light not being required for their development.

He further said it is admitted that dark-coloured or opaque syrup bottles are necessary in our shops to hide from view their dirty insides ; midges, flies, mycelium, etc., being their constant occupants. He thought the old-fashioned teapot form of vessel for syrups was better than the modern bottle. With the former the syrup is poured from the bottom without breaking through the crust of flies, mycelium, etc. (though, of course, they should not be there). He also conceded that using from small bottles was better than from large ones.

A discussion followed the reading of the paper, in which the President, Mr. Thompson, Mr. Smeeton, and Mr

Brown took part; and a hearty vote of thanks was accorded to Mr. Abbott, on the motion of Mr. Jefferson, seconded by Mr. Hellowell.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The Third General Meeting of the session of this Society was held in Anderson's University, on Wednesday Evening, 25th November, Mr. John Currie, President, in the chair. The lecturer for the evening was Mr. J. M. Milne, Ph.D., analytical chemist, who chose for his subject "Carbon and its compounds with Oxygen." He dwelt chiefly upon the nature and properties of the carbon monoxide and carbon dioxide, illustrating his remarks by experiment and otherwise. The lecture was most interesting and instructive, time alone preventing the subject from being treated so extensively as it might have been. At the close, on the motion of the president, Dr. Milne was awarded a very hearty vote of thanks for his able lecture. It was intimated that at next scientific meeting, John Dougal, Esq., M.D., would read a paper on "Zymotic Poison."

The society is reported to be in a most flourishing condition this session. The membership has already tripled what it was last year, and the meetings both of the association and the assistants' section are most enthusiastically and largely attended. An attractive syllabus has been issued, and upwards of thirty members are attending the tutorial class, conducted by Mr. R. C. Lindsay, B.Sc., and over twenty are attending Professor Dittmar's practical chemistry class.

A general meeting of the trade, under the auspices of the Society, is also to be held on the 16th December, to consider, firstly, the propriety of negotiating with the chemists of Edinburgh and other Scotch towns, with a view to having compiled a more extended retail price-list for the whole of Scotland; and, secondly, the effect which the present system of examinations and fees has on the supply of apprentices and assistants; and to consider a memorial proposed to be presented to the Council of the Pharmaceutical Society, praying them to alter and amend the regulations in relation to the same.

HALIFAX CHEMISTS' ASSISTANTS' AND APPRENTICES' ASSOCIATION.

The inaugural meeting of the members of the above Society was held in the rooms on Friday evening, October 30th, when the following address was read by the President, Mr. W. Hollingsworth:—

Gentlemen,—It is my pleasing duty to congratulate you on the success which has attended the efforts of your Council. The reading-room is now, as you see, complete. The laboratory will be in operation in the course of a few months. Arrangements have been made for the conducting of a Latin class, which will meet for the first time on Monday evening next. Classes in materia medica, chemistry, and pharmacy will be commenced as soon as the laboratory is complete for their reception.

I have put together a few remarks for the benefit of those just commencing their studies.

On Study.

By study, I mean not a simple reading over of certain books and the learning off by rote of certain facts, but the earnest diligent perusal of the subject in hand, and when practicable, the verification of the statements made, whether in books, or *per ora*, by actual experiment. No student should accept anything on trust, but take the first opportunity of proving to the satisfaction of his own mind that the conclusion arrived at must be the correct one. Actual observation is of the utmost importance in those sciences with which we more particularly have to deal—chemistry, pharmacy, botany, and materia medica. A student may be fully acquainted with the number of the elements, their atomicity, the theory of atoms, and molecules, he may also have thoroughly learnt off by rote the characteristics of the various metals and non-metals, and yet not be able to distinguish potassium from sodium, nor a flask from a beaker. In botany he may be fully acquainted with descriptions of the various modifications of the root, stem and leaves, and the inflorescence. He may be well up in the characteristics of oxogens and endogens, and the essentials of the various natural orders, and, leaving out the actual examination and collection of plants, be in other respects a model student. But take him out into the fields, ask him to find you a plant, and refer it to its proper natural order; or, pull up a plant by the roots, and ask him to give you the name of that particular modification of root, and in nine cases out of ten he will not be able to answer you. The same in materia medica; he may be thoroughly conversant with the name, physical characters, and the natural orders yielding the various substances of which he has read—yet this will avail him nothing if he does not add to it the actual examination of authentic specimens. Now, suppose the chemical student had at once entered a well-appointed laboratory, and been set to work to make, say, hydrogen gas; he would have, first, the method of using the apparatus explained to him, and be told what materials to use; he would then proceed to the manufacture of the gas, and while this was going on, the teacher would take the opportunity of stating (supposing zinc and sulphuric acid to be used) that the experiment was an illustration of one of the modes of chemical action—the zinc displacing the hydrogen of the sulphuric acid, which was liberated as a gas, sulphate of zinc remaining in the bottle, and so on.

Thus, on the completion of his experiment, the student would not only have learned how to make hydrogen, but the use of the apparatus employed, together with the physical and chemical characters of the substances employed, and of the resultant compounds; and on reading up the subject afterwards he would more thoroughly understand his author, whilst the experiment would form a sort of nucleus round which his mind would cluster any further information and he might gather at any future time respecting hydrogen. These remarks apply equally well to the other sciences mentioned.

In my opinion, one-half of the failures in the examination result simply from the want of a well-directed system of study. Many students will work for three evenings, and sometimes a whole week, at one subject, and I know instances where one subject has been pursued, to the exclusion of all others, for two or three months. Now, suppose a student working up for the preliminary examination, sets to work at Latin grammar, and works at it continuously for, say, a week; the next week he works up his English grammar, and, the week after, arithmetic; at the expiration of the three weeks he comes back to Latin, and finds, to his astonishment, that the knowledge he had gained at the expiration of the first week has been pretty thoroughly crammed out of him by the pressure of English grammar and arithmetic. Nothing daunted, he sets to work again at Latin for another week, and then commences English grammar; here he finds that he is in exactly the same position in regard to this subject as he was with the Latin, yet not knowing how to account for the leakage of learning continually going on, he determines to work all the harder, figuratively "pouring water into a sieve." Here we have a thoroughly earnest and honest student who fails simply for the want of a system. He is, in fact, doing his best to cram out one kind of knowledge by the acquisition of another.

The system of study I would advocate is as follows:— First, in regard to the Preliminary students. The subjects required for this examination are, Latin grammar and translation, English grammar and composition, arithmetic, so far as concerns the first four rules, decimals and vulgar fractions, a knowledge of the metric system of weights and measures, and the First Book of Cæsar, 'De Bello Gallico.' We may place these subjects unde the respective heads of Latin, English, and Arithmetic; thus we have three subjects, and there are five evenings in the week on which the student may study. On Monday evening suppose he attended a Latin class. Tuesday he would devote entirely to the working out of the Latin exercises and the learning off of Latin grammar, etc., Wednesday would be devoted to the study of English grammar and composition, and Thursday to the study of arithmetic and the metric system. Friday evening he would have free for recreation, or for additional study in that branch of education in which he was most deficient. In this way he would go on, week after week, acquiring his knowledge little by little, and the intervals being short, he would not have time to forget anything he had learned before he again took up the same subject. The student should remember that Rome was not built in a day, nor is it to be expected that he will be able to pass his examination by a few months of Herculean study. By acquiring his knowledge in a slow and sure manner, small doses at a time, he has time to think over and practise what he has already learned, before it is crammed out by a fresh instalment. And, after all, this is the best and most expeditious method to adopt, and by degrees his mind becomes disciplined, his power of thought increases, and study becomes a pleasure. Moreover, he has the gratification of knowing that the result of his long course of study has not been the simple passing of an examination, but that the knowledge he has acquired, and the wholesome discipline which his mind has undergone, render him, in these days of the survival of the fittest, all the more fitted to carry on the battle of life. To those preparing for the Minor I would recommend a similar classification of their subjects, and urge on them the importance of not confining themselves to books, but of making their studies as practical as possible by a judicious blending of theory with experiment, and by endeavouring to demonstrate for themselves, as far as possible, the genuineness of the knowledge they acquire, thereby ensuring the success of their efforts. The student of materia medica should, whenever practicable, during the time he is reading up any given subject, have the actual specimen of the substance before him, so that he may examine it from time to time, noting the various characteristics which it is said to possess. No man can aspire to be a chemist who has not had a thorough laboratory training, and is not a diligent experimentalist. Similarly, no man is a botanist who has not gone out into the fields and visited the plants in their own homes; no amount of book learning can possibly make a botanist. The elements of botany should, if possible, be acquired in Nature's school, in order that the student may become a collector of plants before he is a student of their anatomy. We might as well expect a man to become an architect by studying the anatomy of bricks and mortar, and with as much reason, as we might expect the man to become a botanist who confined himself to the study of plants as depicted in books. Above all, the student should learn to apply his knowledge to the business in which he is engaged, whereby it becomes all the more firmly fixed in his memory, and by its application he gains fresh knowledge. What does it profit a man if he have all the knowledge in the world, if he cannot apply it in some way or other for the benefit of mankind? Like the miser, who takes a certain amount of money out of circulation, hoarding it up, he neither uses it himself nor allows others to do so; like the barren fig-tree, he only cumbers the ground. Every man has a talent given him, and woe to him who does not use it. Give me the man who can not only acquire knowledge, but use it. A man's life were indeed wasted if he did not leave the world, in some respect, better than he found it. Every man is not a genius, but every man has at least a mind, if he will only cultivate it. I will now conclude by exhorting all the assistants and apprentices of this town to avail themselves of the advantages which this Association offers, and, if they have not already done so, to at once commence to study in earnest, and, by their diligence and success, cause this Association to be known, not merely as an association of chemists' assistants and apprentices, but as an association of earnest seekers after knowledge, students in more than name.

Mr. A. G. Green proposed that the thanks of the meeting be given to the President for his able address.

Mr. C. Middleton said that the success of the members depended upon their individual efforts. There was a German proverb which said, "Every beginning is difficult, and the more excellent the task the greater the difficulty." Therefore he hoped that now they were commencing to study, they would persevere and endeavour to be successful. He had pleasure in seconding the vote of thanks.

Mr. M. F. Walton said that he could speak from experience of the benefits of a well-ordered system of study, and did not think he could improve upon the plan recommended by the President.

Some little misunderstanding having arisen on the part of the Chemists' Association, on account of a misconception of the attitude of this association, at a meeting of Council held November 4th, the President was empowered to treat with the Chemists' Association in order to settle the matter. A meeting of the Council was held December 1st, to receive his report of the action he had taken, and a copy of a resolution passed at a meeting of the Committee of the Masters' Association, received in reply to his communication, was presented. On the motion of Mr. W. H. Illingworth, seconded by Mr. A. F. Bottomley, the following resolution was passed, and a copy ordered to be sent to the hon. secretary of the Chemists' Association: "That this Council cordially agrees with the resolution passed at a late meeting of the Chemists' Association in reference to this association, and that it is their desire so to act as to merit the hearty sympathy and approval of their masters."

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 3rd December, 1874, Mr. W. H. Perkin, F.R.S., in the chair. After the usual business of the Society was terminated, a paper was read by Mr. S. Lupton on 'The Formulæ of the Alums.' The next was a note 'On the Colour of Cupric Chloride,' by Mr. W. N. Hartley, who finds that the crystals of the salt, when quite dry, have a blue colour, and not a green, as they usually appear when slightly moist. Papers were also read 'On the Oxidation of the Essential Oils, part II,' by Mr. C. T. Kingzett; 'On the Purification and Boiling Point of Methyl Hexyl Carbinol,' by Mr. E. Neison, and a 'Note on the Boiling Point of Methyl Hexyl Carbinol,' by Dr. C. Schorlemmer, F.R.S. The meeting was finally adjourned until Thursday, 17th December, for which date communications are promised 'On Groves' Method of Preparing Chlorides,' by C. Schorlemmer, F.R.S.; 'On the Precipitation of Metals by Zinc,' by J. L. Davies; 'Researches on the Paraffins existing in Pennsylvanian Petroleum,' by T. Morgan; and some remarks on the preceding paper by C. Schorlemmer.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of this Society was held on Wednesday, November 4, under the presidency of M. Regnauld.

A note was presented from M. Martin, accompanying a specimen of native sulphur from the Ottoman empire. M. Martin also presented a specimen of jaborandi from Brazil, which differed from that received from M. Coutinho, the radicles having a piquant taste analogous to that of radix pyrethri.

M. Husson sent a note relative to the alteration of iodide of potassium under the influence of sunlight. He proposed the addition to the starched paper of a small quantity of albumen, which would absorb the iodine in the event of the decomposition of the iodide by sun-light, and thus allow the action proper to ozone to be distinguished.

Eucalyptus as a Vermifuge.

M. Poggiale presented, on behalf of M. Vidal, a note on the vermifuge properties of essence of eucalyptus employed in the form of an enema. It gave the details of the case of a Zouave, who being afflicted with the presence of a great number of *Oxyuris vermicularis*, which all the ordinary vermifuges had failed to remove, was completely cured in nine days by using every evening an enema containing 50 or 60 drops of essence of eucalyptus to the quart. M. Mazet read a paper on the fermentation of currants in preparing the Codex "Suc de Groseilles," and the preparation of that juice.

False Opoponax.

M. Marais presented to the Society a specimen of false opoponax, composed entirely of myrrh. He stated that this gum resin, although little used in pharmacy, is at the present time much employed in Paris by perfumers. The consequence has been that the commercial stock has been exhausted, and the demand still continuing, it has given rise to the fabrication of a false opoponax from certain aromatic gum resins. The following tests are sufficient to discriminate between the true and false substances:—Upon incineration the true opoponax burns with a non-fuliginous flame, and diffuses an extremely pronounced odour of wild celery root; whilst the false gives off the characteristic odour of the gum resin or resin of which it is composed. If myrrh be used, it will, under the influence of the nitric acid vapour, acquire a beautiful rose colour; whilst opoponax, under the same conditions, does not change colour.

M. Bourgoin made known to the Society a new organic acid, dioxymalic acid.

Ceresin.

M. Guichard described some researches he has made upon the properties of ceresin. Paraffin has a crystalline texture, but ceresin and mineral wax are opaque and non-crystalline. Paraffin is soluble in ether, which only incompletely dissolves ceresin and vegetable wax. The residue presents the same appearance as the original substance, and melts at 80°, 85°, and 96°C., according to the degree of purification. From mineral wax may be obtained 23 per cent. of a carbide melting at 85°C. The soluble portion is paraffin. Some paraffin examined melted at 53°C., ceresin at 63°C., and mineral wax at 68°C. Neither mineral wax or paraffin is attacked by potash, and it only acts upon a portion (3 per cent.) of the ceresin. M. Guichard does not consider that these different products present any advantage over animal wax in the preparation of cerates. The absorption of water is difficult, if not impossible. But he thinks they would give to the vesicating plasters and the pomades a degree of hardness that would be valuable in the summer season.

PHILADELPHIA COLLEGE OF PHARMACY.

The first meeting of the present session was held October 20th, 1874, Mr. J. T. Shinn in the chair. Mr. W. McIntyre was elected Registrar.

Professor Bridges presented, in the name of Mr. A. Yarnal, some masses of sublimed bicarbonate of ammonia, which had been found in a barrel of the commercial carbonate lately purchased. This is an accidental product, rarely occurring in commerce. It was first noticed by Phillips, ('Annals of Philosophy,' xvii., 110), Henry (the chemist) having given it to him as an abortive result in a preparation intended for smelling salts. Phillips, on analysis, found it to be anhydrous bicarbonate, having the composition, as then expressed, of $NH_3 2HO.2CO_2$, the ammonium hydrogen carbonate of the new chemistry, $NH_4 H.CO_3$. This salt resembles the commercial carbonate in appearance, is hard, translucent and crystalline. After keeping it in a close bottle for some time a decided odour of ammonia is perceived when the bottle is opened, probably from the presence of some sesquicarbonate. This soon disappears, and, after exposure, becomes imperceptible. It has a pungent, saline taste, but none of the sharp biting of the sesquicarbonate. Exposed to the air it does not alter, but probably evaporates slowly; like all the alkaline bicarbonates, it holds, in the presence of water, part of its carbonic acid with a weak affinity. It dissolves, at 55° F., in six parts of water, and when a mass is placed in water minute bubbles soon form on the surface as solution takes place; these increase in number and size as the temperature rises, and become very copious at 150° F. The gas given off precipitates lime water freely. This solution of lime with an excess of the lime, when raised to the boiling point, does not affect moist turmeric paper placed in the mouth of the flask in which it is heated, showing that the gas is nearly all carbonic acid. The solution of the ammonia salt has also acquired a strong odour. This ready elimination of carbonic acid explains why solution of ammonia cannot be fully saturated with carbonic acid at ordinary temperatures. This salt, of course, is not proper for use as a stimulant, but, like the effloresced sesquicarbonate, may be used for other purposes for which the salt is adapted.

Mr. A. W. Miller exhibited oils of peppermint and lemon adulterated to a very large degree with alcohol and castor oil, and oil of wintergreen adulterated with alcohol.

Professor Maisch exhibited so-called American opium proved by Mr. Ebert to contain no opium, but to be probably extract of lettuce.

Dr. W. H. Pile briefly described the process for preparing bromide of ammonium, as reported by him to the American Pharmaceutical Association. The ammonia must not be poured down the same funnel as the bromine, but should be carefully distributed over the surface of the water, at the bottom of which the bromine is kept, otherwise reaction might take place with dangerous rapidity. In answer to a question by Professor Maisch, he stated that no bromide of nitrogen was produced.

Mr. Robert England exhibited some pictures photographed by the sun's rays, the natural colours of the object being fixed to some extent.

It was stated that sulphate of cinchonidia seems now to be used largely, and the good reports of its merits are substantiated.

Parliamentary and Law Proceedings.

Important Excise Prosecution of a Chemist and Druggist for Selling "Morning Tonic."

At the Hull Police Court on Tuesday, before T. H. Travis, Esq., Stipendiary Magistrate, William Staning, chemist, Cogan Street, was summoned by the Excise Authorities for retailing certain spirits, to wit, spirits contained in a certain compound called "pick-me-up," on the 1st of October, without his having a license to sell exciseable liquors.

Mr. F. Summers appeared for the prosecution, and Dr. Rollit, representing the Hull Chemists' Association, for the defence.

Mr. Summers said he was instructed by the Board of Inland Revenue to prefer the charge against the defendant, under the 6th George IV., chap. 81, sect. 26. The defendant was a druggist carrying on business in Cogan Street, and had latterly dealt in a liquor called "pick-me-up," which he (Mr. Summers) supposed was intended to be used by a man getting drunk over-night to "pick him up" in the morning.

Dr. Rollit (interposing): I beg your pardon, that is not the name. I am instructed not to take any technical objection, but I may say the name is "morning tonic." I don't know how the mistake has arisen of calling it "pick-me-up."

Mr. Summers continued, that if it were more agreeable he would call it "morning tonic," although it was actually known as "pick-me-up." A bottle of it was purchased by John Claridge, an excise officer, on the 1st of October, and it was handed over to his superior, Mr. Shawcross, who in turn sent it for analysis to London. The mixture was then found to contain 67·7 of proof spirit, and was flavoured with ginger, orange peel, and gentian. In consequence of the amount of proof spirit being found in the mixture, the Excise authorities had brought the case into Court. He should call the officer of the Excise who purchased the bottle, and the analytical chemist who had made the analysis, and he thought if he proved that the mixture did contain this large amount of proof spirit, the magistrate would have no difficulty in ordering a conviction. He was told that the gin and bitters sold by the publican did not contain more than 40 per cent. of spirit. In the event of this being so, the defendant would, he contended, be liable for selling spirit without a licence.

In reply to the Bench, Mr. Summers said his contention was that this mixture came under the statute as being British spirit. It was a British compound containing spirit, and flavoured with orange peel, quassia, and gentian.

The following witnesses were then called :—

John Claridge said : I am an officer of excise at Hull. On the 1st October last, I went to the defendant's shop in Cogan Street, and asked for a bottle of "pick-me-up" tonic. I was supplied in the bottle produced, and paid Mr. Staning 3*s.* 6*d.* for it. I took the bottle to the excise officer and gave it to Mr. Shawcross.

By Dr. Rollit : I could not say whether it was "morning tonic." I saw the label, but not until after purchasing the bottle. It was described on it as "morning tonic," but I asked for "pick-me-up" tonic, and I was supplied with it. I called more than once at the shop.

Dr. Rollit : The first time you called, didn't Mr. Staning tell you that he had none made ?—He did.

But you called a second time, and didn't he again tell you he had none made ?—He said he had not got it filtered.

Now, the third time when you called, didn't he fill the bottle for you ?—I do not think it was quite full.

I don't mean that—but did he make it up for you when you called ?—He went into an adjoining room.

Was he not absent a little time ?—He was.

And he brought the tonic from an adjoining room ?—Yes.

And for aught you know he may have had to make up the tonic for that special occasion ; he may have put it into the bottle ?—I can't tell.

At any rate, the bottles were not in the shop exposed for sale ?—I did not see any.

Now, did you ask for the largest size ?—I asked for a bottle of "pick-me-up."

Don't you know there were three sizes, one at 1*s.*, another at 2*s.* 6*d.*, and another at 3*s.* 6*d.* ?—I do not know.

Did you see the label ?—I had not seen the label at the time. I asked him what it was, and he said 3*s.* 6*d.*, and I paid him.

Have you not read the label, "In bottles 1*s.*, 2*s.* 6*d.*, and 3*s.* 6*d.*" ?—Yes, afterwards.

The bottle having been handed to the stipendiary, he asked : Did you see the cork ?—Witness : Yes, it was a plain cork.

Was it sealed ?—Not to my knowledge.

Did the defendant put any sealing wax upon it ?—I believe he did on the paper outside.

There was no seal on the cork ?—No, sir.

Then in point of fact the cork might have been put in at any time ?—Yes.

There was nothing to show that it had been put by for any length of time ?—No.

Mr. Summers: Can you say whether this is the cork put in at the time ?—Witness : I cannot say.

William Shawcross said : I received the bottle now produced from the last witness. He gave it me the same day that he purchased it, the 1st of October. I forwarded it to the Laboratory in London, addressed to the principal of the Laboratory, with the particulars of the case. I put it in a box, and sealed it up. The bottle is now in the same state that I received it, excepting that it was nearly full.

By Dr. Rollit : I believe the cork had no seal upon it. I think the same cork is now in it. I had the cork out several times, and I do not recollect any seal upon it. To the best of my belief there was no seal upon it.

Dr. Rollit : Assuming that this was a medical compound, I presume you would not think it was your duty to interfere at all ?—Witness : I am speaking now as an officer of Inland Revenue, and I do not think I am obliged to answer the question. If a person is selling spirits as we think illegally, we should interfere.

Assuming it to be a tincture, the Board of Inland Revenue would not interfere ?—If we interfere in any case, we must submit it to the commissioners, and ask for their decision.

Assuming this to be a medical tincture, you could not interfere ?—I did not interfere in this case.

If this is a *bonâ fide* medical tincture, the Board would not interfere ?—I should think not.

The Stipendiary : You would send it up and ask the Board instructions about it. You could not tell what the Board's decision might be ?—Witness : That is so.

Dr. Rollit : As a matter of experience you have not known of a case of interference with any *bonâ fide* medical tincture ?—Witness : I have never had such a case before as this is.

William Harkness was the next witness. He deponed : I am the analytical chemist to the Inland Revenue Board, and have been an analytical chemist for 13 or 14 years. The bottle produced I received into my possession on the 20th October last ; it was in a box, sealed. I may explain about this cork ; it was I who cut the top of the cork off. It is the same cork that was in the bottle in the box. By the direction of the Board I proceeded to make an analysis of the contents of the bottle. He found it to contain 67·7 per cent. proof spirit, and the flavour appeared to be derived from gentian, orange peel, and probably a little quassia.

Mr. Summers : From the result of your analysis will you state to the Court what is your opinion as to the mixture in that bottle ?

Dr. Rollit : I submit that my friend must put the question in some more definite form.

The Stipendiary : He tells us the particulars.

Witness : It is similar in every respect to bottles sold by publicans—a bottle of which I hold in my hand ; and is quite different from any "pick-me-ups" I have used.

Dr. Rollit : I submit the witness is not a medical expert ; he is not on the medical practitioners' list.

The Stipendiary : He is called to show what are the ingredients in this compound. I think what he has said so far is perfectly legal.

Mr. Summers : What is the usual quantity to be found in tinctures ?—Witness : Tinctures are generally made with proof spirit, and I have examined, in connection with this case, seven or eight samples, and have found them to contain 90 or 95 per cent. of proof spirit.

By Dr. Rollit : You say this tincture, as I venture to call it, contains 67 of proof spirit ?—It does.

So that it contains less spirit than tinctures usually do ?—It contains less spirit, but just the amount of spirit that public-house bitters do.

Now, you have referred more than once to public-house bitters ; don't you know as a fact that the publicans buy them of the chemist?—I don't know. They generally come from the rectifiers.

I suppose that probably both would be purchased from the same source?—Possibly.

Will you please give me your detailed analysis of the tincture?—67·7 per cent. of proof spirit, and the flavour appears to be gentian, orange peel, and probably quassia. I cannot give the exact quantities.

Can you tell me the names of any more of the ingredients?

In reply to the Stipendiary, Witness said: The amount of solids is only 3 per cent.; the amount of ash 3-10ths per cent.

Dr. Rollit: Do you say it probably only contains gentian, orange, and probably quassia?—One is in such a small quantity that I am not perfectly satisfied of its presence.

Dr. Rollit: Would you be surprised to learn that there are twelve or thirteen drugs in it—gentian root, camomile flowers, chiretta, coriander fruit, cascarilla bark, quassia, cardamom seeds, nutmegs, cayenne pepper, dried orange peel, cinnamon, calumba root, raisins and proof spirit?

Witness: If there had been raisins there I should have detected the sugar.

Dr. Rollit: You do not presume to say the medical attributes of each of these stimulants—

Witness (interrupting): I am not a medical man, though I examine these things for the medical profession.

What do publicans' bitters contain?—Generally proof spirits and one or two ingredients.

So that if there were the numerous ingredients of which I have spoken in this medicine that would distinguish it from the publican's mixture?—I found one publican who had six or seven different bitters.

You said, however, there was generally only one?—Yes, proof spirits and one or two ingredients.

Did you ever know a publican's bitter which contained some twelve or thirteen?—I have known one to contain five.

That is the largest number you ever knew?—Yes.

I want to know, if this contains twelve or thirteen ingredients; whether it will not lead you to modify your opinion that it is similar to the bitters sold by publicans?—Certainly not.

You have limited the publicans' bitters to contain only five ingredients?—In receipt books you will find far more than that number.

I want to ask you whether, if it contains more than twelve or thirteen ingredients that won't modify your opinion as to this being similar to the publican's?—It won't modify it unless I find the amount of each ingredient.

You say it is quite different to the "pick-me-ups?"—Quite different.

So that it is not like the publicans' bitters, and it is in itself a singular compound?—I said it was like the publicans' compound.

You have told us of other "pick-me-ups," just give me the ingredients.—Witness: The last I examined contained a large amount of sugar, glycerine, cinnamon, quassia, and 46·9 per cent. of proof spirit.

So that I may take it the average constituents of a "pick-me-up" would be about four ingredients, with a proportion of proof spirit?—Three or four ingredients; there may be more.

You have never met with a "pick-me-up" which contained some twelve or thirteen or fourteen bitters?—Never.

Are the "pick-me-ups" sold without the interference of the Board as medicines?—Some of them are sold as medicines.

The Board has not interfered in any case yet?—Up to the present time it has not.

Can you tell me what are the chief constituents of these medical "pick-me-ups"?—Quassia, gentian, and sugar.

So that the chief constituents of medical "pick-me-ups" are the same as this morning tonic?—Yes, except in larger quantities.

Can you tell me the detailed analysis of the residue of 3 per cent. of solids?—Oh no.

Supposing I found several chemists to tell us there was a much larger proportion, and they knew the ingredients, might that not lead you to modify your opinion?—If it were said of the same as I have examined I should certainly be astonished at it.

Some tinctures, I believe, are prepared with rectified spirit, which is still stronger than the proof spirit?—I do not know of any tinctures made with rectified spirit.

Supposing I were to name some to you, would you not be astonished?—I have not gone through the Pharmacopœia.

(The Pharmacopœia was here handed to witness, and looking at it, he was asked by Dr. Rollit): What is tincture of aconite?—That is rectified spirit.

Turn to tincture of arnica.—That is rectified spirit.—Turn to tincture of asafœtida.—That is rectified spirit.—Turn to tincture of Indian hemp.—That is rectified spirit; I confess I did not know this before.—Tincture of lavender which is sold every day over the counter, is not that rectified spirit?—I suppose it is.

Now, essence of ginger, is it not sold every day for domestic purposes; is it not used in every household?—It is not used in mine.

Is it not used for rheumatism?—I suppose it is.

Is it not used for flatulency?—I suppose it is; I am not a medical man.

Just turn to essence of ginger?—It is rectified spirit.

Then essence of ginger would contain a much larger portion of spirit than the tincture of which we are speaking?—It would.

I may take it as a general fact that the Pharmacopœia contains a number of compounds prepared in spirit containing a much larger proportion than the one now before us?—Yes.

So that the proportion of spirit in this tincture, if it be a tincture, is not excessive?—It is not.

So that practically that tincture is very far below the Pharmacopœia standard of spirituous ingredients of tinctures?—It is.

Dr. Rollit proposed to reserve his remarks for the present, and called—

Dr. Kelburne King, who said: I am a Fellow of the Royal College of Surgeons, and have been in practice for about twenty-three years in Hull. I am one of the surgeons in the Infirmary, have lectured in Hull on anatomy and surgery, and am President of the Hull Literary and Philosophical Society. I have been shown a bottle of this tincture.

Dr. Rollit: Would any man be likely to take it as a beverage?—Witness: I should think not.

Dr. Rollit asked his worship if he would taste the liquor?

The Stipendiary: I should be reduced to extremities if I did so (laughter).

Witness continued: The tincture is very nasty to the taste. A man would be very much depraved in intellect to take it as a beverage. It leaves a very nasty bitter taste in the mouth. I have had a prescription given me naming the articles in it. It has very much the same taste as the tincture of gentian of the Pharmacopœia has. It may be a little more bitter. From this I should say it contains more or less of gentian. There are other bitters I can detect—one of which I should think is quassia.

Do these appear to be in a small or large proportion?—Quite large enough to make it as strong a tonic as the tincture of gentian is. The proportion of spirit contained was rather less than that in the usual tincture of Pharmacopœia. It was a great deal less than one spoonful of lavender. It was about one-fourth less than a tincture prepared with proof spirit. There were many tinctures prepared with rectified spirit, which was considerably stronger; about 20 altogether.

Assuming this, Dr. King, to be composed of gentian root, camomile flowers, chiretta, coriander fruit, cascarilla bark, quassia, cardamom seeds, nutmegs, Cayenne pepper, dried orange peel, cinnamon, calumba root, raisins, and rectified spirit, *plus* water—how would that be described by yourself?—As a medical preparation, if medicinally prepared.

I ask you, Dr. King, is that what you would prescribe for any one?—I might; I am not bound to follow a prescription I do not know every particle of.

Might it not be prescribed with curative effects for any one suffering from certain complaints?—It might.

Would you prescribe it, or something of the same kind?—I would not prescribe anything, unless I knew every article in it and its preparations.

These constituents might be administered with advantage as a medical compound?—Yes.

Will you tell us any tincture in the Pharmacopœia to which it would be similar?—It would be similar to the compound tincture of gentian.

Have you any reason to doubt that these constituents are contained in that liquor?—I have not the least doubt some of them are.

Is the taste inconsistent with the presence of the whole?—It is not.

By Mr. Summers: I understand you to say that the contents of the bottle are similar to the compound tincture of gentian?—Yes.

Will you tell his worship what quantity of the compound tincture of gentian you would prescribe for a person?—That would entirely depend on the nature of the case.

As a morning tonic?—I don't know that I am particularly given to prescribing morning tonics. (A laugh.)

Don't you know the dose is from ½ to 2 fluid drachms?—It all depends on the case.

You have already said the contents of the bottle are similar to the compound of tincture of gentian, of which I am informed that from half to 2½ fluid drachms is a dose. Now, if you took two or three wine glasses per day from this bottle would it kill you?—No.

What would be the effect?—It would give you a very dry mouth and make you feel very disagreeable. (Reading from the bottle.)

Would you like to take a small wine-glassful at any time?—Certainly not, I don't say I would not prescribe it. You put the question to me, a person in good health; but to say I would not prescribe it under all circumstances is different.

Mr. Summers said the intimation on the bottle was "a small glassful may be taken at any time; or, mixed with a little sherry, it forms a milder but an agreeable tonic."

Mr. Travis asked what was a drachm?

Witness: A drachm is about a teaspoonful.

Mr. Summers: Would you recommend it to a sick or a distempered person?—Witness: There are diseases I would recommend it in.

Mr. Summers: Not to be taken in such large quantities as a wine-glassful?—Witness: I cannot say. It would depend upon the person for whom I was prescribing.

Mr. Summers: Would you think it a wise thing to give a bottle like this that a person might take it indiscriminately?—Witness: I disapprove entirely of medicines being sold to be taken at the discrimination of the person buying them.

By Dr. Rollit: Supposing the tincture of gentian were diluted with water to form a small wine-glassful, would it not have in it similar quantities to the tincture produced?—Yes, of the same strength, in reference to gentian, as the figure 3 to 4; so that an addition of the fourth part of water would bring the tincture of gentian down to the strength of this.

In that case a small wineglassful of the tincture of gentian would not be excessively diluted, as I suppose?—I don't think it would be excessive.

Have you any doubt, from the taste of that liquid, that gentian and other bitter tonics are largely prevailing?—Not the least.

Can you give me any idea of the percentage of solid matters?—The percentage of solid matter is very small.

Supposing it were present to the extent of some 3 or 4 per cent., that I suppose would be sufficient for its medical efficacy?—I should say so, if it were properly prepared.

Mr. Travis: You object to things of this kind being sold except under medical advice?

Witness: I, of course, disapprove of patients taking the law into their own hands.

Mr. Travis: Look at that bottle, we have had evidence that there is 67½ per cent. of strong spirit. Assuming you are not present, a person may take it as he likes?

Witness: I don't approve of their taking it at their own discretion.

The case was then adjourned, *pro formâ*, for a week, and then a day will be fixed for its conclusion.

Reviews.

SCIENTIFIC LONDON. By BERNARD H. BECKER. London: H. S. King and Co. 1874.

More than two centuries have elapsed since, in 1660, after a lecture in Gresham College by Sir Christopher Wren, then Gresham Professor of Astronomy, a number of gentlemen who had been accustomed to meet and talk over subjects connected with mathematical and physical science, resolved to form themselves into the association which survives to the present time under the honoured name of the Royal Society. But science has now become a domain far too vast for any society to attempt its exploration single handed; therefore, whilst in this country the Royal Society still devotes its attention to the investigation of the general principles of science, the working out of the details of the various branches of science has become the work of numerous institutions, each of which undertakes its special portion. Many of these, though not by any means all, have their seat in London, and they have furnished Mr. Becker with a topic for an extremely interesting little book, entitled "Scientific London," in which he has successfully attempted to supply a gap in the literature of science, by arranging, in a form accessible to the general reader, some of the scattered facts of their history.

The scientific institutions treated of in this book are fourteen in number, namely, the Royal Society, the Royal Institution, the Society of Arts, the Institution of Civil Engineers, the Chemical Society, the Department of Science and Art, the London Institution, the Birkbeck Institute, the Gresham Lectures, the Society of Telegraph Engineers, the Museum of Practical Geology, the British Association, the Statistical Society, and the Royal Geographical Society. We notice that no mention is made of any of the medical societies,—and perhaps consequently of the Pharmaceutical Society,—of the Linnean Society, the Royal Society of Literature, the Royal Microscopical Society, the Quekett, the Royal Asiatic Society, the Society of Antiquaries, and some other societies at least as important, in a scientific point of view, as one or two that are included. Of this, however, we make no complaint, for we should be unwilling to make room for them at the expense of any portion of the present volume; but we will express a hope that the author may have the opportunity and inclination to make them the subject of another.

Although Mr. Becker acknowledges the aid he has received from the officers of the various institutions, and some of the chapters evidence an intimate acquaintance with the history of the respective institutions, he has avoided a patchwork of different styles, by himself moulding the materials, and running through them a spice of individuality, which prevents them from becoming a dry record of bare facts. The general plan is to give a sketch of the origin of the institution, then of the work done by it and of the principal workers, and this is usually supplemented by a pleasantly written narrative of a personal visit by the author. Thus in the chapter on the Royal Society we get glimpses of Prince Rupert, Boyle, Wren, Newton, Hooke, Flamsteed, Halley, Gray, Banks, Wollaston, Davy, Brewster, and many others. Amongst the work of members of the Society in its earlier days, are mentioned the transfusion of blood, Newton's researches into the nature of light, the publication of the 'Principia,' Savery's engine to raise water by fire, a new-invented boat to be rowed with oars moved by heat, and Papin's digester. The author might have added, a paper on the production of perfect pea-fowl from barnacle shells. Further it would not be without significance to mention that so late as 1783, a Fellow of the Royal Society having asserted that he had accomplished the transmutation of mercury and other inferior metals into gold and silver, and being requested by his brother fellows to repeat his experiments, committed suicide by drinking laurel-water in the presence of three fellows who attended at his house for the purpose of witnessing them. This man, James Price, was the last of the English alchemists.

The chapter on the Royal Institution contains a sketch of the life of that remarkable man, Count Rumford, and shows how his effort to found an "institution for introducing and bringing forward into general use new inventions and improvements, particularly such as relate to the management of heat and saving of fuel, and to various other mechanical contrivances by which domestic comfort and economy may be promoted," has developed into one which will be for ever associated with the discoveries of Davy, Dalton, Young, Faraday, and Tyndall. On the other hand, the Society of Arts, founded originally to encourage young artists, has successfully carried out a scheme similar to that originally projected for the Royal Institution.

This will, perhaps, suffice to indicate the scope of the work under notice. But in order to give a specimen of the author's style, we quote his description of an evening at the Chemical Society, which also contains some reflections that will not be without interest to many of our readers:—

"The Chemical Society is one of those highly favoured bodies which, like the Royal Society and the Geological Society, are permitted to occupy a portion of Burlington House. A magnificent suite of rooms is allotted to it. There is a handsome library, admirably appointed, and enriched by a fine collection of chemical works, and regular files of English and foreign scientific periodicals. Adjoining the library is the inevitable tea-room, without which the domain of no scientific society is complete. Beneath these apartments is the great room of the society, fitted up with benches in ascending order, like those of an ordinary lecture-room. Behind a long table, more or less encumbered with chemical specimens and apparatus, sit the president and the two secretaries—the two latter gentlemen being charged with the onerous duty of reading papers in the absence of their authors. The presence of a number of ballot-boxes reveals the fact that several gentlemen recommended on the basis of "personal" or "general" knowledge are up for election; and the reception of many recently-elected Fellows, according to the form prescribed, indicates that the Chemical Society is adding largely to its list of members. This is a cheering sign, but my spirits are slightly dashed when I observe the extreme youth of many among the audience. As the names of the visitors—of whom each Fellow may introduce two—are read aloud, I find that their number does not account for the remarkable preponderance of young gentlemen. On inquiry I find that these must, therefore, be actual Fellows. I naturally experience some little surprise at this discovery, as I was once inclined—in the innocence of my heart—to attribute a certain distinction to the mystic letters F.C.S. Now, no human being is more inclined to encourage youth, and more disposed to regret its loss, than myself. It has long been an article of my creed that when a man is able to do good work, he is old enough to be entrusted with it, and I never lose an opportunity of insisting that in life the 'time' is not, as musicians say, 'taken quickly enough,' but I find it difficult to resist the conviction that many of the juvenile Fellows of the Chemical Society cannot possibly have attained any higher rank than that of students or of assistants to lecturers. I may be mistaken. The young gentlemen referred to may have attained eminence in the chemical world, or the letters F.C.S. may not be intended to convey any grave significance, but I confess that I am puzzled.

"Elections over, the reading of papers is proceeded with. Many of these are important, and a particularly interesting account of researches in Phenol is read by Dr. Armstrong, the chemical professor of the London Institution. Time passes quickly, and the attention given to the business of the evening is perfectly warranted by its engrossing character. Much revolving these things, I at length emerge into Piccadilly, admiring the youth of the Fellows of the Chemical Society, and wondering why a powerful body like this, possessing a fine library, has yet no museum of its own."

THE CHEMISTS AND DRUGGISTS' DIARY FOR 1875.

We have received a copy of this useful annual, which is doubtless now too well known to our readers to need any special recommendation. If it be granted that a Diary is a useful adjunct to the tradesman's counter, it necessarily follows that one drawn up with special provision for the wants of his particular calling wlll be a desideratum, and this object is fully attained in the Chemists and Druggists' Diary for 1875. Besides the usual sections of the Diary proper, there are included this year special articles on the Use of the Diary, Book-keeping, The Laboratory, County Court Processes, Aerated Waters, a Botanical Calendar, a Selection of Formulæ from the German Pharmacopœia, and other information generally looked for in almanacs.

BOOKS RECEIVED.

REPORT BY DR. M. C. COOKE ON THE GUMS, RESINS, OLEO-RESINS, AND RESINOUS PRODUCTS IN THE INDIA MUSEUM, OR PRODUCED IN INDIA. London: India Museum. 1874.

TRANSACTIONS OF THE ASIATIC SOCIETY OF JAPAN. Yokohama. 1874. From the Society.

Obituary.

Notice has been received of the death of the following:—

On the 21st October, 1874, Mr. Thomas Abson Nicholson, Chemist and Druggist, of Bradford, Yorkshire.

On the 27th October, 1874, Mr. Thomas Richardson Negus, Chemist and Druggist, of Manea, Cambridge.

On the 20th November, 1874, Mr. Alexander Stewart, Chemist and Druggist, of Milnathort, Kinross-shire.

On the 24th November, 1874, Mr. Henry Augustus Bolton, Chemist and Druggist, of Gateshead.

On the 29th November, 1874, Mr. Thomas Mayhew, Pharmaceutical Chemist, of Glastonbury. Mr. Mayhew had been a Member of the Pharmaceutical Society since 1842.

On the 30th November, 1874, Mr. Robert Waller, Chemist and Druggist, of Liverpool.

Notes and Queries.

[421]. SYRUPUS FERRI LACTO-PHOSPHATIS. —*A.* wishes to be supplied with a formula for Syrup of Lacto-Phosphate of Iron.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Preservation of Infusions.

Sir,—In the discussion which followed Mr. Barnes' paper on the above subject at the last evening meeting of the Pharmaceutical Society, one of the speakers, enumerating several methods which had been tried, observes "they never were found to be very efficacious." Will you allow me one word in defence of an old friend there deprecated, viz., the process of boiling and tying over? It is adopted in many first-class provincial pharmacies, where the demand for infusions does not justify the daily manufacture of a supply of the infusions mostly in request, and where, unfortunately, the physician does not very frequently intimate to the patient that the medicine will take some time to prepare. Your readers are doubtless familiar with the process, which, if carefully conducted, rarely fails. It is easy, and necessitates no departure from the official formula. Some infusions so made were exhibited at the Norwich Conference, and, though six months old, were universally admired, and I shall be glad to show any one a rhubarb infusion eighteen months old as bright and free from deposit as on the day when it was strained into the bottle. To make any addition to official or private formula for the sake of convenience is the worst habit a dispenser can fall into. Who does not recoil from the introduction into infusions of such an element as chloroform? It would, even if sanctioned by the Medical Council, entirely alter the character of the preparation, and vastly diminish its value; for is not an infusion most frequently resorted to when there is a desire by the physician to avoid the stimulant contained in the tincture of the same drug?

THOMAS PERKINS.

Dover, December 7, 1874.

Sir,—I much regret that I am unable on account of distance from London to attend the evening meetings at Bloomsbury Square. I must say that I was surprised to find by last Saturday's Journal that gentlemen who occupy a high position as pharmacists should advocate the use of chloroform as a preservative for infusions, one gentleman gravely asserting (of course "cum grano salis") that two out of every three prescriptions contain chloroform. I find by my own dispensing book that chloroform and its preparations do not average more than about 8 per cent. It is well known that even in small doses in some diseases, especially in heart affections, its use is highly objectionable. By a very simple expedient all infusions (that of roses excepted) may be kept perfectly good for an indefinite period of time. Completely fill bottles, six or eight ounces are a convenient size, with fresh-made infusions, place them in a pan of cold water up to the neck, and bring to the boiling point to expel the air, immediately tie over with a double piece of thick tinfoil. I myself have kept infusions of senna, cascarilla, and others, if carefully prepared, perfectly fresh for three years, and if slightly warmed no difference could be noticed between them and infusions prepared an hour before.

OCTAVIUS CORDER.

London Street, Norwich,
December 9, 1874.

Amorphous Phosphorus.

Sir,—I am gratified to see that Mr. Greenish considered the purport of my letter to the *Pharmaceutical Journal* of sufficient importance to be brought prominently before the members present at your last evening meeting. My object in writing it will at once be apparent if your readers will turn with me to the correspondence (page 400, November 14th, *Pharm. Journ.*) relative to the discussion on my paper on "Amorphous Phosphorus," and they will there find the letter in which four questions are asked with a view to enable that gentleman to support his statement with facts as to dose, etc., this being most important in all cases of investigation where it is essentially necessary to reject "useless theory" and mere hypothetical "statements;" but I confess I am disappointed to find Mr. Greenish has not answered my plain questions in a plain and candid manner. I will therefore leave your readers to decide (on turning to my questions relating to the statements mentioned) what value to put upon the information given.

As workers in the cause of pharmacy, it is necessary to supply to medical men any form or forms required, and in the event of one or more not suiting the palate of a patient, to invent perhaps twenty others which will do so, and in this manner pharmacists may become, like Mr. Squire's book, important and useful, practical companions to the everyday life of the physician.

With your permission I should like to reproduce Dr. Attfield's remarks in the discussion at the evening meeting, and with his remarks I will be silent until I can submit the result of practical investigation.

"Professor Attfield said that amorphous phosphorus had been used in medicine some years ago, though not extensively, except by a few practitioners. He was informed by a person engaged in the trade, that though there was a considerable demand for it some ten or twelve years ago, it had lately been seldom required. At that time, however, therapeutists did not seem to know so much about the peculiar effects of phosphorus as they did now, when it was very generally prescribed, and therefore it occurred to him that with this increased knowledge therapeutists would be in a better position to test the qualities and medicinal properties of amorphous phosphorus. Very contradictory opinions had been expressed as to its physiological effects, and therefore it appeared very important that therapeutists should experiment with this powerful element in this particular form, and give the world the benefit of their experience. All experiments should be with red phosphorus containing no trace of ordinary phosphorus, or resulting observations would be valueless."

ARTHUR W. POSTANS.

35, *Baker Street, W.,*
December 8th, 1874.

Early Closing Movement.

Sir,—I have great pleasure in being able to say that the chemists and druggists of Bedford (a town of about 18,000 inhabitants) close their establishments at 7 p.m., except on Saturdays, when it is 10 o'clock, and do not open on Sundays; and close also on Bank Holidays. Most of them have three or four assistants, who take it in turns to stop in when shop is closed, after which time only medicine is supplied. On Sundays the one on duty stops in one hour in the afternoon, and from 8 to 10 in the evening.

The above plan has worked well for the last five years, so much so that all the other tradesmen have followed the example, with the exception of the tobacconists, etc.

A. W. WARING, A.P.S.

Dissatisfied Young Men.

Sir,—Contrary to the Rev. Dr. M'Auslane, and "A Dissatisfied Master," I do not think a man has reached a state of ineffable bliss when he says, "I have learned, in whatsoever state I am, therewith to be content." (I have often seen a fat, healthy pig look desirous of using such a phrase); moreover, it is pretty evident to any thinker that the amelioration of the "*désagrémens* incidental to the drug business," to living in closely populated countries, together with all moral, physical, and intellectual improvement, are promoted solely by dissatisfaction and a spirit of scepticism. Touching the vexed subject of early closing, it is worth while considering whether it is better to concede fair terms to our assistants now, or to wait until we are involved in the popular question of strikes.

We ask and expect higher education from our assistants, and it is simply justice to accord them definite and sufficient time for study and recreation—not to ask them to make "bricks without straw." When an assistant, I made ineffectual efforts to acquire sufficient knowledge to pass the Minor examination, until I found a master with a conscience, when I passed easily; there are many situated as I was, and want the same aid that I had.

In conclusion, I would ask "A Dissatisfied Master" to evolve from his inner consciousness an idea of what our world would be without dissatisfied people like himself.

GEORGE R. DURRANT.

Hertford, November 23, 1874.

Several other communications upon this subject have been received, which we are unable to print *in extenso*, but their tenour may be estimated from the following extracts:—

F. A. doubts the correctness of identifying the present generation of young men engaged in pharmacy with the class referred to in Dr. M'Auslane's sermons. The rev. doctor, in speaking of "the young men who lived in the great metropolis of the empire," said, that "they had health and strength, vigour and elasticity;" that "they were buoyant with hope," etc.; "they were with few cares, burdens, or trials." These characteristics *F. A.* considers to be inconsistent with long hours, small remuneration, stringent examinations, and the competition of co-operative stores.

"*Nemo*" says, that if "A Dissatisfied Master" is enabled to get comfort from Dr. M'Auslane's ministry, there are few assistants who are so privileged, and he fears they will fail to find any in the paragraph quoted. The comfort which "*Nemo*" thinks they would prefer is short hours, mainly that they may have a little time for study. He thinks the remuneration will be settled when there are more examined assistants.

"*Bristoliensis*" has forwarded a communication, in which he sketches the manner in which this question may be viewed from the masters', the assistants', and the neutral point of view. Although we are unable to spare the space for its insertion, we quite agree with him that the subject should be carefully viewed under every aspect.

We have also received a letter from an esteemed correspondent, under the signature "*Veritas*," which we purpose to print next week for the sake of the sketch it gives of apprenticeship in the "good old times."

Chemists and the Adulteration Act.

Sir,—Your leader of the 5th, on "Chemists and the Adulteration Act," though in the main excellent, yet in some points appears to have been written under a misapprehension, the correction of which is the object of this letter.

The "Society of Public Analysts" do not pretend, at this stage, to submit an absolutely authoritative definition of "adulteration" or of an "adulterated article," but they have endeavoured to express in tolerably comprehensible language the views which generally they hold.

The actual framing of a definition for the new Adulteration Act, if there should be such an Act, and if it should contain a definition, will have to be done by the authors of the Bill, who would probably confer with the Local Government Board, and if the co-operation and assistance of the "Society of Public Analysts" be then requested, they will be willingly rendered.

The Adulteration Act, 1872, contains no definition, strictly speaking, and the only legal guide which public analysts have had has been the well-known tea case in the Court of Queen's Bench, where it was ruled that any deviation, no matter how infinitesimal, from the standard of absolute purity should be deemed an adulteration.

Had this judgment been followed (and undoubtedly analysts and magistrates might have argued that it ought to be, seeing where it was given), the tradesmen, who, in their trade journals, as it is, are continually bewailing their lot, would indeed have had some cause to complain.

The public analysts, however, happening to be not only men of science, but men of sense, have given a considerable (I admit a variable) amount of "law," but their experience onvinces them that, in justice alike to themselves, the tradesmen, and the public, a definition of "an adulterated article" should be framed, and they presume to think themselves as competent to undertake the task as any other body of men.

Who, for instance, is so likely to know whether an article is "injurious to health" as the analyst?

Scarcely solicitors or magistrates, whose *forte* is law, not toxicology.

Surely not the manufacturers or vendors who have never made such a point their study, even if they feel any interest in it.

Certainly not the consumers, who, as a rule, know nothing about the matter.

Even the present Act therefore very properly assigned this duty to the analyst.

As to your objection to the term "sensibly increases,' your reason of objection is precisely my cause of defence, viz., that it does not tie the analyst down to report as adulterated an article containing some minute trace of foreign matter, but leaves him free to ignore any but an appreciable quantity, such as could be weighed or measured, and if the analyst be "sensible" there can be little danger in his being allowed this margin.

You next challenge the wisdom of making exceptions in the case of the presence of ingredients "due to circumstances necessarily appertaining to its collection, manufacture," etc.; but though the expression would doubtless leave room for argument, to have left it out would have been to rob the manufacturer of a safeguard to which he is fairly entitled.

I think it is idle to discuss the literal meaning of the word "adulteration," whether it includes substitution as well as debasement, impurity, corruption, contamination, etc.; and in the compilation of the definition we have declined to be shackled by the mere dictionary meaning, but adopting the view taken by the Select Committee have endeavoured to reduce to terms a "definition of adulteration" (or whatever other name you like to give it), which, if acted upon, will, we believe, at the same time, guard both the health and the pocket of the public, and the just interests of the honest tradesmen.

No one, except those who have been engaged in the task, knows the amount of labour it has taken.

Every effort has been made to obtain the soundest opinions, both chemical and legal, and though members of various trades would each like to see their own specially exempted, even some chemists, I believe, holding the extraordinary doctrine that the adulteration of drugs (but of course of nothing else) is a good thing; yet, on the whole, the Society of Public Analysts have all but unanimously accepted the definition as a "fair" one.

G. W. Wigner.

Erratum.—We are informed by Mr. J. B. Barnes that in the report of the discussion which followed the reading of Professor Godeffroy's paper "On an Additional Method of Testing for Glycerine," he is erroneously reported to have said "that there was an account contained last week in the *Daily News*, in the last article on the Exhibition, in which it was stated that glycerine was burnt for giving light." What Mr. Barnes said, was, that there was an account contained last week in the *Daily News* of the last English Arctic Expedition, in which it was stated that glycerine had been burnt as well as oil for giving light.

"*Student*."—The precipitate probably consists of a sparingly soluble compound of the quinine with the chloride of mercury.

F. C. S.—We will try to obtain the information asked for.

O. O. O.—According to section 12 of the Pharmacy Act, 1852, it is not lawful for any person, not being duly registered as a pharmaceutical chemist, to "assume, use, or exhibit any *name, title,* or *sign implying*" that he is so registered.

J. Simpson.—The arsenic in sheep-dipping compositions is generally combined with soft soap and potash. See an article by Dr. Macadam and Professor Gamgee in the first series of this journal, vol. xviii., p. 511, for precautions to be observed in the use of such compositions.

"*Query*" has forwarded, unaccompanied by his name and address, a series of queries, replies to which would involve an antiquarian research into the history of lac sulphuris. We must refer our correspondent to the rule respecting anonymous communications.

A.—Several formulæ for syrupus calcis lacto-phosphatis have already appeared in this journal. See vol. iii., pp. 559 and 570. Your other question appears on p. 578.

E. M.—See vol. i. (present series), p. 446.

J. T. Barrett.—Both your communications have arrived together, just as we are going to press. They shall receive early attention.

Communications, Letters, etc., have been received from Professor Tichborne, Mr. W. Baxter, Mr. Bennett, Mr. Ince, Mr. Bell, Mr. J. F. Brown, Mr. Postans, "Digitis."

ON A DRUG SUBSTITUTED FOR CHIRETTA (OPHELIA CHIRATA, GRISEBACH).

BY PROFESSOR BENTLEY.

Honorary Member of the Pharmaceutical Society of Great Britain.

A few days since a sample of Chiretta was forwarded to me by a well-known wholesale firm in London, stating that its genuineness had been called in question, and asking my opinion as to whether it really was the true herb.

Upon a superficial examination I found the sample to answer in colour and general appearance, as stated by the sender, the description of the official Chiretta pretty closely; but a practised observer would soon observe differences, more especially in the form of the stems of which the sample was composed, their less scarred character, and the less compact arrangement of the flowers and fruits, than in the true Chiretta.

When more carefully examined, several marked distinctive characters were noticed, the most important of which, in order to render them more evident, I have tabulated with the characters of true Chiretta as follows:—

Spurious Chiretta.	True Chiretta.
Stem obscurely quadrangular below, its four angles being each marked by a somewhat prominent border or wing; and very evidently quadrangular and winged above.	*Stem* round below and throughout nearly its whole length; and very faintly quadrangular above.
Leaves when present, sessile, narrow, and tapering to each end, that is, somewhat lanceolate in outline.	*Leaves* embracing the stem, broad at their base, and tapering upwards into a long acute point; that is ovate or cordate-ovate in shape, and acuminate-pointed.
Scars left by the fallen leaves, not very prominently marked, in consequence of the slight and comparatively narrow attachment of the leaves.	*Scars* left by the fallen leaves, very evident, opposite to each other and almost encircling the stem.
Flowers arranged in elongated loosely aggregated clusters, or cymose panicles. Flowers also larger and longer than those of true Chiretta.	*Flowers* arranged in less elongated cymose panicles, that is, more compact, and more umbellate.
A transverse section of the stem exhibits a comparatively thick woody ring on the outside; and with the centre hollow, or presenting but faint traces of pith attached to the inner surface of the ring of wood.	*A transverse section of the stem* exhibits a comparatively thin woody ring, enclosing a large continuous easily separable pith, which is yellowish in colour.

Such are the general distinctive structural and morphological characters between the spurious and true drug, which I have purposely given in as practical a form as possible in order to be readily available. Another very marked difference is afforded when we make an infusion of the two drugs. Thus, the taste of the infusion of true Chiretta is intensely bitter; and that of the spurious drug, although bitter, far less intensely so than that of the official drug. An infusion of true Chiretta has also a somewhat greenish tint, while that of the spurious drug has a distinctly yellowish-brown colour.

The question of the botanical source of the spurious drug now arises. It is well known that in the Indian bazaars several plants are known by the name of Chiretta, besides the true drug, and are used for the same puryoses as it. Thus, Royle, many years since, in his *Illustrations of the Botany of the Himalayan Mountains*, page 277, stated that *Ophelia angustifolia*, Don, is so used in Northern India, where it is called *Puharee* (hill) *Chiretta*, to distinguish it from the true or *Dukhunee* (southern) *Chiretta;* and he adds that *Exacum tetragonum* is also called *ooda* (that is, purple) *Chiretta.*

At least three other species of *Ophelia*—namely, *O. elegans*, Wight., *O. densifolia*, Grisebach, and *O. multiflora*, Dalzell; two other species of *Exacum*, as *E. bicolor*, Roxb., and *E. pedunculatum*, Linn., may be also enumerated; as well as *Slevogtia orientalis*, Grisebach, which is known as *Chota Chiretta* (small Chiretta), as being employed in India like true Chiretta.

The above-mentioned plants are all derived from the same natural order, Gentianaceæ, as that yielding the true Chiretta; but besides these, as mentioned by Royle, Waring, and other writers, another powerful Indian bitter—that is, *Creyat* or *Kariyát*, derived from *Andrographis* (*Justicia*) *paniculata*, Wall., of the natural order, Acanthaceæ, is also often confounded in Southern India with the true Chiretta.

It is somewhat surprising, considering the number of substitutes for the true Chiretta which are thus known in India, that some of them should not have found their way, accidentally or intentionally, into the English market; but no English writer of repute on the materia medica has hitherto noticed any such substitution. Even Flückiger and Hanbury, in their recently published *Pharmacographia*, say, page 393, "We have frequently examined the chiretta found in the English market, but have never met with any other than the legitimate sort." Moreover, beyond the case of false-packing described by Mr. E. A. Webb, in the *Pharmaceutical Journal*, vol. 1, third series, page 367, in which the roots of *Rubia cordifolia*, Linn. (*Munjeet*), had been enclosed in bundles of chiretta, I know of no published case of adulteration or substitution of true Chiretta in this country.

The botanical source of the present substitute of chiretta is, therefore, one of some interest and importance, and, upon examination, I believe it to be the sort of chiretta which, as stated above, is called in India *Puharee* (hill) *Chiretta*, and which is derived from *Ophelia angustifolia*, Don.; or if not from this plant, most certainly from a species of *Ophelia* very closely resembling it. Thus, it may be derived from *Ophelia pulchella*, Don. It is, therefore, closely allied to the true and official chiretta, which is obtained from *Ophelia Chirata*, Grisebach, and it possesses in some degree the bitter tonic properties of that drug. It is satisfactory to know that such is the case, and that, therefore, its use can lead to no serious consequences, but as it is very inferior in its bitter tonic properties to the genuine drug, it ought not to be substituted for it. I have, therefore, deemed it advisable to describe it at once in the *Pharmaceutical Journal*, and more especially so as there will be no Pharmaceutical meeting till February.

REMARKS ON THE JAVANESE CALISAYA AND ON CONCHININE.*

BY O. HESSE.

One remarkable circumstance connected with the results of cinchona cultivation in Java is that the *Cinchona Calisaya* grown there for many years, produces an important quantity of conchinine which is even relatively more considerable than in *Cinchona Pitayensis* and other cinchonas. It differs therein especially from the indigenous *Cinchona Calisaya* of Peru and Bolivia, the bark of which contains chiefly quinine, which is generally wanting in the Javanese Calisaya. If this difference be considered, together with the fact that a transformation of quinine into conchinine, or the reverse, does not occur either in nature or in the separation of these alkaloids from the barks, it may well be questioned whether this Javanese Calisaya be the *Cinchona Calisaya* of Weddell, or possibly, a distinct species.

I believe that I shall not be in error if I express the latter opinion. So far as can be judged, this species is not new—originating possibly in cultivation—but existed in South America prior to the transplantion of cinchonas from thence to Java. Evidently it was on that occasion taken for the true Calisaya. Hence it would obviously follow that the botanical characters of both species are either so alike or nearly alike, that the one species might be taken for the other. The only important distinction therefore was to be sought in the quality of their constituents.

This Cinchona is not to be confounded with that introduced into Java, through Ledger. That species yields a bark which in relation to its chemical constituents corresponds with the true Calisaya bark, and at the present time even exceeding it in the amount of quinine it contains. J. E. Howard named this Cinchona, under the first impression of these favourable results, *Cinchona Ledgeriana*. He considered it to be a variety of Weddell's *Calisaya*. Upon further consideration of the matter, however, it may yet turn out that the plant is no other than the true Calisaya, and that the large amount of quinine it contains may be the result of the great care with which the development of the Cinchona is at the present time observed and followed up in Java. At the commencement of the present year (1874), there were in Java 72,000 plants of this latter species. Among this large number of plants, some have become remarkable by the diversity of their botanical characters, as well as the quality of their alkaloids; whether this be a differentiation, which would indicate that the so-called *Ledgeriana* is a hybrid, or whether there is here a species invariable in its characters, has not yet been determined.

The amount of conchinine must be looked upon as characteristic of the original Javanese Calisaya. De Vrij, in 1859, separated this alkaloid for the first time from that Cinchona, and pointed out that what had hitherto been looked upon as a decomposition product of quinine was no doubt yielded ready formed by Nature. But the evidence was unsatisfactory, because at that time De Vrij knew too little of the properties of the more abundant alkaloids, and thus a confusion with some other alkaloid, possibly with cinchonidine or cinchonine, was not impossible.

This latter circumstance led me in a former communication upon the quinine alkaloids,† to make reference to that in the 'Jahresbericht f. Chemie' (1869), p. 940.

Upon this De Vrij gave me a specimen of the bark in question, from Tjibodas, that I might by an examination of the same satisfy myself of the correctness of his earlier observations. This investigation, carried out by a trustworthy method, gave with 100 parts of air-dried bark:—

		De Vrij found.*
Conchinine	3·18	0·50
Cinchonine	0·16	0·15
Amorphous Bases	0·77	3·60†
Quinine and Cinchonidine	0·00	
New Alkaloid	0·00	0·06
	4·11	4·31

The conchinine may be here regarded as a product of the oxidation of cinchonine. Though the chemical and physical behaviour of both alkaloids almost throughout suggest the near relations which exist between them, nevertheless the conversion of the one of these alkaloids into the other artificially has not yet been attained.

Recently Zorn has investigated conchinine in this direction.‡ This chemist obtained thereby a compound, which was represented to be constituted according to the formula, $C_{20}H_{23}N_2OCl, 2HCl$, and to have been formed by the substitution in the complex-atomic group of HO by Cl. Zorn considered it might be assumed that in this respect conchinine behaved in a manner analogous to cinchonine, cinchonidine and quinine. Unfortunately Zorn has neglected to ascertain what atom-group is capable of passing from the new salt into other combinations, and whether the water, which is represented in the formula given, actually exists. It appears to me that these new substances derived from cinchonine, cinchonidine, and quinine, are addition-products; so that Zorn's chlorcinchonid $= C_{20}H_{25}ClN_2O$, would be equal to hydrochlorcinchonin; presuming that it is not to be referred to cinchonicine. So far, however, as relates to conchinine the reaction takes place in a manner essentially different from the last-mentioned case. If sulphate of conchinine be treated with hydrochloric acid, according to the directions of Zorn, hydrochloric acid takes the place of the sulphuric acid, and we obtain a conchinine salt—namely, the bihydrochlorate. This salt forms fine colourless prisms, which by crystallization from moderately concentrated warm hydrochloric acid, may easily be obtained free from the least trace of adhering sulphuric acid. The crystals dissolve easily in alcohol, less so in water, hydrochloric acid, and chloroform. Their fluorescent aqueous solution gives, upon the addition of chlorine water and excess of ammonia, the well-known green colour. At from 100° to 120° C. this salt loses from 8 to 9 per cent., consisting of the water of crystallization and hydrochloric acid. The dried residue, dissolved in water, still has an acid reaction.

0·211 gram of air-dried substance, after being dried in

* *Annalen der Chemie*, vol. clxxiv.

† *Annalen der Chemie*, vol. cxxvi., p. 234.

* 'De Kinakultur op Java, op het einde van het jaar,' 1859 (Batavia, 1860), pp. 79, 94.

† These figures are the difference of 431 – (0·50 + 0·15 + 0·06). De Vrij does not state what he considered this quantity of alkaloid to be; but to judge from his communication to the *Pharmaceutical Journal* in the year 1864 (vol. iv., pp. 15, 50), it should be designated quinine, although no quinine is present.

‡ *Journ. f. prakt. Chemie* [2], vol. viii., p. 279.

the exsiccator (whereby no loss was occasioned), and being heated to 100° C., and afterwards to 120° C., until the weight remained constant, lost 0·0185, equal to 8·76 per cent. The residue was then dissolved in water, and the yet remaining hydrochloric acid precipitated with nitrate of silver, yielding 0·115 AgCl = 13·48 per cent. Cl. Then, since 0·2642 air-dried substance, precipitated with silver salt, yielded 0·188 AgCl = 17·59 per cent. Cl; there would be in the above case a loss of 17·59 per cent. less 13·48 per cent., or equal to 4·11 per cent. of Cl, or 4·23 per cent. of HCl. This gives for the water of crystallization 8·76 − 4·23 = 4·53 per cent.

The composition of our compound, therefore, answers to the formula $C_{20}H_{24}N_2O_2$, $2HCl + H_2O$—

	Required.	Found. Zorn.	Found. Hesse.
2Cl	17·11	17·02	17·59
H_2O	4·34	——	4·53

As a further characteristic of this substance, I may mention that the alkaloid, precipitated by ammonia, contained no chlorine after it had been crystallized from dilute alcohol. According to Zorn, it contains chlorine, but that chemist had omitted to purify his alkaloid by re-crystallization. This explains, probably, the difference in our results.

Zorn applies to the alkaloid he experimented with the name of quinidine. But as different alkaloids are understood under the name quinidine, I should not have ventured to substitute conchinine for that name had I not known that he employed sulphate of conchinine in the experiment referred to. This salt is very seldom met with in commerce at the present time; owing to the fact that the barks used in quinine manufacture—except the pitayo barks, which are becoming more and more scarce—contain an extremely small quantity, often mere traces of conchinine, so that the preparation of conchinine sulphate incidental to the manufacture of quinine sulphate has been almost entirely done away with. Notwithstanding this, a large quantity of "sulphate of quinidine" comes into the market; because it happens that in England, as well as in France and Germany, the barks now being used for manufacturing purposes are very rich in alkaloids which readily crystallize from ether, and from this portion of the alkaloid a sulphate is prepared, which in conformity to its origin is called "quinidine." But this "quinidine" consists in the main of cinchonidine, and only quite exceptionally contains conchinine. I mention this here, because many persons yet believe that the "sulphate of quinidine" of commerce is identical with sulphate of conchinine.

SOME PREPARATIONS OF ERYTHROXYLON COCA.

BY E. B. SHUTTLEWORTH.

Some time ago a sample of coca leaves, weighing several pounds, was forwarded to the writer, and was accompanied by a request that experiments should be made with a view of determining the most eligible form in which the drug might be administered. As the coca plant is coming more frequently into notice, and as its powerful remedial properties favour the idea that, sooner or later, it will be introduced into the materia medica, he has thought it advisable to offer a record of the result of these experiments, together with that of others made for the purpose of ascertaining the best formulæ for possible preparations of the drug.

In devising formulæ of this kind it is essentially necessary that the nature and properties of the active principle or principles of the drug operated upon be well understood. The literature of coca does not, however, afford information of as precise and thorough a character as might be desired, but, for practical purposes, it may, perhaps, be deemed sufficiently definite. Niemann* made a proximate analysis of the plant, and gives, as its constituents, a crystallizable basic substance (cocaina), a volatile, odoriferous substance, a peculiar tannin (cocatannic acid), and a waxy body termed coca-wax. Stanislas Martin† found a peculiar bitter principle, extractive, chlorophyll, a substance analogous to theine, and salts of lime. Maisch‡ was led to think that the leaves contained a volatile alkaloid. This supposition was subsequently confirmed by Lossen,§ who isolated this principle, and, at the suggestion of Woehler, who was associated with him in these investigations, named the new alkaloid *hygrina*. Lossen also found that cocaina, when heated with muriatic acid, was decomposed, benzoic acid and a new base, *ecgonia*, being produced. This fact operates against attempts to extract cocaina with acid liquors, and its importance was recognized by Lossen, who recommended the abandonment of Niemann's plan, in which acidulated alcohol was employed, and the substitution of infusion with simple water.

Thus far, then, we have as important and tolerably well established constituents of the leaves, cocaina, hygrina, cocatannic acid, coca-wax, and a volatile oil, to which the odour of the plant is due; of these, the first-named alkaloid is undoubtedly that to which attention should be principally directed in any attempt to make a preparation representing the active medicinal properties of the plant.

The characteristics and properties of the alkaloid may be concisely given as stated by Watts:‖ "Cocaina crystallizes in small, colourless, inodorous poisons; it has a slightly bitter taste, and produces temporary insensibility of the part of the tongue with which it comes in contact. It is soluble in 704 parts of water at 12° C. (53·6° F.), more soluble in alcohol, and still more so in ether. It melts at 98° C. (208·4° F.), and solidifies to a transparent mass, which gradually becomes white and crystalline. At a higher temperature a very small portion appears to volatilize undecomposed, but the greater portion is decomposed, yielding ammoniacal products. Cocaina dissolves without colour in strong nitric, hydrochloric, and sulphuric acid; the last solution becoming black when heated. It is strongly alkaline, dissolves in dilute acids, and neutralizes them completely." In most of its reactions cocaina resembles atropia, but that with carbonate of ammonia is different, and the melting points of the two alkaloids are not coincident. The formula assigned to it is $C_{16}H_{19}NO_4$.

Hygrina, the other alkaloidal constituent of coca assumes, at ordinary temperatures, the form of a thick oil of yellowish colour. It possesses a strong alkaline reaction, a burning taste, and an odour of trimethylamine. It combines with hydrochloric acid, forming a deliquescent salt. It is to some extent soluble in water, and dissolves readily in alcohol and ether. It does not appear to be poisonous.

Those points which bear directly on the subject of this paper, and which are embodied in the above particulars, are that coca contains two active principles on which its medicinal virtues depend; that one of these is mutable in the presence of acids, the other volatile, and, therefore, liable to be dissipated by heat; and that both are soluble in water and alcohol. We are not, however, informed in regard to the peculiar state of combination in which these alkaloids exist in the plant. That they are combined with some acid appears probable from the fact that the addition of a little lime, or other alkali, develops to a much greater extent the characteristic taste, and also the activity of the drug. This has been recognized for ages by the millions of persons addicted to the use of coca. Von Tchudi, Poppig,

* *Arch. Pharm.* ciii., p. 120 and 291, *Chem. News*, July 1860.
† *Jour. de Pharm.* 1859, p. 283.
‡ *Am. Journ. Pharm.* ix., p. 496.
§ *Ann. Chem. Pharm.* cxxi., p. 374.
‖ *Dictionary of Chemistry*, i., p. 1059.

Herndon, Weddell, and other travellers, affirm that in preparing the leaves for chewing, the addition of lime, *llipta*, the ashes of plants, as *Chenopodium Quinoa* or other alkaline substance, is generally made. A simple infusion is, however, often employed, and the full effects of the medicine appear to be realized from its administration. This is the oldest, and almost the only preparation of coca which has been used, and to this attention may, with propriety, be first directed.

Infusum Cocæ.—Take of coca, bruised, one ounce; boiling water, ten fluid ounces. Infuse in a covered vessel for one hour, and strain.

This preparation resembles in appearance and odour an infusion of ordinary green tea. Its taste is slightly bitter and alkaline, recalling infusion of spearmint. The benumbing sensation experienced when chewing the leaves is not so perceptible in this infusion. By applying to the dregs a slight pressure, about eight ounces of liquid may be recovered. Each ounce of the preparation will therefore be equivalent to a drachm of the leaves. The dose may be from one to two fluid ounces.*

Ext. Cocæ Aquosum.—Coca in moderately coarse (No. 40) powder; water a sufficiency. Macerate the coca with four times its weight of water for twelve hours, at a temperature not exceeding 120°F. Transfer to a percolator and exhaust with water. Evaporate by means of a water bath, to the consistence of an extract.

The extract thus prepared is of a dark brown colour, and bitter but not very characteristic taste; 100 parts of leaves yield 36 parts of extract. The dose may be from 15 to 30 grains.

Ext. Cocæ Alcoholicum.—Coca in moderately fine (No. 50) powder; alcohol, sp. gr. ·838 a sufficiency. Moisten the powder with alcohol and pack tightly in a percolator. Add alcohol, and continue the percolation until the powder is exhausted. Evaporate the percolate by means of a water-bath, at a temperature not exceeding 150°F., until the extract is of proper consistence.

This extract is much superior to that prepared by water, possessing, in the highest degree, the characteristic taste and odour of the plant; and as far as I have been able to ascertain by experiments upon myself, possessing also in full its medicinal properties. It is of a green colour, resembling extract of Indian hemp, and is apparently resinous in character. This characteristic is attributable to the coca-wax or other concrete oily substance with which the extract is mixed. When exposed to the air the extract does not harden, but slowly attracts moisture, becoming, in time, quite liquefied. I regard this extract as one of the best forms in which coca can be administered. It can be readily formed into pills, and is perfectly reliable. The product from 100 parts of the leaves is 15 parts of extract. The dose may be from 10 to 20 grains.

Ext. Cocæ Fluidum.—I have not had time to experiment upon this preparation, but would suggest, as a menstruum, alcohol of sp. gr. ·835 or ·838; the reservation of a portion of the percolate equivalent to three-fourths of the weight of the leaves employed; and evaporation of the remainder, at a temperature not exceeding 150° F.

Tinct. Cocæ.—A tincture containing four ounces of coca to one imperial pint of proof spirit or diluted alcohol may be prepared by percolation, but such a preparation does not appear to be advisable or necessary. The large quantity of alcohol which each dose would contain might entail therapeutical complications which it would be well to avoid. For administering the drug in a liquid form the infusion will be found as simple and reliable as any, and, by the addition of a small quantity of alcohol—say one-eighth part—it might be preserved from change for a reasonable length of time.

* A description of the therapeutical effect of coca does not properly come within the limits of this paper. But for information regarding the remedy as administered by infusion, the reader is referred to a Prize Essay on the subject, written by Dr. Mantegazza, of Milan, and of which abstracts may be found in the *Pharm. Journ. and Trans.*, 1860.

MERCURIAL POISONING FROM THE USE OF PINK AND RED VULCANITE IN ARTIFICIAL GUMS.

In the *Medical Press and Circular* for December 9, Dr. W. Bathurst Woodman records several cases where patients have shown symptoms of mercurial poisoning for which he could find no other explanation than that they were wearing artificial gums, or artificial palates coloured with vermilion. Upon inquiring carefully he found that very large quantities of this material are manufactured, and that in past years, at least, dentists of the highest respectability, and in various parts of the kingdom, as well as on the Continent, have supplied their patients with this *matériel vraiesemblant*, which is not always vulcanite. He examined specimens of various depths of tint, from varying proportions of vermilion; and of varying hardness, some of the cheaper kinds being simply blanched gutta-percha incorporated with cinnabar. The results of his examination and experiments are as follows:—

(1). All the pink and red artificial gums, palates, and materials for the same examined contained vermilion.

(2). The quantity of vermilion present was not always proportionate to the depth of tint. Some of the most beautiful and natural specimens contained the pigment rather in a state of very fine division than in any great quantity.

(3). As the temperature of the mouth seldom exceeds 37° or 38° centigrade, and saliva is a very dilute solution of the saline substances it contains, the possibility of the warmth of the mouth, and the action of the saliva, or of articles of food, producing volatilization or solution of the pigment has been questioned. Dr. Woodman believes, however, that poisoning occurs in both ways, and possibly by a third method—viz., by conveyance to the stomach, along with the food ingested, of minute particles worn off in the process of mastication. As regards the first method, or volatilization, he satisfied himself by delicate methods of analysis that nearly all the mercurial compounds are somewhat volatile at lower temperatures than 98° or 100° Fahr.

He also remarks that lead, arsenic, and numerous other bodies, in forms not usually deemed volatile, are so in a slight degree, as proved by continuous observation at ordinary temperatures, a fact well known to chemists. But he has found that the prepared rubber, or tinted vulcanite, *slowly gives up its mercury* (which is only mechanically mixed with it), both to saliva and to an artificial solution made to imitate it with common salt, sulpho-cyanide of potassium, etc., at 60° Fahr., and more quickly if the solution be kept at 100° Fahr., and the metal can be easily detected by electrolysis, as well as by other tests. This solution may be hastened by agitation. Solutions of several of the haloïd salts have similar solvent properties.

(4) In answer to the possible objection that although this solution goes on slowly, yet the constant washing of the artificial gum or palate would really prevent the occurrence of mischief in the human body. Dr. Woodman narrates three or four out of about a dozen cases observed by him from the year 1862 up to the year 1873, in which once rid of the corpus delicti, the red gum, not of Australia nor of the nursery, but of the dentists, the patients rapidly recovered. "*Tollitur effectus, sublatâ causâ.*"

(5) The saliva and urine in some of these cases contained minute but unmistakable traces of mercury, every possible precaution being taken to avoid known and probable sources of fallacy.

After describing the cases, Dr. Woodman says, "I think few candid persons will doubt that in some cases, perhaps more numerous than we now think, severe effects follow the continued use of artificial gums, palates, and teeth-plates coloured with mercurial pigment. The amalgams used by some dentists may produce similar symptoms. The question is one which I think well deserves the attention of scientific dentists and chemists. I write on it as a practical physician; and as my cases extend over nearly twelve years, I do not think I have displayed undue haste in doing so. There is some danger now of arsenical, lead, and chromium pigments being substituted, and toxic symptoms, due to these metals rather than to mercury, may possibly have been noticed in some cases. A dental student told me that herpes labialis is unusually common in those who wear false teeth; but this may possibly be due to mechanical irritation only. Well-fitting teeth are otherwise so desirable that it would be well to devise and employ some pigment of a natural colour which should be free from the objections attaching to all the metals I have named.

DR. CLELAND ON THE RELATIONS OF SCIENCE TO PHILOSOPHY.*

The following is a portion of an introductory lecture delivered by Professor Cleland to the students attending the classes of Anatomy and Physiology in the Queen's College, Galway, at the opening of the winter session:—

Gentlemen,—In welcoming my pupils to their studies at the commencement of a new session, I own that I feel more impressed every year with the gravity of the circumstances in which they are placed. I shall not occupy your time with moral reflections on that subject, but shall content myself with observing that, even surveying your position with the utmost seriousness, it is impossible for you to appreciate at present the consequences to yourselves in after life of the manner in which you dispose of your time in your four years of study, as you will appreciate it when the time is past, and you begin to reap the results of a well- or ill-spent college career. Four years is but a short time to learn all that you ought to know before entering on the practice of your profession, and all that you will wish that you had learned when in after life you look back on your student days. Remember that what constitutes learning in a practitioner of a scientific art is the intimacy of his acquaintance with the sciences on which his art is based. To be worthy, then, of holding a high position, you must give all your energies during your student days to your scientific studies. I should be sorry indeed that your literary education should be neglected. I think it a sad mistake for any student to be hurried into medical classes without a general acquaintance with languages, mathematics, and physics; but the time for literary studies in your case is in the first place, and principally, before you begin your medical studies, and afterwards as much as you like when your medical curriculum is completed. They may even be advantageously attended to in holiday time; but devotion of time and study to literature during the sessions which ought to be given up entirely to your professional education is always injurious. Those of you who are commencing their medical studies are about to engage probably for the first time in scientific pursuits; and these differ widely from your studies hitherto, both in their matter and their methods. It is no longer principally memory on which you are to rely, but observation. You will find in science that it is little matter what this or that authority has said, or what the words in which he has spoken—Nature is to be your authority. You must observe for yourselves in every instance in which you have the opportunity; and, both in your own observations and in judging the statements of others, you have to learn by great care and practice to distinguish accurately the phenomena observed from the translation given to them—an art which perhaps to you at the outset may appear easy, but which I have learned to believe is never perfectly mastered.

And now I wish to say a few words about the relations of the sciences to philosophy, and to your future career.

Life is a voyage on which we enter without any will of our own, and in which we gradually wake to find ourselves on a stream not of our own selecting; with scenes around us, not of our own choice, carried by currents not of our own creating, but through which we have a certain limited power of steering, sufficient, at least, to enable us to profit by many lessons of experience, and avoid numerous dangers. This is that voyage of life in which men continually awake to ask the questions, whence have we come? and whither are we bound?—questions of the most gigantic and important description of any which directly interest humanity. It may naturally occur to you to ask what are the relations of science to those questions; and I do not think that I shall be travelling out of my proper domain to devote some part of an introductory lecture to put that matter justly before you. Science, if we consider the word merely from an etymological point of view, may be considered to include all methodized search after truth of whatever description; and it appears to me that this circumstance has often misled some of its more noisy and less judicious votaries and on-hangers into arrogating for that which is in the present day called science, a title to deference in domains beyond its sway. It ought not to be forgotten that the term science, as the word is now used, includes only those branches of research in which the data are matters of observation. And I may remark further, that every science consists of two stages of different dignity—viz., the collection of data, and the formation of laws and doctrines therefrom. Thus, in philology the data consist of observations on languages and dialects, whence laws are evolved as to the changes to which words are subject, and doctrines as to the affinities of different tongues. In chemistry observations are made on the percentage composition of bodies, the proportions in which they combine with others, their crystallisation, and so forth; and conclusions, often of a most deeply theoretical description, are arrived at with regard to their constitution and the laws which regulate chemical combination. In physiology the component parts of living bodies are observed in action, the variation of their structure in different circumstances, and the chemical composition both of the parts themselves and their products are investigated, also the effects of external agents on them, and the influence on the body of removal of portions; and from the collection of such inquiries is built up all our information of the use of organs and of the laws of life as exhibited in the individual. Anatomy consists largely of an observational part which is of most importance to medical students. But in this science also there is a higher department; and he who looks on the mere gathering of material for the use of the physiologist, the surgeon, and the physician, as including the whole scope of the study, has but a very meagre and imperfect knowledge of that science whose business it is to investigate the laws of organization—a science which, more than any other inquiry in the domain of nature, affords evidence of a mighty intelligence as Creator. I allude to that department of anatomy specially designated as morphology or philosophic anatomy; and this brings me to my next remark. For in philosophic anatomy we touch nearly on that department of knowledge which in modern nomenclature is distinguished from science under the name of philosophy. Philosophy is something very different from science in the restricted modern sense. It is a word which has always been used to designate the methodical search after the highest truths which interest humanity. Before the sciences had a distinct existence, philosophy contained the germs of them in its bosom. It has been not inaptly described as the science of the sciences, inasmuch as the generalization and conclusions of the individual sciences furnish data on which it founds. It is not a structure built directly on observation of individual phenomena; such observation is not the instrument by which philosophy in the restricted sense is advanced. The object of philosophy is to penetrate to the unseen; to discover, as far as may be possible, the sources of all things, both of being and of good and evil; and this end is sought by processes of further generalization than those attempted by the various

* Reprinted from the *Medical Times and Gazette*, Dec. 5.

sciences. All the sciences are useful for philosophic purposes; none of them to be despised; and I grant it is sufficiently plain that it is a most unsafe thing for any man to speculate on the nature of matter who has taken no trouble to inform himself as to what is known of the phenomena of the thing about which he talks. But it is not only the external world which has to be taken into consideration by the philosopher; the media through which the mind has cognizance of an external world, and the nature of that mind which takes cognizance must also be made the subject of investigation. Therefore, psychology takes its place as one of the most important bases from which the philosophic structure must spring; and you will perceive that no man has a right to put himself forward as an authority on questions of philosophy, on the mere strength of having spent his life in physical science. In the first place, physical science does not afford the whole material on which a philosophy can be founded; and in the second, a man who is an acute observer of the phenomena which he can appreciate by the aid of his senses may do most important work in the physical sciences, although he may be deficient in the logical power required for the higher generalizations—not to mention that he may be defective in those elements of judgment which are necessary for common sense. Take the question of the origin of man, or his position in the world. The studies of the biologist enable him to speak of man's zoological relations; and, indeed, none but biologists are in a position to express an opinion on that subject. The biologist, however, is right when he states that for any other than mere zoological relations he has no instrument at his disposal in his particular department of knowledge; and he is wrong, egregiously and culpably wrong, if, on that account, he pawns upon a credulous public a statement or even insinuation as based on the sure methods of science, that man has none but zoological relations, or that any other are to be ignored as beyond the power of investigation.

I have spoken of philosophy only as it is founded on science. You will probably many of you ask in your hearts, if I put Christianity or revelation overboard. To that I answer, certainly not. Christianity deals also with the highest questions which interest humanity; but in a totally different way. And, indeed, therein is its advantage; for philosophy is for the few, the very few, and Christianity for all. Philosophy and religion do not clash, but they are independent one of the other. I do not enter into religious matters in detail, because it is not my province, and because the principle on which these colleges are founded is, that religion shall be respected, and the tenets of no man interfered with, but that, inasmuch as all sections of the community are not of one way of thinking, whatever pertains to religion shall be left entirely for the various clergy to supply to their own adherents. Of this, however, we may be certain, that truth is one and harmonious in its parts. Parts far asunder and separate one from the other may, indeed, sometimes appear irreconcilable, till the gap which separates them is filled; but they shall surely be seen to agree in the long run. Therefore we can never do wrong, with due reverence and complete self-forgetfulness, unblenchingly to face and inquire into any aspect of truth which is presented to us.

I have said that the physical sciences are insufficient to serve unaided as a foundation for a philosophy, and there are some branches of philosophy—as, for example, ethics—to which they stand in little, if any, immediate relation; but there is one question on which they have an indubitable bearing—namely, as to whether the universe is to be traced into an intelligent source. One hears a good deal of talk about the materialistic tendencies of the age, and of physical science, and also of medical studies (which an ungrateful public has always been suspicious of); and I am not going to deny that there is foundation for talk of that kind; but I take leave to make just two statements on that subject. In the first place, if you will keep living physicists out of consideration, as it might be an invidious task to settle their claim to niches in the temple of fame, I think you will find that scepticism as to the intelligent source of the universe has not been fostered by the intellects of the highest order. Very sure I am that you will easily call to mind scientific authorities of the very highest type—men who were not mere observers of phenomena, but of the profoundest and clearest judgment that the world has seen—of whom that remark is true; and this I say, not because I would have you allow that or any other important doctrine to rest on the dictum of scientific men, however great, but because I would have you notice that the highest mountains rise above the mists, although perhaps they may sometimes be particularly cold; and because I frankly admit that there is quite sufficient shallow materialism abroad to tempt the young student to imagine that anything else is contrary to what is grandiloquently called "the precise methods of modern investigation." By all means be precise; but commence by pinning physical methods precisely to their proper place. In the second place, I have no hesitation in stating, as I have hinted already, that the study of anatomy, especially comparative anatomy, affords the most incontestable proofs of the existence of Deity, and that to espouse a contrary belief is to occupy a position from which it is impossible to appreciate morphology. If I find in a series of animal forms, arranged according to their places in an ascending scale, that the structures exhibit the evolution of a harmonious plan to which adaptation to external circumstances plays a mere subordinate part, then I must at once acknowledge an intelligent source—and that is just what I venture to say that no unprejudiced student of comparative anatomy can fail to see. Even in mere human anatomy what we call serial homology points to the same thing. Those of you who have studied the skeleton are familiar with the correspondences of one segment with another, and more particularly with the accurate correspondence of the bones of the hand and the foot; and you will judge rightly that nothing but a purely morphological unity of design will account for the detailed correspondences in two structures placed in the same organism and fitted for widely different purposes.

The propositions which I have ventured to lay down, you will perceive, are principally two; first, that the physical sciences do not afford sufficient material by themselves for the just consideration of the source of being, nor are its votaries necessarily accustomed to the methods which should be employed in contemplating that question; and secondly, that the material which is furnished by the physical sciences and more particularly by the study of organisation, affords important evidence of the existence of an intelligent source. That second proposition I have laid before you merely as an assertion, but my object is simply to direct your attention to the subject, that, as you progress in your anatomical studies, you may judge for yourselves if the assertion is true.

IS LICORICE JUICE FERMENTABLE?*

There exists in the root of licorice and some other plants a sugar-like substance which comes into commerce as an extract, or inspissated juice. The active principle of this is a yellowish-white powder with a pleasant bitter, sweet taste, and is called *glycyrrhizin*. Although it has been popularly supposed that this juice was not infrequently used by brewers, this supposition was met by scientific men with the assertion that this substance was not capable of undergoing fermentation, and hence could be of no use to the brewer. Dr. Griessmayer has instituted some experiments, and his results seem to contradict the latter assertion. On dissolving glycyrrhizin in cold water, in which it is not very soluble, a yellow solution is obtained, which has a brown colour by reflected light, and possesses a peculiar odour like that of smoking tobacco.

* *Journal of Applied Chemistry.*

On heating the solution a fine yellow foam rises, which soon subsides on boiling. The vapours given off have a pleasant aromatic odour.

Glycyrrhizin is a glucoside, a body which, on warming with a dilute acid, splits up into glycyrretin and sugar. If, then, any free acid, like phosphoric or succinic, were present in the root, it would serve to produce this change during the mashing, or on boiling the hops. But even boiling alone seems to effect this change; for after a solution has been boiled for some time without anything being added, it is capable of reducing the alkaline copper solution. A cold saturated solution of course will not do this, not even on heating it with the tartrate of copper, and hence the error arose of supposing that glycyrrhizin would not reduce the copper solution at the boiling point. The cause of this difference of behaviour is evidently due to the alkalinity of the copper solution, which prevents the glucoside from splitting up.

In order to decide the question whether the sugar liberated by previous boiling was really capable of undergoing fermentation, 400 c.c. of a solution of licorice was first boiled, then cooled to the temperature of the room, 87°F., and 0·5 gram of yeast added. In about six hours the evolution of carbonic acid was observed, and in three days the fermentation was over. The presence of alcohol was proven both by distillation and by Liebig's test. Toward the end of the fermentation a very offensive odour was given off, and this of course went over to the distillate. The fermented liquor contained no bacteria or vibriones, but perfectly healthy *saccharomyces cerevisiæ*. It is natural to suppose that the vile taste and smell of certain beers arise from the addition of licorice.

THE ACTION OF SOLIDS AND OF FRICTION IN LIBERATING GAS FROM SOLUTION.*

BY CHARLES TOMLINSON, F.R.S.

In the *Philosophical Magazine* for April, 1873, I stated that chemically clean solid bodies, in their behaviour towards gaseous solutions, admit of being arranged into four classes or groups. The first group includes glass, and all vitrified and siliceous surfaces, and the denser metals, including mercury. The gaseous solution, whether supersaturated or not, adheres to the chemically clean surfaces of these bodies in the most perfect manner, so that there is no separation of gas.

The second group includes oils, both fixed and volatile; fatty bodies, whether acid or neutral, various kinds of wax, resin and gum-resin, camphor, spermaceti, and similar bodies, not soluble in water. The surfaces of such bodies, though chemically clean, liberate gases from their aqueous solutions; and they do so the more efficiently, in proportion as their surfaces are less liable to be wetted by the water of the solution. In other words, the gas adheres to such surfaces with greater force than the water.

When it is said that a body in Class I., not chemically clean, liberates gas from solution, it is contaminated more or less with one of the substances in Class II.

The third class consists of porous solids, which are eminently active in liberating gas from solution. This class includes woods of all kinds, hard and soft, and the charcoals made from them; also coal, coke, anthracite, jet, plumbago, roll sulphur, pumice, meerschaum, bone, ivory, chalk, lime, indigo, and the less dense metals, such as aluminium and magnesium; and lamillar metals, such as antimony; and crystalline metals, such as bismuth, which contain a good deal of occluded gas. The strong adhesion between the gases and the pores of bodies in this class may be strikingly exhibited by placing one of them in soda-water, when it becomes apparently saturated with the gas, whilst more gas seeking to precipitate itself upon the innumerable surfaces already occupied gives rise to the appearance of a stream of gas constantly ascending from the porous surface until the liquid seems to be exhausted; but the action may be renewed by reducing the pressure or raising the temperature. In the latter case, when the gas is expelled and the liquid is at or near its boiling-point, it is constituted exactly like the soda-water, which may be called an aqueous supersaturated solution of CO_2, while the other may be termed an aqueous supersaturated solution of steam.* A strip of aluminium ($1\frac{3}{4}$ inch by $\frac{3}{4}$ inch) cleaned by being rubbed between two corks in the strongest oil of vitriol, and rinsing in water, was active in disengaging gas from soda-water; and when taken out and put into water, over a spirit-lamp, it liberated such copious streams of vapour, when the water boiled, as to be supported vertically on one of its long edges, while innumerable bubbles issued from both sides, and continued to do so for about a minute after the lamp had been removed. When taken out and cooled in cold water and again transferred to soda-water, it was as active as before in occluding and liberating gas.

The fourth class of bodies are those which are soluble in water, and act by lessening the adhesion between the gas and the water, as when powdered white sugar is put into a glass of sparkling Moselle wine. A piece of gamboge in soda-water is also a good example of this class, while bodies so little soluble as phosphorus and iodine belong to it.

The results obtained with all four classes of solids in their action on soda-water may, with proper precautions, be obtained with aqueous solutions of ammonia, of hydrochloric acid, of chlorine, and of nitrous oxide, and also with liquids at or near their boiling-points.

Next, as to the effect of friction. It has long been known to chemists that certain saline solutions, which show no disposition to deposit crystals, may be started into crystalline action by rubbing the inside of the vessel below the level of the solution with a glass rod. This effect is produced, although every part of the arrangement be chemically clean; and it has not, so far as I know, been explained. It is the same with a gaseous or vaporous solution. Soda-water, in a chemically clean test-glass, in which not a bubble of gas is visible, will display a line of bubbles along the path described with friction by a clean glass, metal, or other rod, against the inside of the glass below the level of the liquid. So also, if a glass rod be rubbed against the side of a vessel containing a liquid (such as spirits of wine, or a saline solution such as one of common salt) at or near the boiling-point after the source of heat has been removed, bubbles of vapour may be liberated so abundantly that the liquid may be made not only to boil, but to boil over.

A gentle rubbing sometimes fails to convert a friction line into a bubble line, whereas harder rubbing and a quicker motion produce the effect. And in general hard bodies are more efficacious in producing the result than soft ones. It is not necessary that the friction produce an actual scratching of the surface; nor does the track of a bubble line remain more sensitive than other parts in liberating gas after the first display is over. The more highly supersaturated or superheated the solution the more sensitive the surface appears to be, and the smaller the amount of friction required. Beer gently warmed produces foam by rubbing the side of the vessel. Or if, instead of rubbing the side of the vessel, two solids such as copper and steel be introduced into the liquid and rubbed against each other, bubbles are produced.

An explanation of these interesting facts, offered by Professor Schrötter (*loc. cit.*), is to the effect that the friction immediately produces a change of mechanical action into latent heat or work.

* From the *Philosophical Magazine and Journal of Science* for November.

* This definition is given in a paper read before the Royal Society, January 21, 1869 ('Proc. Roy. Soc.' vol. xvii., p. 240), "On the Action of Solid Nuclei in liberating Vapour from Boiling Liquids." I may state that Professor Schrötter (Pogg. *Ann.* vol. cxxxvii.) accepts this definition.

Some of my scientific friends to whom I have showed these effects, endeavour to explain them by supposing that the friction produces heat, or electricity, or some molecular change on the surface of the vessel.

My explanation is derived from a more vulgar source. From the shelter of an archway during a heavy fall of rain I have watched the extemporized puddles before me, and admired the large bubbles of air which frequently follow those drops which plunge into the miniature lake with something like decision of character. Old Mariotte was interested in the same phenomenon. He says, "Each drop of rain, in falling from the height of the cloud, drags with it two or three times as much air as its own size, as may be shown by letting a little ball of lead fall into a bucket of water; for as soon as it touches the bottom two or three bubbles of air rise, each as large as itself, which can only proceed from air which follows it to the bottom of the vessel." He then refers to the *trompe*, in which air is dragged down by water*.

Mariotte's experiment, differently arranged, forms a good illustration for a class. Over a tall glass cylinder of water is suspended a funnel with its beak from 20 to 25 inches above the axis of the water-jar. A shot put into the funnel will thus be delivered neatly and properly to the water, and as soon as it strikes the bottom a number of bubbles of air are liberated, some say twenty times (Mr. Rodwell informs me thirteen times) the volume of the shot†. The old idea (still retained in some modern books) was that the air thus liberated was air adhering to the shot; to disprove which I oiled some shot and dropped them in, with the same result.

The more rational explanation is that the shot, in plunging into the water, displaces a quantity of that fluid in the form of a well or cylindrical shaft, to which the shot forms the lower boundary, and into which air, as the more mobile body, rushes before the water has time to close over it; and as the shot is still pursuing its journey, it makes a path which the cylinder of air continues to follow until both are arrested at the bottom of the vessel, where they are disposed of according to their respective densities and that of the surrounding medium.

Now to apply this to the liberation of gas from soda-water, etc., by the friction of a hard body against the side of the vessel. The glass rod or the steel knitting-needle, on being pressed against the side of the glass, displaces a certain small quantity of the liquid, and on moving the solid, with friction, against the side successive quantities of liquid are thus displaced. A certain time, however short, must elapse before the water can fairly close in upon the moving points of the line thus traced; but however quick the water may be in filling up the void, the gas is quicker, and hence a friction line becomes a line of bubbles.

The same explanation applies to other gaseous solutions, to solutions of vapour, such as spirits of wine at or near its boiling-point, and also to certain saline solutions. The gas, or the vapour, or the salt, fills up the spaces in the friction line more quickly than the liquid part of the solution can do; and thus we have a line of gas, or of vapour-bubbles, or a line of minute crystals.

Highgate, N., October, 1874.

* *Œuvres*, 1717, vol. ii., p. 353.

† See Magnus, Pogg. *Ann.* vol. xcv.

ANALYSTS AND THE ADULTERATION ACT.

At the recent general meeting of the Newcastle-upon-Tyne Chemical Society, an introductory Address was delivered by the President, Mr. John Pattinson, in which, after recounting the work done by the Society during the previous session, he referred to the position of chemists in relation to the Adulteration Act, in the following terms:—

"The working of the Adulteration of Food Act of 1872 has for some time past attracted considerable public attention, and there can be no doubt that great injury and injustice has been done to many honest traders by the way in which its provisions have been carried out. This injury to the tradesman has also, I regret to say, been in too many instances the result of incompetency on the part of the analyst, and sometimes even due to a want of judgment, and of what may be termed commercial common sense. Respectable tradesmen have had to submit to the disgrace of being convicted and fined for selling for mustard what every purchaser knows as mustard, viz., a mixture of flour and ground mustard seed; for selling, under what is merely a trade name—effervescing citrate of magnesia—a substance which was well known did not contain citrate of magnesia, and the purchaser of which would have complained bitterly if it *had* contained any; for selling tea containing a few grains of probably accidentally adhering sand, or coloured on the surface with an infinitesimal amount of harmless colouring matter, placed there to please the eye of the customer, but with no intention of fraud. Surely the analysts and authorities instigating these proceedings believe there is something in a name, and are determined to enforce the exact use of language in a way which it is difficult to resist. Then, again, the conflicting evidence given by analysts in many cases, and the too high standards of purity by which the articles of consumption were frequently judged, showed that the necessary amount of knowledge to do their work properly was wanting in some of the persons who had received appointments under the Act. Our secretary, Professor Marreco, drew attention to this subject at one of our last year's meetings, and strongly urged that in the interest alike of the buyer, the seller, and the profession, the appointment of public analyst should only be given to those persons who hold a certificate from some recognised and competent body of examiners, giving some guarantee that the holder thereof possesses the requisite medical, chemical, and microscopical knowledge. Since then a Select Committee of the House of Commons have inquired into the operation of the Act, and in their report they make the same suggestion, and further suggest, what does not meet with such general approval, that the examining body be the authorities at the School of Chemistry at South Kensington. After all, the number of mistakes made by the analysts is fewer than might have been expected when all the circumstances are taken into consideration. When the Act was first passed, but very little attention had been given to this branch of analytical chemistry, and the methods of analysis of many substances were very crude and uncertain. The limits of variation in the composition of pure articles of consumption were in many cases unknown. It is worthy of remark that the evidence taken by the Select Committee of the House of Commons shows that the greatest diversity of opinion prevailed even amongst those chemists who stand highest as food analysts. Dr. Voelcker and Dr. Tidy's standards for pure milk were very different from that of Mr. Wanklyn; and Dr. Voelcker and Mr. Wanklyn asserted, very positively, that the presence of foreign fat in butter could not be detected, whilst Dr. Hassall stated as positively that it could. Until our knowledge of this branch of chemical analysis is considerably increased, we are therefore likely to have cases in which differences of opinion exist, and doubtless occasionally different results of analysis obtained. The Select Committee, in pointing out that in some cases magistrates have declined to allow any other analysis to be taken as evidence than that of the analyst appointed to act for the district, very properly say they think that evidence from well-established analysts should be allowed to be produced for the defence, and suggest that, when cases of dispute arise between the chemical authorities, there should be some court of appeal to settle the disputed points. They also suggest, in the absence of further information as to any better appeal, that where the analysis of the chemist of the local authority is challenged, the sample in dispute shall be analysed at the laboratory at Somerset House, and the decision arrived at there be regarded as final. At an important meeting of public analysts held in London in August last, to take the report of the Select Committee into consideration, this proposed appeal to the Somerset House laboratory was most strongly objected to, and a resolution was passed to the effect that no referee's decision in a disputed case should be accepted as final unless it be given on oath and tested by cross-examination. The meeting further objected to the suggestion that public analysts should be called upon to pass an examination at the College of Chemistry at South Kensington, or elsewhere, on the ground that such examination would lead to the exclusion of chemists of experience, and to the appointments falling into the hands of young and inexperienced men. There is the further objection that undue preference would thus be given to one teaching institution to the detriment of others equally efficient. Perhaps the best and most practicable suggestion was that first made, I believe, by Mr. Allen, of Sheffield, that in order to secure a board of referees in which the analysts and the public would have confidence, it should be elected by the analysts themselves. They are best able to know the fitness of the men to occupy this position, and they would take care to select men of undisputed standing and of known special experience. The editor of the *Chemical News*, I believe, was the first to make the excellent suggestion that the board of examiners, to decide the fitness of candidates for the office of public analysts, should also be appointed by the public analysts themselves. A board of referees and examiners elected in this manner would secure the confidence of food analysts and the public generally, and it would be free from the objection of unfair preference for one teaching institution to the disadvantage of others.

"From the evidence taken before the Select Committee there is no doubt that on the whole the effect of the Act has been productive of good. A considerable check has been given to the adulteration of many articles of consumption, such as milk, tea, bread, flour, etc., and a wholesome deterrent influence has been exercised, the extent of which cannot be measured by the number of convictions which have taken place. The public mind has been set at rest regarding the sensational stories which have gone the round of the newspapers as to butter made from Thames mud, milk made from sheep's brains, iron filings in tea, etc., etc. The usefulness of the Act will doubtless be very much increased by the amendments it will receive during the next session. Amongst the amendments suggested in the report, I am glad to see the one that the sale of goods to inspectors should be made compulsory on the money value of the goods being tendered. I have, myself, now great difficulty in getting hold of samples of milk which are supposed to be adulterated. The milk dealers know the inspectors, and, of course, assert they have no milk to spare when he applies for a sample. Under the present Act there is no power to compel the sale.

"The shortcomings of food analysts will probably soon be removed to a great extent. A vast amount of valuable information on the analysis of food is being collected and disseminated. Already several handbooks have been published, and a number of articles have appeared in our scientific journals, on the best methods of examining various articles of consumption, so that, in a short time, we may hope to hear less of the unseemly conflicts of evidence and of unjust convictions arising from errors of analysis. Meanwhile, until such knowledge is obtained, chemists should strive to prevent their zeal from outrunning their discretion. In all doubtful cases it is always wise to follow the practice of our English law, and give the prisoner the benefit of the doubt.

"At the meeting above referred to, the public analysts formed themselves into a society with the proposed title of the 'Association of Public Analysts,' for the purpose of mutual assistance and co-operation. This organisation will afford the means of carrying out the suggestions relating to the appointment of a board of examiners and referees, should the legislature see fit to adopt them. One of the most important uses of this association is, however, the opportunity which it gives of its members making known to each other the results of their various investigations, and of having the proposed methods of analysis discussed, so that accurate and uniform methods may be readily arrived at. It is very much to be regretted that the association proposes to elect its members from food analysts only. Its usefulness would be immensely increased by widening its scope so as to include analytical chemists of all classes. The desirability of having a competent tribunal to whom to appeal when conflicting analyses of various commercial products are obtained, is often felt both by commercial men and analytical chemists, and it appears to me that a board selected from an organized association, which should embrace analytical chemists of all classes, is the proper tribunal to appeal to in such cases. It is to be hoped that the association of food analysts just formed will yet see its way to somewhat alter its name and scope, and thus materially extend its usefulness both to the trading public and the profession at large.

"So pressing had the question become of the formation of a court of appeal to decide disputes in commercial analysis, that our Society received a communication in May last from the chemical section of the Glasgow Philosophical Society asking us to join them in a memorial to the chemical section of the British Association, requesting that a committee of that section should be appointed to inquire into the subject of commercial analysis, and especially with reference to the analysis of potash salts and superphosphates. A special meeting of our Society was called in that month, and the matter was discussed. Many of our members were of opinion that the processes of analysis of many of the substances in which we on the Tyne are more immediately concerned, such as soda, sulphur, manganese, and copper, call equally urgently for investigation, and many instances were given of great discrepancies in the results of analysis of the same substances given by various chemists, involving, of course, the loss of large sums of money either to the buyer or the seller. It is, moreover, somewhat compromising to our analytical and commercial morality to find out, for instance, that large profits have been made by buying soda ash by one chemist's test in one district and selling by that of another chemist in another district, whilst at the same time both chemists professed to test by the same method; yet this is known to have occurred. Surely there is here gross carelessness, or worse, on one side or the other. A resolution was ultimately passed at the meeting expressing the opinion that a sub-committee of section B of the British Association should be appointed to inquire into and report upon the processes employed in commercial analyses, and more especially the analysis of copper, soda, potash, sulphur, and superphosphates and other manures. The British Association, at their Belfast meeting took the matter into consideration, and have appointed a committee with a grant of ten pounds to inquire into and report upon the methods at present used in the analysis of potash salts and superphosphates; so that we may hope to have a report on the matter at the next meeting of the British Association."

THE WILD VANILLA PLANT.*

By vanilla plant we do not refer to the orchid which furnishes vanilla, but to a hardy North American plant, *Liatris odoratissima*, which, on account of a similarity of odour, has received that name. Most of the species of liatris, or button-snakeroot, have a tuber-like root, and long straight stems, upon which the numerous flower-heads are crowded in a close spike. In *L. odoratissima*, the root-leaves are from 8 to 12 inches long by 2 or 3 broad; those of the stem very small. The stem divides above into a broad branching panicle of purple flowers, which make

* From *The Garden*.

the plant an attractive one. A correspondent of the *American Agriculturist* has furnished the following account of the plant:—"The wild vanilla, or, as it is commonly called, hound's tongue, or deer tongue, grows abundantly on the edges of what are called 'bays,' *i.e.*, low places in the pine woods, which are partially covered with water and overgrown with bays (a species of magnolia), or on low swampy pine woods in east and south Florida, and in portions of lower Georgia. The fresh leaf has, when crushed, a greenish disagreeable odour, but when pulled from the plant and dried in the shade for a day or so, it becomes highly fragrant, having a smell resembling vanilla or tonka bean, and similar to the sweet-scented vernal grass, but much stronger. This odour is developed by some chemical change made in the leaf during the process of drying, whereby a peculiar principle known as coumarin is formed. Coumarin is found abundantly in the tonka bean of commerce, but so abundant is it in the *Liatris*, that it is often found in large quantities on the upper portions of a mass of the semi-dried leaves. It is readily sublimed by a low degree of heat (150°), and the heat generated in these masses or bundles is sufficient to sublimate it on the upper or cooler layer. When found in this way, coumarin is composed of snow-white needle-shaped crystals, exceedingly fragrant—a leaf of the *Liatris* often being covered on its under side, and looking as though it had been out all night in cold, frosty weather. The dried leaves furnish an article of commerce, and one that is steadily growing in importance. It is gathered all through east and south Florida, principally on the St. John's River and its tributaries, and sold to the country store-keepers in exchange for goods; by these store-keepers it is sent to the balers and packers, by whom it is sent to New York for home use and exportation. Pilatka, on the St. John's River, is the head-quarters in this trade. One may often see 75 or 100 bales, of 200 lbs. each, lying on the wharves, awaiting shipment—one dealer at this place having an order to fill of 150,000 lbs. Adults can gather from 150 to 400 lbs. of the green leaves in a day; active boys and girls nearly as much. The green leaves are taken home and dried in the shade, and lose about 80 or 85 per cent.; they are, when dried, sold at the country stores, for from 3 to 6 cents per lb., yielding quite a good return for the labour. The packer bales and ships, and realizes from 8 to 12½ cents per lb. The dried leaves are used to give a flavour to cigars, snuff, and smoking tobacco. For cigars, it is sufficient to place the leaves and the cigars in alternate layers in a box, and allow the whole to remain together for several days; for snuff, the leaves are dried, ground, and mixed; it is granulated, or shredded up, and mixed with smoking tobacco. A small quantity is sufficient to flavour a large mass of tobacco. The odour is given off much more intensely on a damp day than on a dry one. Although large quantities of these leaves are consumed in our home factories, a much larger quantity is shipped to Germany and France direct, where it is rapidly growing in favour. It is quite probable that it will soon be an article used extensively in perfumery; and as it is known to keep 'the wicked moth away,' it will be in great demand for the purpose in the stead of the strong-smelling camphor and tobacco stems."

COPAL.*

The following extract is taken from an article in the *Geographical Magazine* relating to the products of Eastern and Tropical Africa:—

The *Msandarusi*, or copal tree (*Trachylobium sp.*), according to Captain Elton, is largely scattered over an extensive tract of country, in the Mrima, or coast region. This tract lies along both banks of the Lufiji, and extends from the mountains to the sea, a belt from 30 to 35 miles wide. Throughout these limits immense quantities of the semi-fossil are dug up by the natives, and this constitutes the most lucrative commerce of the Indian settlers at the small trading ports. Further south, beyond the Lufiji, there is a break in the supply, attributed by Captain Elton to the surrounding slave traffic, which rapidly drives legitimate commerce out of its course, but also affected by the increased difficulties of communication caused by the marshy swamps which here fringe the coast more deeply than above the Lufiji. Beyond Kliwa copal again appears, and is largely bought up, in tranquil times, at the numerous trading stations which dot the seaboard down to the Rovuma River.

The copal tree is described by Burton as a large tree, the towering bole of which has formed canoes 60 feet long. The bark is smooth, the trunk of a yellowish white tinge, rendering the tree conspicuous amid the dark African jungle growths, and is dotted with exudations of raw gum, which is also found scattered in bits about the base. The forests, called *kiregesi*, contain many *msandarusi*, or copal trees, and between them, in the broad transverse glades which always intersect African woodlands, some of the finest fossil gum is dug. This never reaches the trader, however, without a large admixture of the copal from the neighbouring trees, and the contents of the digger's basket are made up with wet sand and small stones, in order to give it a little extra weight. The chief centre of supply is the Kwale district, where there are eleven stations for carrying on the copal trade. In the early morning strings of natives are seen on the paths, each party led by a few men, armed with old muskets and bows and arrows, and consisting of women and lads, carrying copal baskets. Except during the very dry season, these arrivals take place daily, but there is no organized system of working. The Indian traders do not venture to send out parties of their own, for each village and each working is represented by a head man, and the natives are only too ready to unite against the slightest encroachments on their monopoly. The "trade union" system is here represented in its strongest form.

Below four feet no gum is found worth taking, and very few diggers go beyond three feet in search of it. The trade appears to be surrounded by many difficulties. The Indian trader, on the Mrima coast, has many extortions to contend against, and heavy duties to pay, besides the continual haggling with the natives, competition with his neighbours, and a perpetual round of coast fevers. The local village headman extracts a ground rent from him; and he has to pay an arbitrary percentage on his profits and twenty out of every hundred *frasilahs* of copals shipped as an export duty. The cost is from 3 to 5¼ dols. per *frasilah* of copal, varying according to the season of the year, and at Zanzibar the merchants buy at from 7 to 8 dols. Yet, in spite of all difficulties, the trade prospers; and Captain Elton is of opinion that the inexhaustible supply of copal, under a settled rule and with systematic working, would furnish the means of supporting a far larger community than that which is now sparsely scattered along the coast.

In old days the trees would appear to have lined the shores, but the extent of the ancient forests can now only be estimated by the area of the present workings, and by the positions of the existing *msandarusi* which are found away towards the foot of the low hills bordering the Mrima, and on all the terraced lands sloping down from the ridges to the present sea-beach. *Msandarusi* is the true or ripe copal, the produce of vast extinct forests, and buried at depths beyond atmospheric influence. The raw or tree copal is called *chakazi*. It is little valued in European markets, but is exported to Bombay and China. A most interesting account of copal and the copal trade is given by Captain Burton in his 'Lake Regions.'*

* From the *Gardeners' Chronicle*.

* *Royal Geographical Society's Journal*, xxix., p. 435.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 19, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W.*

Envelopes indorsed "Pharm. Journ."

EARLY CLOSING.

THE receipt of the Report of the Early Closing Association furnishes an opportunity for reverting to a subject in relation to which, up to the present time, pharmacists have made nearly the least advance of any class of the trading community. If this be thought to be an exaggerated statement, it will find sufficient justification in the fact that when the Early Closing Society attempts to show by force of contrast the large amount of good accomplished by its efforts, it draws a picture of "thirty years ago" which is only too faithful a picture of pharmacy in 1874. "At the outset of the Early Closing Movement, *ten* o'clock was the prevailing hour for the closing of shops in the *retail* trade of London; the time of the actual release of the assistants was still later." To-day it can be reported that by silk mercers, linendrapers, hosiers, and other retail traders, the hours of 8 in summer and 7 in winter have been largely adopted and are making rapid progress. But what about pharmacists? Unfortunately, although there are many who are acting as pioneers, by closing their establishments an hour or two earlier, the description of thirty years ago is still applicable to a large majority.

In this report of the Early Closing Association it is properly pointed out that the most effectual method in bringing about earlier closing has been to arrest public attention and to bring public opinion to bear upon late closing. In certain callings sympathy has been evoked for employers and employed who formerly suffered from long and late hours, and now it has become unfashionable and unpopular to close late. Various remedies have been advocated by persons who have lost patience with the necessarily slow progress of the voluntary movement, but the Board of Management has, after careful consideration, decided to persevere unhesitatingly in the old and tried policy of attempting to eradicate the evil by persuasion and argument only. Notwithstanding the hindrance caused by the perversity of isolated employers who refuse to join the majority, this policy has, on the whole, been successful, whilst it is free from all the probably insurmountable difficulties that would attend compulsory legislation.

We are glad to have such a valuable ratification of the course we ventured to take in respect to Sir JOHN LUBBOCK'S Shop Hours' Regulation Bill. Some of our correspondents have thought differently, and have at different times expressed the opinion that Sir JOHN'S attempt at compulsory legislation ought to have had the support instead of the opposition of the Council of the Pharmaceutical Society. But we agree with the Board of Management of the Early Closing Association that however desirable it may be that shops should be closed at 8 o'clock in the evening, there is not the slightest chance, unless a decided change comes over the British Legislature, of such a law being passed for the purpose. Indeed, were the law passed, the evasions that would result from the admittedly necessary exemptions would, as we pointed out at the time of the introduction of the Bill, render it ridiculous and unworkable.

This conclusion has not been arrived at without consideration. In March last a meeting of employers convened by Mr. SAMUEL MORLEY, passed a resolution in favour of an uniform compulsory closing of shops at 8 P.M., and appealed to the Early Closing Association to co-operate in promoting such a measure. The result was the issue of a statement in which the matured opinion of the executive of the Early Closing Association was represented as being distinctly adverse to compulsory legislation, and ample reason was given in support of the opinion. We regret, however, to notice that there appears to be a disposition to coquet with "permissive legislation" on the same subject, although it is acknowledged that the result would probably be very limited and confined to small communities, where the pressure of long hours and overwork in connection with trade is but little known.

In conclusion, we would urge every one of our readers to make sure that he is doing his utmost by example and by influencing public opinion, rather than look to the Parliamentary Jupiter to get the wheel out of the rut. We suggest that the Press and the Pulpit both might be found more extensively available were proper applications made. If this were done there might be some prospect of pharmacy being included in the Early Closing Society's next report amongst callings which have equally valid excuses for late hours, but are turning their backs upon the practice.

CHINESE PHARMACY IN SAN FRANCISCO.

As we descend in the social scale, we find the quack, the astrologer, and the conjuror in ever greater request, more particularly in those countries where there is a constant influx of the labouring classes. California, and its capital San Francisco, fulfil nearly every condition under which the "irregular practitioners" above-mentioned succeed; and of these the greater proportion are Chinamen. Constantly advertising in the San Francisco press, or flaunting their diplomas (generally bogus ones) in their shop windows, the Chinese doctors drive a "roaring trade" among the floating or resident population of the city. There are eighteen of them in regular, or rather "irregular" practice, their names and professions paraded in Chinese and English characters at every turning. At the commencement of practice they accept the humblest honorarium; and if they assist at the death of one of their compatriots they invariably register him as having "died from unknown causes." The most prominent of them is the anglicised Chinaman, Dr. LI-PO-TAI, who is located in a showy suite of apartments, which are daily thronged with patients, principally of the softer sex and of European complexion, for whose benefit some five or six pupils of the doctor are seen busily preparing the decoctions charged with life or death. The doctor first manipulates his patient's pulse, then the joints of the arms, after which he is prepared to point out the seat of the malady and the appropriate cure. The quality of the medicine, as well as its quantity, is determined by the purse and the patience of the client, who is expected to state his preference for a cure which shall be short and sharp, or for one which shall be prolonged and painless. The medicines are nearly all of vegetable origin: gentian, rhubarb, myrtle, and camphor are the chief, to which are added some nondescript Chinese roots, rinds, leaves, and seeds, administered in homœopathic doses, and generally in the form of pills and decoctions. Ignorance of chemistry keeps the Chinese doctor clear of mineral acids and re-agents, mercury being about the only inorganic element used, and that in very few preparations.

The principle of Chinese therapeutics seems to be the effecting of cure, not by sympathetic or homogeneous, but by contrary means. For syncope or weakness they prescribe the blood-extract of the tiger; and so on till almost every animal is laid under contribution for an essence which is also an antidote. The blood and the liver are the sources from which these animal-specifics are mainly drawn. "Eye of newt, and toe of frog" are also in high esteem with the Chinese practitioner, whose stock-in-trade is chiefly imported from his native country, and comprises snakes, lizards, toads, bugs and spiders, all in the dried state; along with claws, ears, tongues, teeth, hearts and livers. These latter are taken from animals of every possible kind, and are found in immense quantities in the Chinese medicine stores of San Francisco.

The Chinese doctors have little or no knowledge of anatomy. They take the lungs to be the seat of the voice; the stomach, the residence of the emotions; the liver, that of the soul; and the spleen, that of the reason; while this last, in conjunction with the heart, engenders thought. The gall begets courage, and on that account takes rank with the most potent medicaments. But the materia medica includes other agencies. To conquer a malady the Chinese physician must have under control the evil spirits who trouble the breath or generate bad humours. Indeed, without this control, the physician does not pretend to possess the proper remedy or to guarantee a favourable result. Significantly enough, the most "positive" department of the healing art, surgery, is a *terra incognita* to the Chinese practitioners—at least, in California. Kneading, rolling, and stretching are the remedies employed for fractures, while poultices of cat's liver (cat-aplasms?) and of cocks' entrails, are favourite applications. Decayed teeth are punched out with the familiar forceps. Strange to add, these odd people must possess a sovereign remedy for small-pox. During the prevalence of that epidemic, not a single Chinaman fell a victim to it, though none of them had been vaccinated.

Chinese medicine, indeed, is as inscrutable as Chinese metaphysics; and is likely to remain so. Its practitioners have the greatest contempt for Western science, as they have the grossest ignorance of it. In this respect they stand in marked and melancholy contrast to their neighbours, the Japanese, who are courting every opportunity of educating themselves according to the standards of the West. It was but the other day that the son of the MIKADO's body-physician, SATSO SUMA, by name, graduated as Doctor in Medicine at Berlin, after a severe examination, and defended his thesis with fluency and effect in the German language, which he had mastered in a few months Such is by no means an isolated example of Japanese enterprise in the matter of education, and it requires no conjuror—certainly not a Chinese one!—to tell us which of the two nations gives better promise of ultimate superiority.

A NEW CHEMISTS' ASSOCIATION AT WOLVERHAMPTON.

WE are glad to learn from a report which has been kindly forwarded to us by a correspondent, that it has been resolved by the Chemists and Druggists of Wolverhampton and District to form a local Association, which shall have for one of its principal objects the provision of lectures, classes, museum, library, etc., for instruction in pharmacy and the allied sciences.

We hear that classes are already in the course of formation, and that the first meeting of the Society will take place on Tuesday, January 5th, 1875. The Honorary Secretaries (Mr. W. Y. BREVITT, Darlington Street, Wolverhampton, and Mr. F. J. BARRETT, the General Hospital, Wolverhampton) will be glad to receive for exhibition any articles of interest, or donations of books and scientific periodicals for the library and reading room, and specimens of chemicals and drugs for the contemplated museum.

WE are informed that one of five gentlemen who have recently been added to the commission of the peace for the Borough of Hull, is Mr. Alderman JOHN LOVE SEATON, whose name occurs on the Register of Pharmaceutical Chemists.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Fourth General Meeting of the Liverpool Chemists' Association was held at the Royal Institution, on Thursday, December 3rd. The President, Mr. A. H. Mason, F.C.S., in the chair.

Messrs. Thomas Smyth and H. B. Steadman were elected members of the Association.

Donations to the library of the *Pharmaceutical Journal*, the *Canadian Pharmaceutical Journal*, and the *Proceedings of the Liverpool Geological Society* were acknowledged, and thanks voted to the donors.

After some discussion on the questions in the question box, the meeting adjourned to the tea-room.

There was exhibited by Mr. Armstrong a new kind of stand for burettes and other apparatus, from Messrs. Zimmerman, of London, which was considered very convenient and useful.

THE STARCHES OF COMMERCE.

Mr. Abraham said that in the *Pharmaceutical Journal* for September 5, he had called the attention of pharmacists to the fact that the starch generally supplied for medical purposes, so far as his experience enabled him to judge, was *maize starch*, not *wheat* starch, as it was required to be according to the definition of the British Pharmacopœia, by which they in dispensing medicine were bound. Starch was so generally found in the vegetable kingdom that it was difficult to say in what plants it was not present. Chemically, all starches were alike, and it was not easy to show how far they differed dietetically, or in their other practical applications. But it was very well known that in their commercial value they differed very much, and it was by no means safe to assume that one may, for all purposes, be substituted for another. The substitution of potato starch for the starch called arrowroot had been the subject of judicial proceedings, and they well knew the difference in value between Bermuda and other arrowroots. Under the microscope marked differences of form were apparent. The general structure was illustrated by the figure of two watch glasses placed in apposition with the convex surfaces outwards. But this form was subject to variations which apparently proceeded from the pressure to which the granules were subjected during their growth in the cells of the several plants from which they were obtained. The wheat starch, which he believed was formerly the only kind which was produced for the use of the laundress, had been, he believed, almost entirely superseded by starch obtained from cheaper sources, especially *rice* and *maize*.

In answer to his inquiry for wheat starch in the Journal, he had been favoured with several specimens.

Firstly. From a wholesale drug house who believed they were supplying wheat starch. He found it to be a mixture of *potato* with *rice* starch.

Secondly. From Mr. Burrell, of Montrose, who sent him a specimen of wheat starch from the Montrose Starch Company. He could hardly say however that this was adapted to medical purposes nor was it intended to be.

Thirdly. From Messrs. Parry and Garnham, of the Borough High Street, who said that it was from the South of France. This was *wheat* starch, and very pure, though not in powder. It was in the well-known *columnar masses* as defined in the Pharmacopœia, though he thought pharmacists generally wished it in powder.

Fourthly. He was favoured by Messrs. Evans, Lescher, and Evans with a specimen of wheat starch in powder, and was glad to have obtained a supply through Messrs. Evans, Sons, and Co., of Liverpool.

Lastly. He had been favoured by Messrs. Sumner and Co. with a sample which he found to be pure wheat starch.

He had intended to have acknowledged his obligations to the gentlemen he had named through the *Pharmaceutical Journal*, but at the request of the President he now illustrated the various forms of starch under the several microscopes before them.

A vote of thanks to Mr. Abraham concluded the meeting.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The second ordinary monthly meeting of the session was held in the lecture room of the Association, on Wednesday evening, December 9th. Business in connection with the grant of £50, lately made to the Association by the Council of the Pharmaceutical Society, was postponed till the next ordinary meeting, in consequence of the absence of many of the officers of the Association.

Mr. Siebold gave the second of his course of lectures on "The Detection of Adulteration in Common Articles of Food and Drink." Commencing with Beer, the lecturer said a long essay had recently been published in a foreign journal, describing modes of detecting the substitution of gentian, trifolium, and many other bitter drugs for hops; he had repeated these experiments, and did not hesitate to say that there was not one among them reliable; the indications were indistinct, and though possibly they might be considered conclusive by an expert who had devoted a great deal of time to their study, the tests were not such as he could recommend to the meeting. There were, however, some substances occasionally used to give a bitterness to beer, which might be very easily detected. Picric acid was one. Boil a piece of white Berlin wool in the suspected beer, acidulated with hydrochloric acid: a trace of picric acid will dye the wool a bright yellow; should the beer be of a dark colour the yellow tint on the wool may be obscured, in which case, after removing it from the beer, it should be rinsed, heated with a little weak solution of ammonia, and the filtered liquid evaporated to a few drops. To this a little cyanide of potassium should be added, when a deep red colour will be produced (isopurpurate of potassium); one part in a million may be thus detected.

Nux vomica.—Hofmann and Graham recommend that the beer be shaken with animal charcoal for twenty-four hours, the charcoal separated and boiled with alcohol, the filtered alcohol evaporated almost to dryness, and potash and ether then added. The ether would take up any strychnine present, derived from the nux vomica, and its presence could be easily discovered by the usual colour test (bichromate of potash and sulphuric acid).

Cocculus indicus had doubtless been occasionally used to increase the intoxicating effect of beer. The suspected sample should be treated with acetate of lead to throw down the colouring matter, filtered, the lead removed by sulphuretted hydrogen, evaporated to a small bulk, animal charcoal added, and left in contact for twenty-four hours, then removed and boiled with alcohol, and the latter evaporated, when crystals of picrotoxine would separate, and these might be distinguished by their microscopic and chemical characters.

Salt.—Beer always contains chlorides, but Bass's ale, which may be taken as a standard of perfection, will, when mixed with 7 or 8 parts of water and acidulated with nitric acid, give only a faint opalescence with nitrate of silver. Large quantities of salt are added to beer by some publicans, and must be estimated quantitatively in the usual way, should a precipitate be produced when tested as above. The alcoholic strength of beer may be determined by distilling half its volume and testing the distillate by the hydrometer. Burnt sugar may be detected by shaking the sample with a little solution of tannin, which will remove the colour natural to beer, but leave that produced by caramel.

Wines are sometimes coloured artificially. Logwood may be detected occasionally in cheap port by immersing in it a strip of filtering paper previously soaked in solution of acetate of copper and dried. In pure port wine the paper will acquire only a greyish pink colour, but in wine containing logwood it will turn sky blue.

Magenta may be detected by shaking the wine with an equal volume of amylic alcohol, and leaving the mixture at rest for a few minutes, when the amylic alcohol will separate, taking with it the magenta.

Clarets are extremely liable to adulteration with artificial colouring matters. It was formerly believed that agitation with black oxide of manganese would remove the colour from pure claret, but not from the coloured; this test is perfectly useless. The addition of dry caustic potash to pure claret will produce no coloured precipitate, other colouring matters are at once thrown down, and though it is difficult to distinguish with certainty what the adulterant may be, a wine yielding a violet or otherwise coloured precipitate with caustic potash may be at once condemned as artificially coloured. The precipitate is violet with logwood, reddish with beet or Brazil wood, pale violet with litmus, dark violet with mulberries or elderberries.

Lead is by no means rarely found in clarets. Wine-bottles in France are almost invariably cleaned with shot, and the glass becomes coated with a carbonate of lead insoluble in water, but quickly taken up by the acid wine. Orfila found lead so constantly present in the human body that he asserted it to be a normal constituent, and it is now believed that this lead was derived from the wine drunk largely in the district in which he lived. Lead is best detected by heating the wine with a little chlorate of potash and hydrochloric acid to remove the colouring matter, and when the chlorine has all been driven off, passing into the pale yellow liquid a current of sulphuretted hydrogen to precipitate the metal as sulphide.

The legality of a process known as "improving" wine has been the subject of much discussion in the hock-growing districts. It consists in adding sugar and water to the must before fermentation. In years when the grapes have imperfectly ripened, and contain little sugar but much free acid, it is evident that such an addition would render the resulting wine more alcoholic and agreeable, but less acid. Dr. Fresenius is one of those who strongly advocate the adoption of this process. Any addition to the wine after fermentation would be objectionable.

Brandy, whisky, and other spirits differ very much in the percentage of alcohol they contain, and in some cases hot ingredients are added to keep up the apparent strength. A specimen of brandy recently examined by the lecturer had the peculiar property of retaining its burning taste however much he diluted it. On evaporating this specimen at a low temperature in a water-bath, and so driving off all the alcohol, a residue, tasting strongly of capsicum, was obtained. Spirits are generally coloured with burnt sugar, and they almost invariably contain traces of tannin and astringent matter derived from the casks in which they have been stored.

Vinegar.—It was formerly believed, or stated, that the addition of at least one part of sulphuric acid to 1000 parts of vinegar is necessary in order to preserve it; and this addition, though unnecessary, is still allowed by law. Judging from an examination of many specimens it is evident that manufacturers generally avail themselves of this permission, though vinegar free from sulphuric acid may be obtained. Vinegar always contains sulphates; salts of barium cannot, therefore, be used for separating the sulphuric acid. A sample should be evaporated almost to dryness on a water-bath, and treated with strong alcohol, which will remove the sulphuric acid, leaving the sulphates behind; this is mixed with water, the alcohol driven off by heat, and the free sulphuric acid may be then precipitated with a salt of barium, and estimated in the usual way. A piece of filtering paper, dipped in vinegar containing sulphuric acid and dried on a water-bath, will be blackened.

Nitric Acid may be detected by boiling the sample with a little sulphate of indigo, which it would decolourize. Hydrochloric acid, lead, and copper, occasionally present, may be tested for in the usual manner.

The strength of vinegar can of course be ascertained by means of a standard solution of caustic soda. The numbers 22, 24, etc., by which different qualities of vinegar are known, indicate the number of grains of anhydrous carbonate of soda required to neutralize one fluid-ounce of the vinegar.

LEEDS CHEMISTS' ASSOCIATION.

The fourth meeting of this Association, session 1874-75, was held in the Library on the evening of Wednesday, December 9. In the absence of the President, Mr. E. Thompson was called upon to preside. After the election of two new members and four associates, a circular from the Hull Chemists' Association, asking for co-operation and assistance in defending a member of the trade in that town who is being prosecuted by the Inland Revenue Board for selling a mixture called "Pick-me-Up," or "Morning Tonic" without a spirit licence, was laid before the meeting, but action was deferred until further information on the subject had been received.

Mr. Smeeton then read the paper of the evening entitled, "A Beginner's Notion of Geology." In commencing he stated that in this as in other sciences, there was a boundary to knowledge which was soon reached; that, however correctly the causes of geological phenomena might be pointed out, there was an infinity of space beyond, leading upward to the primal cause of all. Such definitions as primary and secondary could only be relatively true. Still, geology could teach much, and the rational way to understand it was to interpret the past by the present, on the assumption that the same forces have previously been in operation and produced like results. Mr. Smeeton confined his remarks to two of the denuding or destructive forces, namely, water as a chemical and mechanical agent, and water in the shape of ice. He showed how water acted chemically by dissolving lime rocks and salts, which eventually were carried to the sea, and mechanically by its wearing influence as shown in every stream and river, and along every shore; so that, constantly, land and sea were changing places both now and in ages past. The action of glaciers was illustrated by scratched boulder-stones, and by diagrams showing that there was plenty of evidence that the northern half of Britain was at some remote period covered with ice, as Greenland is at the present day. The lecturer concluded by expressing a hope that though denizens of a town his hearers would devote some portion of their leisure to the study of nature in its varied forms, such pursuits being always elevating, and reminding them of the country side from which so many of them had come. Various fossils both from the coal and limestone formations were exhibited during the lecture.

A hearty vote of thanks to Mr. Smeeton, proposed by Mr. Abbott, and seconded by Mr. Longley, was carried unanimously and concluded the meeting.

HULL CHEMISTS AND DRUGGISTS' ASSOCIATION.

On Friday evening, Dec. 11, the annual supper of the members of the above Association was held at Varley's Cross Keys Hotel. Between forty and fifty gentlemen attended. The Mayor (Alderman C. Wells) presided, supported by the ex-Mayor (Ald. Seaton), Councillor J. Thompson, the President of the Association (Mr. Anthony Smith), and the Secretary (Mr. C. B. Bell). The Vice-Chairmen were Mr. W. Stanning and Mr. Wokes.

The toast of "The Queen and rest of the Royal Family" having being proposed by the Mayor, and heartily received, the President of the Association gave the toast of "The Mayor and Corporation," which was responded to by the Mayor.

The toast of "The Town and Trade of Hull," proposed by Councillor J. Thompson, was acknowledged by Alderman Seaton.

The Ex-Mayor, as President of the Chamber of Commerce, in alluding to the progress of the town during the past few years, said it was not energy alone which did so much for the progress of the town, but energy in connection with intelligence; and it might be that such societies as the Hull Chemists' Association and the literary institutions of the town had a great deal to do with developing as it were science in connection with industry. After alluding to various matter of local interest, he concluded by referring to his pleasure, as an old chemist, at being present at the gathering, and stating the debt of gratitude he felt he owed to the town by having been its chief magistrate.

The Mayor proposed the toast of the evening, that of "Success to the Hull Chemists' Association." He expressed his pleasure at the number of members having doubled during the last year. One of the chief objects of the Association was the better education of the apprentices, and he was told the lectures were attended in a manner which was satisfactory, and that the result of the educational movement was equally satisfactory. Another object of the Society was the protection of the particular trade, and he certainly knew no society or class of men requiring greater protection than, probably, the chemists. He would show his appreciation of the objects of the Society by continuing the prize which his predecessor in office offered to the students. He had great pleasure in submitting the toast of the Association.

The President (Mr. A. Smith) replied, first thanking the members of the Association for having paid him the compliment of electing him for the third time to fill the office of president. The Association was commenced six years ago, and he was proud to say that out of four of its founders, three were present. It was formed in consequence of the passing of the Pharmacy Act in 1868, and the need that was felt for such an association. The primary object was the offering of better facilities for the education of the apprentices, and it was now a matter of history that there was a development of facilities in Hull for such education, and pupils had passed most creditably. The second object was that of a trade protection society; and four years ago, mainly through the efforts of the Association, which aroused other associations, the Poisons Regulation Bill was tumbled into the waste-paper basket of the House of Commons. The executive of the Society were always alive to the interests of the trade. During the past year he was glad to say the members of the association had increased from 30 to 60. In conclusion, he returned thanks for the cordial way in which the toast had been received.

Mr. W. Stanning proposed the toast of "The Vice-President (Mr. G. Myers), the Secretary and Treasurer (Mr. Bell), and the Committee." He briefly alluded to the case now pending and affecting the trade generally throughout the country.

Messrs. Myers, Bell, and Oldham replied to the toast.

Mr. Milner gave the toast of "The Medical Profession," to which Dr. Gibson replied.

Mr. Wokes gave "The Health of the Lecturers, Messrs. Niven and Parsons," which was suitably replied to.

The toast of "The Ladies," "The Press," etc., followed.

ASSOCIATION OF CHEMISTS AND DRUGGISTS FOR WOLVERHAMPTON AND DISTRICT.

A large and influential meeting of gentlemen engaged in the practice of pharmacy in Wolverhampton and its district took place, on Friday evening, December 4, in the Committee room of the Agricultural Hall, to consider the advisability of establishing an association of chemists "having for its objects the better scientific education of its associates, and the protection, general advancement, and mutual improvement of its members."

Mr. W. Fleeming (Fleeming and Son) having been elected chairman, opened the business of the meeting by explaining at length the desirability of the commencement of such an association in the "metropolis of the black country." He stated that the increasing stringency of the examinations of the Pharmaceutical Society, without passing which no future aspirant can commence business as a chemist, caused great alarm amongst those assistants and apprentices who had not already qualified themselves. With a view, therefore, to assist these young men, it was proposed, as a primary object, to arrange for the delivery of lectures and the holding of classes upon the arts and sciences connected with the practice of pharmacy, and subsequently to establish a reference library, a museum, and a reading room. Besides this, he thought there could be no possible doubt that a union of chemists and druggists was desirable to resist vexatious legislation, and to arrange, by a series of friendly meetings, such matters of business as are of general interest to the trade.

Mr. W. Y. Brevitt (the local secretary of the Pharmaceutical Society) then formally proposed the establishment of the association. He called the attention of the meeting to numerous circulars forwarded by local associations, and said that from statistics he had obtained, he thought there could be no doubt of the feasibility of the scheme, for in towns much smaller than Wolverhampton, prosperous self-supporting societies were successfully carried on. Apart from the educational aspect of the case, he thought they ought to devise some means, as a body, to resist unjust prosecution under the Adulteration Act. In illustration of this he read a letter he had received from the Hull Association, calling upon chemists to assist in the defence of a brother-tradesman who was threatened by the Excise with an action for having sold a compound tincture of gentian as a "pick-me-up." He further cited the well-known citrate of magnesia, sweet spirit of nitre, and scammony cases, as examples of these obnoxious Adulteration Act prosecutions. He read letters from gentlemen promising their aid in promoting the movement, and called especially upon the assistants and apprentices present to do all they could to ensure the successful carrying out of the scheme.

The proposition was then seconded by Mr. Wm. Cannell, and having been supported by Mr. Wm. Reed, was carried unanimously.

After naming the Society and defining its object and work, the following officers were elected:—President, Mr. Wm. Fleeming; Vice-President, Mr. R. H. Lowe; Treasurer, Mr. Alexander Gow; joint Secretaries, Mr. W. Y. Brevitt (Darlington street), and Mr. F. J. Barrett, F.C.S. (the Hospital); and a Council of nine members of the Association and three associates.

In addition to ordinary members and associates, it was resolved to elect as honorary or corresponding members, gentlemen engaged in the medical or scientific professions who might be willing to co-operate in promoting the objects of the Association by subscriptions or other means. A code of rules was next drawn up and approved of, but it was deferred for the further consideration of the Council, who were to report upon it at the next meeting.

A discussion took place as to the relative positions of "members" and "associates," and it was resolved that the latter should enjoy all the privileges of membership, save the right of voting at meetings upon business subjects.

A letter was then read from Mr. Stokes Dewson, teacher of botany, etc., to the Birmingham Association, offering to deliver a course of lectures on botany and materia medica upon very favourable terms; this was also deferred for the consideration of the Council. At the conclusion of the meeting, which throughout was an extremely cordial and enthusiastic one, a vote of thanks was passed to the Chairman, who, in reply, expressed a wish that now the good ship was fairly launched, every one of the crew would endeavour to make the voyage a prosperous one and the enterprise successful.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Carbon and certain Compounds of Carbon.*

BY PROFESSOR BARFF.

(*Continued from page* 416.)

Lecture VI.

The heating power of a liquid hydrocarbon may be determined as follows:—A weighed quantity of it should be mixed with black oxide of manganese or oxide of copper (cupric oxide). The mixture should be made to form a stiff paste; it can then be mixed with the oxidizing agent, as the coke is mixed with it, and the experiment can be performed as before described in respect to coal.

Coal gas is made by the destructive distillation of coal. The destructive distillation of any organic substance, fat, oil, vegetable refuse of all kinds, will give gases very much resembling in their composition coal gas. By destructive distillation is meant the heating of substances which can be decomposed by heat out of contact with atmospheric air; that is, in such a way that they cannot be burnt. In the manufacture of gas there is much the engineer has to do to improve the process, and an alleged improvement has been suggested by Messrs. Coffel, Thomas, and Company, the object of which is to relieve the pressure in a certain part of the gas apparatus, and thereby prevent the deposition of carbon. First of all, there is a retort made of iron or fire-clay, the end of which can be taken off and put on. Into that end the coals are introduced, and the retort being charged, the end is screwed up. The gas passes out through what is termed the hydraulic main. In this a portion of the tar is deposited, and the ammoniacal liquid. It is at this part of the apparatus that it is proposed to put an appliance, the object of which is to relieve the pressure, for the gas here under ordinary circumstances is given off from the coal very rapidly, so that there is a considerable tension inside the retort and that portion of the apparatus which is in connection with it; the consequence is that the pressure exerted by the gas is such that the gases deposit carbon in the upper part of the retort, and this deposition of the carbon of course impoverishes the gas, that is to say, robs it of some of its carbon, and, according to theory, must necessarily interfere with its illuminating properties. After the gas has passed through, and has deposited its tar, it is then passed through a series of tubes, which are kept cool by water trickling over them, and then through a condenser, by means of which other liquid products that come off in the state of suspension or vapour with the gas are condensed and run down into a tank.

A "scrubber," is used for the purpose of purifying the gas from certain impurities; it contains dilute oil of vitriol. Then there is what is called the lime purifier, through which the gas passes and loses certain other of its impurities, viz., sulphuretted hydrogen and a certain amount possibly of carbon bisulphide and other impurities of coal gas, which it is very difficult to get rid of entirely. Other substances besides lime are used for the perfect purification of common coal gas from sulphuretted hydrogen. When the sulphuretted hydrogen gas comes into contact with the lime, an interchange takes place, the calcium takes the sulphur, and the hydrogen takes the oxygen, so that water and sulphide of lime are formed. In this way the sulphuretted hydrogen is decomposed. In small country towns lime only is used to purify the gas, and lime does remarkably well, but there is an objection in large cities like London, to the extremely offensive smell of this sulphide of lime. In the country, people do not seem to care so much about it. This sulphide of lime is not a waste product, for after it has been exposed to the air for some time the sulphur becomes oxidized, and sulphate is formed, and if the operation be allowed to go on to its full extent, so that the whole of the sulphur is oxidized into sulphate, then it makes an excellent manure for the fields, although it would be very injurious to vegetation to put it on the ground before the oxidation had fully taken place. It used to be thought that if the lime were continually renewed in the lime-scrubber it would more perfectly purify the gas from the sulphur; but sulphur exists in two forms in coal gas, in the form of sulphuretted hydrogen, and in that of bisulphide of carbon. Now we have in the one case carbonate of the oxide of lime, and in the other the sulphide of lime, CaS, uniting with carbonic sulphide. Carbon bisulphide will not unite with lime, but it does unite with sulphide of calcium, if there be present in the scrubber some sulphide of calcium; that is, if only a portion of all that which has been already acted upon by the sulphuretted hydrogen be replaced, then the carbon bisulphide coming off with the coal gas will be taken up by the sulphide of calcium which is in the scrubber, whereas the carbon bisulphide coming off with the coal gas will not be taken up by the calcic oxide or lime. Therefore it is a matter of importance that there should be present some of this sulphide of calcium in order to take up the carbon bisulphide. One of the principal impurities in coal gas is ammonia, which is got rid of by means of sulphuric acid used in a dilute state. The purification of coal gas from ammonia by this means can be made quite perfect. If we pass into a burning jet of coal gas a small quantity of ammonia gas, the flame will immediately become less luminous. This illustrates how these impurities injure the illuminating power of coal gas. They do it by taking away heat. In order to get the maximum of illumination there must be a certain amount of heat. Ammonia gas will not burn. It is stated that it burns at a high temperature, but it is not the ammonia itself which burns; the ammonia is decomposed, and the hydrogen of which it is partly composed, burns; therefore, a certain amount of heat is wasted in the decomposition of the ammonia gas before the hydrogen burns. This leads to the mention of the subject of air gas, or gas formed by the passage of atmospheric air over red-hot carbon, and then passed through some petroleum oils in order that it might become saturated with them, and so become illuminating. There is a *primâ facie* objection to this. In atmospheric air there are four volumes roughly of nitrogen, and one of oxygen, or more correctly, 21 of oxygen, and 79 of nitrogen. Then if we convert that oxygen into carbonic oxide we have four volumes of nitrogen holding, it may be, in suspension some of these liquid hydrocarbons, but not contributing one single iota to their combustion. It is quite certain that there must be a difficulty which is not at present got over. Now in water gas, where steam is passed over carbon, we get carbonic oxide and hydrogen, which are both combustible gases, but in passing air over carbon we get a quantity of nitrogen, which is worse than useless, for it takes away heat.

Hydrated oxide of iron absorbs sulphuretted hydrogen gas very readily, and therefore is an excellent purifier of coal gas from this very great impurity. There need be no waste of iron, because the sulphide of iron, on exposure to atmospheric air in the presence of moisture, is again oxidized, and the iron oxide can be recovered, so that it is not an expensive process if care be used in its application.

Most London coal gas is thoroughly purified from sulphuretted hydrogen. Therefore, the indications of the presence of sulphur given upon the combustion of the coal gas is not resulting from the presence of sulphuretted hydrogen, but of bisulphide of carbon. Sulphuretted hydrogen, when burnt, forms water and sulphurous acid; carbon bisulphide forms carbonic acid and sulphurous acid. It is, therefore, important that this bisulphide of carbon should be got rid of from coal gas; for if gas be giving off this sulphurous acid in large quantities, which in the presence of moisture—and moisture exists largely in all rooms—is converted into sulphuric acid; as the draught

* Abstract of a course of Cantor Lectures, delivered before the Society of Arts.

generally takes it to the walls, and the moisture gets condensed on the walls, the sulphuric acid is deposited there, and if it comes into contact with substances easily destroyed by it, the destruction produced will be great. The effects on the constitution may not be particularly bad, because the quantity at any given time is very small; but in a library, or in a room full of paintings, where gas is burned every night for many hours, the sulphuric acid which is formed and condensed on the walls must do a certain injury to them; and it has been found, without doubt, to have committed great ravages on the binding of books, and also on pictures which are affected by acids. If a picture be not protected by glass or varnish, such colours as ultramarine, which are affected by acid, will be very considerably damaged by the continued action of sulphuric acid resulting from the burning of coal gas, because ultramarine is always destroyed by acids.

Bisulphide of carbon, as is known, is a very inflammable substance, catching light at a temperature far below that required to produce a gas flame. To get rid of it has been a great difficulty to gas manufacturers for a long time past. We can get rid of it well enough in small quantities in laboratory experiments, but to get rid of it on a large scale in a manufactory is very difficult. Several processes have been adopted, and a certain portion can be got rid of by passing it through lime which has already absorbed the sulphur from the sulphuretted hydrogen. That would take away some, but not the whole. If hydrogen gas be charged with the vapour of carbonic sulphide, and the two be heated together, the bisulphide of carbon will be decomposed, and sulphuretted hydrogen will be formed. Suppose coal gas containing hydrogen and bisulphide of carbon be heated in its passage through certain pipes, the hydrogen will decompose the bisulphide of carbon, and sulphuretted hydrogen will be formed, and there is no difficulty whatever in absorbing sulphuretted hydrogen. But then, it may be said, if olefiant gas be passed through a red-hot tube, carbon is deposited, and if carbon is deposited, then the illuminating power of the gas is destroyed to a considerable extent. This is true, but Mr. Vernon Harcourt states that if the gases are passed through tubes heated to a low temperature, such as does not cause the deposit of carbon, it will yet be sufficiently hot to cause the decomposition of bisulphide of carbon.

To pass on to the subject of the means by which heat is communicated from body to body, and the way in which temperature and heating power are measured, because that is what we have to consider in constructing stoves and economizing heat in all illuminating and cooking apparatus, and in fact in all processes where heat is employed. It is said that half the quantity of heat produced by the combustion of coal in this country is lost by the way in which we burn our coal. As a general rule, in our fire-places we allow half the heat at least to pass up the chimney without giving the slightest benefit.

Heat passes from one body to another in three ways—by conduction, convection, and radiation. Metals are the best conductors of heat; then come stone, wood, woollen materials, etc., which are not such good conductors. Why are metals good conductors, and wool, worsted, and cotton wool bad conductors of heat? It can be partly explained in this way. Take a bar of metal of considerable density, the particles of which are very close, and put it to the ear and strike at the end of it, and then take a metal, the particles of which are not in such close contact; it will be found that according to the density of the medium so is the sound more perfectly conducted to the ear—the more dense the material used the more perfect the sound. For instance, at the top of a mountain sounds cannot be heard at a distance, because the air is very light, whereas those who have been down in diving bells tell us that all noises sound like thunder because the air is so dense. So that a dense medium serves as a better conductor of sound than one which is not so dense. Now, heat does not travel as sound does, but it travels through undulations—not of air but of an imponderable ether—but it can be imagined that those metals which are more dense, and whose particles are more close together, would be better conductors than those whose particles are less densely packed together, for this ether is supposed to permeate all matter. I am not sure but that this, as to the density of all metals, may be subject to corrections, but the general principle is right, for a dense substance conducts heat readily, but air, for instance, which is not such a dense substance, does not conduct heat like a metal. Cotton wool and wool from a sheep are made up of a number of tubes, and these tubes contain air, and it is, no doubt, to a great extent because those cavities contain air, that wool and such substances are extremely bad conductors of heat. In foreign countries, more than in our own, people use double windows in winter, allowing a space of three or four inches between the two, and these are found to keep a house perfectly warm. The reason of it is that you have the air confined between the two windows, and the air being a bad conductor of heat, does not allow the heat to escape from the apartment. Air, when it is still, is about the worst conductor of heat that we know of, but there is a difference between air fixed and air in motion. Liquids, also, are bad conductors of heat when stationary, yet if they can be made to travel they conduct heat readily. In the application of heat to cooking purposes we have to make much use of good non-conductors as well as of good conductors. The temperature of a room may be uniform, but if we put the hand upon the marble mantelpiece we find it to be colder than if put on the wall. On the other hand, if it be put upon the blade of an iron knife it is felt to be colder than the marble. This is simply because metal is a good conductor of heat, and takes the heat away from the hand, although it is of the same temperature as the marble. Marble is a better conductor than the wall, and therefore the hand gets colder when placed on it than when it is placed on the wall.

So much about the conduction of heat. When air or any liquid is warmed, it rises, and when it is cold it descends, and so circulation is set up, and that is the principle on which water is used for the purpose of heating houses. The hot water goes to the extremity of the pipes, and the cold comes back to be warmed.

Heat, from any source, say a fire, warms the contents of the room by radiation. If a hot iron ball be put in the focus of one of a pair of conjugate mirrors, the heat will be reflected from that mirror on to the other, and in the focus of the second mirror an easily inflamed substance will demonstrate that the heat radiated can also be reflected. This principle is applicable to, and has been applied to fire-grates, and has also been applied to warming apartments of all kinds.

(*To be continued.*)

Parliamentary and Law Proceedings.

Prosecution under the Adulteration Act.

At the Southwark Police Court, on Thursday, December 11, Richard Barrow, grocer, St. George's Road, was summoned by the Sanitary Inspector for St. George's Vestry, for selling arrowroot strongly adulterated with tapioca, starch, etc. The Inspector said that on the 28th ult. he caused to be purchased a quarter of a pound of shilling arrowroot at the defendant's shop, and at the same time he told the defendant that he was going to have it analysed, and invited him to accompany him. He declined to do so. Witness took the arrowroot to Dr. Muter's and left it to be analysed. Witness produced Dr. Muter's certificate, showing it to be adulterated with tapioca and starch. The defendant said he sold it as he received it, and was not aware it was adulterated. The magistrates ordered him to pay 4s. 6d. costs, and recommended him to communicate with the wholesale dealer who supplied him.—*Times.*

Attempted Poisoning by Corrosive Sublimate.

William Thomas Cherry, 32, was indicted at the Central Criminal Court, before Mr. Baron Amphlett, for feloniously attempting to administer to his wife, Emma Cherry, a quantity of corrosive sublimate with intent to murder her.—Mr. Beasley and Mr. Mead prosecuted; Mr. Warner Sleigh appeared for the defence. —The prisoner and his wife lived at Bath Street, St. Luke's. They occasionally had quarrels, but nothing serious resulted from them. They were both in the habit of going out to work during the day, the man being employed as a smith, and the woman in some occupation as a seamstress. Some sugar had been purchased on a Saturday two or three days before the occurrence took place, and on the following Tuesday the prosecutor took a portion of the sugar with her, and put it in some coffee, but the taste was so disagreeable that she threw the coffee away. She tried the sugar a second time, and with the same result, and this led to an inquiry. It was ascertained that the sugar contained a large quantity of corrosive sublimate, and the question was how it could have come there except by the agency of the prisoner. It turned out that the employer of the prisoner was in the habit of using corrosive sublimate in his business, and shortly before the alleged offence was committed he had placed in a cupboard a portion of the noxious ingredients, and that he missed it when the discovery was made. The prisoner clearly had access to this cupboard, and the evidence left no doubt that he had taken it from its place of deposit and put it in the sugar with the intention imputed to him in the indictment. The Jury found the prisoner guilty, and the learned Judge, after making some appropriate observations upon the atrocity of his conduct, sentenced him to twenty years' penal servitude.—*Standard.*

Review.

On the Various Forces of Nature and their Relations to each other. By Michael Faraday, D.C.L., F.R.S. Edited by William Crookes, F.C.S. London: Chatto and Windus. 1874.

At this time, when a knowledge of the scientific principles which accord with the varied phenomena we see around is becoming daily to be considered of more and more importance as a branch of the education of the young, it is especially interesting to note the issue of such books as that we have before us. The volume contains a series of lectures, delivered originally before a juvenile audience in the Royal Institution, of a character equal with the former productions of one whose loss will be felt by scientific investigators for many years to come.

The lecturer, after a brief introduction respecting the universality of "forces or abilities to do things or powers," accompanied by one or two simple and most evident illustrations of their exercise, remarks that he "shall gradually proceed to distinguish these powers one from the other, and compare the way in which they combine together;" and this plan he carries out in the first (from which we have quoted) and five following lectures which form the course.

The force of gravitation occupies the first and part of the second lecture, and is followed by cohesion, to which, in its turn, chemical affinity succeeds. This extends over the latter portion of the third and first part of the fourth lecture, which is terminated by a description of many of the phenomena accompanying heat. The fifth lecture deals with the forces of magnetism and electricity; whilst a fitting finale to the course is found in the sixth, on the correlation of the physical forces.

A lecture upon lighthouse illumination is added, in which, after alluding to the labours of Buffon and Fresnel in this department, the speaker very strongly advocates the general adoption of the electric light for the mariner's guidance.

The leading characteristics of the work are the great adaptability of the lecturer's words to his audience, the clear and forcible manner in which truths, often considered too abstruse for children to understand, are put, and the simple, felicitous experiments adduced in support of the statements.

These experiments in many cases are such as could be performed at home without the aid of elaborate apparatus, *e.g.*, when it is wished to exemplify that light and heavy bodies would fall through air at the same rate if the resistance of the latter is excluded, the method suggested is to take a coin and a round piece of paper a trifle smaller in diameter; place the latter upon the top of the coin, so that it does not meet with any resistance from the air; then, upon both being dropped together from a height of two or three feet, the paper will reach the ground as soon as the heavier piece of money.

There are a few useful explanatory notes appended to the volume, and in one of these we might suggest an alteration which would render it more in conformity with prevailing chemical theories. Note 16, sect. 3, calls the colourless gas evolved by the action of copper turnings upon dilute nitric acid binoxide of nitrogen, and states that it is formed of one atom of nitrogen and two of oxygen. This is now called nitric oxide. As in many chemical works the formula NO_2 is used for a totally different substance, viz., nitric peroxide, a gas not colourless, but of a deep orange hue, some embarrassment would probably be caused to the young student.

An abundant supply of woodcuts embellishes the work. These are in the main correct, the principal exception being that illustrating the electrolysis of water, on page 92, in which the volume of oxygen would appear—contrary to fact and to the text—to be twice as great as that of hydrogen.

In conclusion, we are convinced that, as a preparation to the more careful study of natural phenomena, no better book could be placed before children than this.

BOOKS RECEIVED.

Monthly Report on the Progress of Therapeutics No. III. By W. Handsel Griffiths, Ph.D. L.R.C.P.E.

Chemistry in Relation to Therapeutics. By W. Handsel Griffiths, Ph.D., L.R.C.P.E. London: Baillière, Tindall, and Cox. 1874. From the Author.

The Pharmacopœial Companion to the Visiting List and Medical Diaries. A Posological Table of all the Medicines of the British Pharmacopœia. By Robert T. H. Bartley, M.D., M.B. London: Bailliere. 1875.

A Year's Botany: adapted to Home and School Use, By Frances Anna Kitchener. London: Rivingtons. 1874.

Obituary.

Notice has been received of the death of the following:—

On the 9th December, 1874, Mr. Thomas Gallye Lamotte, Chemist and Druggist, of Exebridge, near Tiverton.

On the 11th December, 1874, Mr. Edward Ballard Short, Chemist and Druggist, of Bushey Heath, Herts.

On the 15th December, 1874, Mr. Thomas Ellis Mitchell, Chemist and Druggist, of Gravesend.

Notes and Queries.

[422]. MAPSON'S SALVE.—I take the liberty of asking for a recipe for "Mapson's Salve." It is an old patent, and if not a breach of confidence, I should feel obliged by any one giving it in the Journal.—Digitis.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Good Old Times.

Sir,—I read the letters from time to time appearing in the Journal from gentlemen clamorous for early closing, shorter hours, less work, etc., and I have read the letter from "A Dissatisfied Master" on the subject. From that gentleman's point of view, I think much more might be said. I would ask "An Examined Assistant" if furthering his master's—I beg his pardon, his employer's—interest would be his first consideration? Would he be much surprised at the expiration of twelve months' servitude were his employer to say to him, "The returns of my business have considerably increased during the past year, to which your industry and zeal have much contributed; I therefore shall be pleased to make an extra increase to your salary?" I fancy, if he knows himself, he will say, "No" to my first question, and admit that he would be absolutely astounded to receive such testimony to the value of his services. I rather think he would desire to obtain that situation which offers a minimum amount of work, provided it was not accompanied by a minimum amount of pay. And if so, he assuredly is no man of business, and not likely to do much good either for an employer or for himself, although he may have the high honour of writing so sounding an affix to his name.

On reading his proposed "second stipulation," I could not help exclaiming—and I take it I was not singular—"what next, and next?" I could perhaps understand such a proposition if assistants were workmen who never could become employers, but the assistants of to-day will be the masters of to-morrow. And here I would ask, who are the head and chief offenders in keeping shops open late at night, men who have old-established businesses, the generation going out; or those who have newly-established businesses, the generation coming in? My experience tells me that it is decidedly the latter, many of whom perhaps were but yesterday the most noisily clamorous for early closing. What sort of business can "An Examined Assistant" have been employed in, when he talks of "unemployed time during business hours" when "works on pharmacy and the allied sciences could be studied?" I have never had experience of such. A well-managed retail business, the same as a wholesale, would have constant and abundant employment for the employés during business hours, and in such a business an assistant, if he were wise, would desire to be engaged. Possibly for unhappy discontents, like "An Examined Assistant," a glance at what they have escaped by being brought on the stage of these latter times may prove a solace. Take an instance—no fancied one. Apprenticed before fourteen and a half. Opened shop at 6·30, so long as it was light; and, so long as it was light enough, rose at 4·30 to study or play cricket, and as the church clock pointed to 6·30—punctual to the minute—struck wickets, dropped bat and ball, and assumed in their stead the apron and dusting cloth. At 8 o'clock precisely passed from the shop to the breakfast room—a room with no light but that borrowed from the shop. By that hour the shop from end to end, and from ceiling to floor, had been thoroughly dusted, and on Mondays the shop windows in addition had been cleaned. The window-shutters were put up at 10, the shop closed at 11. Work relaxed at 9, save on Saturdays, then it might be said to be continuous till 11, barring a brief interval for supper—generally on that night a treat of tripe. The dormitory an attic, without chimney or other ventilation, in which for some time three persons slept—assistant and apprentice in one bed, and errand lad in a second. No "evening out" during the week was ever heard or dreamt of. On Sundays shop kept open from 8 a.m. till 11 p.m. When the apprentice was able, he alternated Sunday duty with the assistant, and when he was sufficiently competent and old enough, the assistant's services were dispensed with. And then the apprentice's hat was sometimes known to experience the luxury of resting undisturbed in its box for six weeks at a stretch, each successive Sunday being spent by the apprentice—not his hat—in the little room with the borrowed light. And, it may appear incredible to "An Examined Assistant," the apprentice anticipated with as much pleasure then the return of the seventh day as he ever has since, for he was fond of reading, and the amount of Sunday trade offered but little interruption.

As a proof that all situations at that time of day were not widely different from the one described, I may mention that in one of the first situations the apprentice held as assistant, the proprietor of the business said to him, "I don't think the master should be expected to do so much Sunday work as the assistant, and therefore I expect him to attend to the shop two Sundays out of three, and I attend the third." That meant absolute rest for the assistant's hat twenty days out of each twenty-one. As the master never went to church, nor ever stirred out on a Sunday, and was able to indulge in any amount of out-door recreation, had he pleased, during the other six days, while the assistant could only hope to do so on the seventh, this—though not at the time—did, in after-years, strike the assistant as rather selfish. So also did his master's hint that as the assistant's home was not more than twelve miles distant, he supposed he would go thither on his "Sundays out." He evidently did not desire that the assistant should have a cut of his mutton on a day that he did nothing to earn it, and the assistant being, perhaps, over sensitive and modest, could not appear blind to the hint; and so every third Sunday, regardless of the weather, undertook a journey of twenty-four miles, generally at an expenditure of shoe-leather and muscle, not relishing the inroad that travelling regularly by coach or omnibus would have made in his salary of £30 per annum.

My letter is already longer than I intended it to be. I draw suddenly to a close. I may, in a future communication, endeavour to administer further consolation to "An Examined Assistant," and others like unto him. In conclusion I would simply say that I rejoice that what I have depicted are things of the past, and that with regard to "Sundays out," I think that in establishments where only one or two are kept, the principal should place the seventh day entirely at the disposal of his employés, content himself to do, as a rule, whatever Sunday work is required.

Veritas.

Pharmaceutical Education in Ireland.

Sir,—The subject of Irish pharmacy and the extension or formation of a Society of pharmaceutists for the sister isle has often, and long occupied the pages of your Journal, but has led, as yet, to no practical result.

I remember during a three years' residence with the largest firm of apothecaries in Dublin, taking up the Journal one evening in 1868, I think, and finding that Mr. Abraham had given notice that it was his intention to move, at the next meeting of the Council, that steps be taken to assimilate the laws relating to pharmacy in Great Britain and Ireland.

I wrote to Mr. Abraham on that subject, and I also remember that he seemed to have an impression similar to that mentioned in your article on the Irish pharmacy question, namely, there is an idea entertained by some, that should such an act become law, there would be, as you say, an exodus of chemists and druggists, of all degrees of efficiency, making their way to Ireland, eager to clutch the pharmaceutical prizes dropping from the hands of the apothecaries.

During my sojourn in Dublin, I had opportunities of hearing and knowing the feelings of a large number of medical men there on this point, and I am simply stating what I know to be the case—that the largest number of physicians, practising as such, are decidedly in favour of the extension of the Pharmaceutical Society of Great Britain to the sister isle, or of the establishment of a Pharmaceutical Society in Ireland altogether separate and distinct from "the Hall." Apothecaries of known reputation and standing, possessing powerful local interest, would have nothing to fear, and much respecting which to rejoice, as they could, probably, so far as the present generation is concerned, take the lead in the management and general government of such Pharmaceutical Society, they being really, truly, and practically pharmaceutists and not practitioners.

For my own part, I would fall in with Dr. Leet's view of the matter, namely, that pharmaceutists alone should be recognized, and thus the Major qualification would necessarily be insisted upon; and so this anticipated current of chemists and druggists of all degrees of efficiency would set another away.

I believe the Apothecaries' Hall of Ireland is favourable to this scheme, and I imagine from Professor Tichborne's name being constantly mentioned in connection with some of the classes, that he has done, and is doing, much to smooth the way for an amicable arrangement, for the ultimate good and advancement of pharmacy.

In some parts of Ireland I know there is much need of such an Act, to supply the inhabitants of large districts with necessary medicines, and to these people and places such an institution would be of the greatest possible value; but in Dublin, Belfast, and Cork there are very superior, and very extensive houses, conducted strictly as compounding establishments, well able to compete with any London or Edinburgh firms, and it is quite a mistake for anyone to imagine other than that in the above places pharmacy has some most able and distinguished representatives.

In conclusion, I will only express a hope that ere long some such Act as that mentioned may have passed into law, so that when other societies are holding conferences and exchanging mutual greetings and friendly cordialities with our Irish brethren, we, too, as pharmacists, may be permitted to hold conferences in Dublin and Belfast, and partake of, and share in the hospitalities so liberally and lavishly bestowed on members of the other British Associations.

Arthur Wm. Postans.

35, *Baker Street, W.*
November 30th, 1874.

Preservation of Infusions.

Sir,—I was surprised to read, in the Journal of the 5th inst., the following remarks made by Mr. Martindale:—"He believed that Mr. Barrett had once used carbolic acid for preserving infusions, but that substance, to the extent that Mr. Barrett used it, was very dangerous in consequence of its poisonous action."

I beg leave to deny this statement *in toto*. I certainly, some years ago, plugged the mouths of infusion bottles with carbolized wool, and tried carbolic acid with other antiseptics as infusion preservatives against chloroform, but only as an experiment. Of course I never gave (or intended to give) carbolic acid preserved infusions to patients, and as I have not had the honour of speaking more than a dozen words to Mr. Martindale in my life, I conclude that some good-natured mutual friend has played us both a practical joke.

I quite think that it is not likely chloroform will prove to be a satisfactory preservative for ordinary infusions. In hospitals, however, where concentrated infusions are used, and after obtaining the sanction of the prescriber, its use is, I think, quite unobjectionable. No one can doubt the immense superiority of the fresh infusion over the concentrated, but how can the former be kept in readiness for dispensing in hospitals?

Frederick John Barrett.

Wolverhampton and Staffordshire General Hospital.

Amorphous Phosphorus.

Sir,—If Mr. Postans flatters himself that I attached the least "importance" to the "purport of his letter" in the Pharmaceutical Journal of November 14th, he is so far mistaken. I replied to the only question necessarily connected with the observation I made when the paper was read, and I did it at the proper time and in the proper place at the next month's evening meeting, directly after the reading of the minutes.

The other questions refer to the medical literature rather than to the pharmacy of the subject.

If Mr. Postans and his medical coadjutor waited a month for my reply as to dose, etc., I fear that Pharmaceutical research on the one hand and Therapeutic Science on the other, will not be much advanced by either.

I have yet to learn that pharmacists are as a rule averse to making reasonable experiments in aid of Therapeutics, or that they require to be reminded of the important services they may render by doing so, but many of them have a conscientious objection to "floating" rubbish which is a blot to Pharmacy and no credit to medical science.

I may be excused reminding Mr. Postans that the tone of his letter is personal in the extreme. In the discussion which took place I advanced no "useless theory" or "hypothetical statements;" I merely related a fact within my own knowledge; he will not therefore be surprised at my declining to reply to any further communication.

Personal observations in discussions of this nature do not advance science and they are quite unnecessary, but they tend to dissociate the profession of a gentleman from that of a pharmacist.

Thomas Greenish.

20, *New Street, Dorset Square.*

Sir,—The statements contained in the letters of Messrs. Corder and Perkins, relating to the preservation of infusions, I can fully corroborate by my own experience.

The method first came under my notice some six years ago, when I came to reside with Mr. Humpage at Turnham Green, who then informed me that it had been his practice so to keep them for years, and he added that only in exceptional cases did they go bad. Our *modus operandi* is simply to heat the infusion to about 190° Fahrenheit, and then, fill up some six or eight ounce bottles completely to the brim, so as to run over, and tie them over immediately with bladder. The bottles we always warm, so as to prevent fracture when the hot infusion is put in. Care should also be taken that the bladder used be perfectly air-tight. As the infusion cools a vacuum forms, causing a concave appearance of the bladder, and as long as it presents this appearance the infusion is good. Occasionally a certain amount of decomposition takes place, gas is formed, when the concave surface becomes convex, and on piercing it a slight report is heard; the infusion then of course is valueless.

While on the subject I may remark that lime juice, which is so liable to decomposition, may in this manner be preserved fresh and good for almost any time. The objections to the use of chloroform are, I think, too obvious to need repetition, and I quite agree with Mr. Corder that the average of prescriptions containing it and its preparations is very much less than stated by certain eminent pharmacists at the late meeting.

Frederick George Gudgen.

Turnham Green, W.

Proposed Conference of South London Chemists.—Mr. Samuel Lacey, of Vassall Road, North Brixton, writes to suggest the desirability of holding a conference of Pharmaceutical and Non-Pharmaceutical Chemists of South London, which shall have for its object:—1. The formation of local committees for organizing a mutual society to promote the interests and advancement of the profession. 2. To promote early closing. 3. To establish a library and reading room. 4. To promote periodical meetings for the interchange of professional experience and ideas. 5. To aim at establishing a permanent school of chemistry to facilitate the acquirement of a sound knowledge of all branches of science in connection with pharmacy. Should these proposals be approved of, a meeting could be arranged (by those willing to form a committee *pro tem.* forwarding their names and addresses to Mr. Lacey or as under), which could be advertised in due course, and a preliminary meeting held to decide upon the time and place for holding the conference. Mr. J. Bailey, Chemist, Clapham Road, will be glad to receive any names and addresses of those wishing to cooperate in the movement.

R. U. Clark.—Bicarbonate of Soda 1 oz., powdered Castile soap ½ oz., sulphate of potash ½ oz., sugar of milk ½ oz., orris root 4 oz., oil of bitter almonds 4 drops. Coloured at pleasure. (Beasley).

W. Bird.—The book is out of print, but we believe some copies are still held by various booksellers. Apply to Mr. Kimpton, Bookseller, Holborn.

"*Chemist.*"—Yes, if he is on the Register of Chemists and Druggists.

"*Horns.*"—Perhaps the best way would be to make a fresh solution, and use nitrate of copper.

J. W. S.—The solvents of ordinary shellac will dissolve white shellac provided it be freshly prepared and has not been exposed to the air.

A. H. Claypole.—You will find directions for preparing and using the tests mentioned in 'Sutton's Volumetric Analysis,' or any manual of Water Analysis.

R. M. Gould.—The pamphlet is published by Baillière, Tindall and Cox, King William Street, W.C.

Communications, Letters, etc., have been received from Mr. Bird, Mr. Bell, Mr. Howard, "A Pharmacist."

REMARKS ON JAVANESE CALISAYA BARK AND ON QUINIDINE IN REFUTATION OF SOME STATEMENTS IN DR. HESSE'S PAPER ON THE SAME SUBJECT.*

BY DR. J. E. DE VRIJ.

The just reputation of Dr. O. Hesse as a chemist in general, and particularly in relation to the chemistry of the cinchona alkaloids, and a wish not to lose the confidence which I am happy to enjoy of many readers of this periodical, compel me, much against my inclination, to refute the following statements which occur in the above paper:—

1. That the Calisaya originally introduced into Java is not *Cinchona Calisaya*, Weddell, but another species, because its bark contains quinidine, which alkaloid does not occur in Calisaya bark from Peru or Bolivia.

2. That when, in 1859, I extracted quinidine from the bark of the above-mentioned species, my proof of this fact was unsatisfactory, because at that time I was not enough acquainted with the more frequently occurring Cinchona alkaloids.

3. That Dr. Hesse found in a Javanese Calisaya bark, which I had presented to him, 3·18 per cent. of quinidine, whilst I obtained only 0·50 per cent. of that alkaloid from the *same* bark.

4. That sulphate of quinidine, which really deserves that name, very rarely occurs in the trade.

Ad 1m.—Although I quite agree that the plants originally introduced into Java do not belong to a valuable variety of *Cinchona Calisaya*, Weddell—so that I very much prefer the later introduced variety, called *Ledgeriana* by Mr. Howard—I, nevertheless, am obliged to maintain that they really do belong to *Cinchona Calisaya*, Weddell, and to no other species, notwithstanding the large amount of quinidine sometimes contained in their bark. My authority for this assertion is Dr. Weddell himself, who visited me in September, 1855. At that time the Cinchona seeds sent by Dr. Hasskarl from Peru had produced seedlings in the botanical garden of Leiden, and as there was a rumour that these young plants did not belong to valuable species, the Colonial Minister, Mr. Pahud, to whom I had communicated the expected visit of Dr. Weddell, was very anxious to have his opinion about this matter. The Minister expressed to me his wish to meet Dr. Weddell, but not before this gentleman should have seen the plants. I, therefore, on the 24th September, 1855, accompanied Dr. Weddell to Leiden, where my friend, Professor de Vriese, showed to him the young Cinchona plants of the kind of which the greatest number had been sent a few weeks before to Java, under the care of Dr. Junghuhn, on board of the ship, "Minister Pahud." The plants showed to Dr. Weddell belonged to two species, one of which he immediately recognised to be *C. Calisaya*; he did not, however, recognise the other species, which was described some years later by Mr. J. E. Howard, under the name of *C. Pahudiana*. I returned with Dr. Weddell from Leiden to the Hague on the same day, and accompanied him in the evening to the Colonial Office, where I left him with the Minister, who was expecting him there at 8 o'clock p.m.

The fact that after the conference of the Minister with Dr. Weddell, the remaining Calisaya plants were sent, like the former, under *that* name to Java, proves that Dr. Weddell maintained the opinion which he expressed at Leiden, also in presence of the Minister. Therefore, as long as Dr. Weddell does not retract his opinion, I shall hold that the Cinchonas originally imported into Java under the name of *Calisaya* belong to the species described by Dr. Weddell under the name of *C. Calisaya*.

Ad 2m. I readily agree that in 1859 I was much less acquainted with the Cinchona alkaloids than I am now; but at that time there was none of them with which I was so well acquainted as with the alkaloid called "quinidine" by Henry and Delondre, who discovered it in 1833, and maintained in 1853, under that name, by Pasteur. It was at that time the only Cinchona alkaloid which I succeeded in obtaining *chemically* pure. I feel at liberty to make an appeal to Mr. J. E. Howard, who can state by experience that as early as 1856 I was thoroughly acquainted with Pasteur's quinidine after my discovering its interesting compound with hydriodic acid.* The slight solubility of this compound in water, combined with the powerful dextrogyre rotation of the alkaloid, which I never failed to ascertain, as my laboratory in Java was provided with a first-rate polarizing apparatus made by Dubosq, rendered it impossible for me to have been mistaken when I stated in 1859 that the Javanese Calisaya contained a relatively large amount of quinidine. But there is still another proof that the quinidine discovered by me in 1859 as existing in Javanese Calisaya is really the same alkaloid described under *that* name by Pasteur, for everyone who has studied the International Exhibition at London, in 1862, may have seen the crystallized hydriodate of quinidine prepared by me from Javanese Calisaya bark, and exhibited, together with other products of Javanese Cinchonas, by my colleague, Dr. Junghuhn, who was rewarded with a medal for these contributions. This same hydriodate of quinidine is still existing in the Colonial Museum at Harlem, where Dr. Hesse and anyone interested in the matter may see it.

Ad 3m. Every chemist who has once prepared the hydriodate of quinidine, and has thereby become acquainted with its properties, will agree with me that the quantitative determination of the alkaloid called quinidine by Pasteur, and conchinine by Hesse, is so very easy that a difference so great as between the numbers 3·18 and 0·50 is really an impossibility. I agree that the Javanese Calisaya bark with which I presented Dr. Hesse about a year ago was really grown and collected by me at Tjibodas, in Java; but I positively deny that this bark is identical with that which I analysed in 1859. The bark then analysed by me was a product of several young Calisayas which had died, and was wholly sacrificed to that analysis, so that *nothing* was left. The bark in which Dr. Hesse states he has found 3·18 per cent. of quinidine is of a later period, and I made him a present of it so that he might convince himself of its large amount of quinidine. I am quite at a loss to understand how Dr. Hesse can quote from p. 79 and 94 of my paper a *quantitative* analysis of the *different* alkaloids of Calisaya bark, for on page 79 I find only that I obtained from 50 grams of Calisaya bark 2·155

* See before, p. 482.

* In his letter, dated December 30th, 1856, Mr. J. E. Howard wrote to me about this subject, "Your letter has given me much pleasure, and proved very interesting, more especially so your very beautiful reaction for quinidine by means of hydriodate of potash. This I have put to the proof, but not as yet the hydriodic acid."

grams = 4·31 per cent. of rough alkaloids, and on page 94 the only number which I can find is that of 46°·5, indicating the molecular rotation of quinic acid. The only explanation which I am able to give of this misquotation is, that the paper, of which I gave a copy to Dr. Hesse, is written in Dutch, so that it is possible that he did not quite understand it. The quotation of any page of this paper is, however, quite useless, as it is a copy of a paper published originally in the journal called "*Natuurkundig Tijdschrift van Nederlandsch Indie.*" As the copy cannot be had, in order to put the reader in the position to compare the accuracy of the quotation, a quotation ought to refer to the pages of the journal in which the paper has been inserted. I therefore correct Dr. Hesse's quotation by stating that p. 79 refers to p. 255, and p. 94 to p. 270 of the mentioned journal, vol. 21, 1860.

This journal can be bought in the trade, and it is therefore now possible for the reader of Dr. Hesse's paper to judge between my statement and Dr. Hesse's.

Ad 4m. If Dr. Hesse had stated on p. 342 of the journal quoted that sulphate of quinidine, which really deserves that name, does not occur in the *German* trade, I should quite agree with him; but I must differ from him when he states that in England, like in France and in Germany, a mixture of Cinchona alkaloids freely crystallizing from ether serves to prepare large quantities of a so-called sulphate of quinidine, which however contains, according to Dr. Hesse, chiefly cinchonidine, and only by exception real quinidine. Although I am unable to judge, generally, if there be *some* truth in that assertion, because I am not acquainted with the products of all the firms who manufacture Cinchona alkaloids, gratitude compels me to acknowledge that as early as 1856 Mr. Howard presented me with *pure* quinidine, and it is chiefly to his generosity that I owe my peculiar knowledge of that alkaloid. The purity of his alkaloid was proved by me both by the polarizing instrument and by its compound with hydriodic acid. For the history of Pasteur's quinidine (= Hesse's conchinin) the following extract from Mr. Howard's letter, dated Dec. 30th, 1856, is very interesting:—"It seems to me a great pity that sulphate of quinidine is not more used commercially. I have myself tried it with excellent effect in many cases of ague, to which I have given this medicine gratuitously, and have never failed in checking the periodical returning of the paroxysms of fever. I am inclined to think that it produces less disturbance and that it may be given more freely than quinine, and the price is now low. I suppose we should sell the commercial article in large quantity at four shillings the English ounce." To this I can add that when I went to Java in 1857 I took with me a large provision of sulphate of quinidine, for which I was indebted to the generosity of Mr. Howard, and during the six years of my staying in Java I always cured my servants of ague by this sulphate with the greatest success. Although I do not know exactly when Messrs. Howard and Sons introduced the real sulphate of quinidine into the trade, it is of public notoriety that in 1867 they provided the Indian Government with pure sulphate of quinidine, whilst I am myself, through their liberality, in possession of most beautifully crystallized sulphate of quinidine.

The Hague, December 9th, 1874.

NOTE ON SPIRITUS VINI RECTIFICATUS.

BY JOSEPH INCE.

It was suggested in a recent paper on a proposed International Pharmacopœia, that the mode adopted in America for expressing spirit strength, might be recommended as another step in the direction of uniformity. The advantage of this method has the same claim for general use as the metrical system of weights and measures—one common language and one recognized standard for degrees of temperature. The gain would be on the side of mutual understanding, and ease of definite application.

To save private correspondence on the subject, the argument in favour of the American plan may thus be stated:—

In England spirit strength is described in two different ways, the first referring to pharmacy and the directions of the British Pharmacopœia; the second to excise regulations. We have then—

I. Spiritus Rectificatus = Spirit of Wine, B. P.
Specific gravity at 60° F., 0·8382.

It contains 84 per cent., by weight, of absolute alcohol.

II. Spiritus Tenuior = Proof Spirit, B. P.
Specific gravity, at 60° F., 0·920.

It contains 49 per cent., by weight, of absolute alcohol, and may be further described as Sp. Rect., B. P., 100 volumes + water *ad* 156 volumes. Sixty volumes of water are required, owing to the known law of condensation.

Excise arrangements involve another nomenclature, and we have—

(a) Proof spirit as the standard unit.
(b) Spirit over proof = O. P.
(c) Spirit under proof = U. P.

To ascertain the spirit strength we have to use Syke's hydrometer with certain precautions, or we make various calculations which resolve themselves into this—

P. S. (proof spirit) = 1.
Absolute alcohol = 100 O. P.
Water = 100 U. P.

Let it be noticed that the term Spiritus rectificatus has an arbitrary signification. The adjective does not mean rect-ified, as in rectified oil of turpentine; but weak spirit so concentrated as that it may be of official strength. Also in determining the specific gravity, it is requisite for a Frenchman to know that 60° Fahrenheit = 15·5° Centigrade. It is granted that these points are familiar to every student of chemistry, but not the less are these terms of themselves unintelligible in countries not our own, until their exact relative meaning has been ascertained.

With this may be compared the Paris system, as given in the Codex, 1866. In commercial use we find—

Alcool, syn. Esprit de Vin.
1. Alcool absolu = 100°.
2. $\left\{\begin{array}{l}\text{Alcool rectifié}\\ \text{Esprit de vin}\end{array}\right\}$ = 85°.
3. $\left\{\begin{array}{l}\text{Alcool faible}\\ \text{Eau de vie}\end{array}\right\}$ = 56°.

The degrees are those marked on the Alcoo-mètre centésimal of Gay-Lussac, the description and use of the apparatus being given in the Codex, page 13.

Its chief divisional arrangement is as follows :—
The instrument is marked off in 100 parts—

Pure { Water = 0.
Alcohol = 100.

Each division shews $\frac{1}{100}$ of absolute alcohol; necessarily in its construction allowance has been made for the laws of variable contraction.

These forms of Spiritus rectificatus are (as already said) commercial; but French pharmacy offers two more varieties.

A. Alcool Rectifié, syn. Alcool repurgatus.

This is the result of the distillation of Esprit de Vin; the first product (two-fifths of the distillate) marks 88° to 90° on the centesimal. The remainder of the distillate is used "in a great number of preparations," being obviously a weaker spirit.

B. Alcool at 95° centésimaux.

This is Alcool at 85°, digested for two days at a gentle heat with dried potassium carbonate, and then distilled.

It marks (as its title indicates) 95° at a temperature of + 15° C. Lastly, Alcool absolu = 100° at + 15° C, the standard of comparison, and is obtained by adding to each litre of this alcool at 95°, 300 grammes of finely powdered quicklime, previously slacked by water, and well calcined. After two or three days' contact in the hot room, the mixture is slowly distilled in a water-bath.

It will be conceded that this French mode of designating spirit strength is not familiar to the average English reader. When Dr. de Vrij was asked at the opening meeting of the British Pharmaceutical Conference the strength of the spirit which he used in testing the cinchona alkaloids, he endeavoured to find out the absolute strength of the spirit used in England. The answer was elicited with hesitation; but had we followed the example of the United States, there would have been no difficulty in the reply.

Spirit of wine is chiefly used in America in the form of alcohol and of diluted spirit, but it is also frequently described according to its per centage; as, for example, 50 per cent. spirit, 60 per cent. spirit, and 80 per cent. spirit, meaning that in the volume there are 50, 60, or 80 parts, *by weight*, of absolute alcohol to a corresponding number of parts of water to make 100. Thus 80 per cent. spirit contains 80 per cent of absolute alcohol (sp. gr. ·795) to 20 per cent. of water, both by weight.

Alcohol, official, in the United States' Pharmacopœia, is not absolute alcohol, but is known as "druggists' alcohol," and contains 85 per cent., by weight, of absolute alcohol having a specific gravity of ·835. This, therefore, would be popularly known and correctly described as 85 per cent. spirit. It is employed as a solvent for resins, balsams, grape-sugar, and castor oil.

Diluted alcohol, U. S. P., consists of equal parts, *by measure*, of druggists' alcohol and water, or 42 parts, by weight, of absolute alcohol to 58 of water. Its specific gravity is ·935. By our Syke's hydrometer it would be 14 under proof. This would be popularly known, and correctly described, as 42 per cent. spirit. Our B. P. rectified spirit, sp. gr. ·838, would be popularly known as 84 per cent. spirit, because it contains 84 per cent., by weight, of absolute alcohol, to 16 parts of water. Our B. P. proof spirit, sp. gr. ·920, would be popularly known as 49 per cent. spirit, because it contains 49 per cent. of absolute alcohol to 51 of water by weight. This method of naming spirits of various strengths is so simple and correct that its great advantages are at once apparent and leave nothing to desire.

It may serve at once for international assimilation and practical pharmaceutical employment.

THE INSECTICIDAL PROPERTIES OF SOME SPECIES OF PYRETHRUM.*

BY HERMANN KALBRUNER.

Some plants of the Composite family have long been used for the destruction of different kinds of insects. Thus, Mathiolus in his 'Herbal' (A.D. 1563) says of the *Conyza media* (*Conyza squarrosa*, L.) that the plant or the smoke of it will drive away fleas, gnats, and other noxious insects. The smell of *Inula Pulicaria* was held to be equally efficacious in dispersing insects, and the herb *Artemisia Absinthium* was used for similar purposes. In the Banat the root of *Inula Helenium*, L., has long been held in high esteem as a fumigant against mosquitoes, etc.

But in more recent times certain species of *Pyrethrum* have obtained considerable reputation as insecticides; the *Pyrethrum carneum* and *P. roseum*, M.B., both growing wild, and frequently cultivated in the Caucasus, having, in this respect, proved to be very superior. In the year 1846, Zacherl, a Tiflis merchant, first introduced the sale of these flowers into Vienna under the name of "Persian Insect Powder."

Notwithstanding that *P. carneum* and *P. roseum* are indigenous in the Caucasus and in Persia, they have been successfully cultivated in many localities in Europe and North America. The climate of Lower Austria suits them very well; they are found there as ornamental plants in the gardens, and they grow in northerly cool places with especial luxuriance. The author has had plants of *P. roseum* in his garden during several years, and they have supported the cold of winter without shelter.

Under the name of Dalmatian Insect Powder the flowers of *Pyrethrum cinerariæfolium*, Trev., a plant that grows wild in Dalmatia, have been used. Through the kindness of a friend the author obtained some seeds from Dalmatia, from which he was successful in raising plants in his garden, where they lived through the winter in the open air.

In order to test the effect of the different insect powders the author sprinkled some flies with the powders, and took the length of time required to kill the flies as the measure of the value of the powders. When a house fly was placed in a small flask, sprinkled with four grains of insect powder, if the powder were very powerful, there was considerable stupor at the end of one minute, followed by death of the fly after two or three minutes. The commercial insect powders behaved differently in this respect; some of them corresponding completely to the above standard, whilst others, although they quickly stupefied flies treated as above, required fifteen to thirty minutes to kill them. The druggists in Vienna purchase the whole flowers, yielded, in the author's opinion, by the uncultivated Dalmatian *Pyrethrum cinerariæfolium*, Trev., and the powder they supply is a very energetic preparation. It is noteworthy that

* Zeitschrift des allgemeinen österreichischen Apotheker-Vereines, vol. xii., p. 542.

both these entire flowers and the powder prepared from them, after being kept six years, do not suffer any particular loss of activity. The author found the powder of the flowers of *P. cinerariæfolium* cultivated by himself also to be very active.

Pyrethrum roseum, M. B., of the author's cultivation, appeared to be slower in its action, which he ascribes to the circumstance that the dscoid flowers are much more powerful than the radiate flowers, which appear to have little activity. The radiate flowers occur in *P. roseum* in much larger proportion than in *P. cinerariæfolium*; and to this fact he considers the greater activity of the latter due.

The fresh (undried) flowers of both these Pyrethrums will kill flies, but very slowly. The plant itself, powdered, appeared to be quite inactive. In a similar manner the author tested the powdered flowers of several Austrian Compositæ, and he found the following to be quite inactive in this respect:—*Chrysanthemum leucanthemum*, L., *C. Coronarium*, L., *Anthemis arvensis*, L., *A. Cotula*, L., *A. tinctoria*, L., *A. nobilis*, L., and *Inula Pulicaria*, L. The flowers of *Tanacetum vulgare*, L., and *Pyrethrum corymbosum*, Sm., appeared to have a very slight stupefying effect.

Of all the Austrian indigenous Composites tried by the author, only the powdered flowers of *Pyrethrum Parthenium*, Sm., and *P. inodorum*, Sm., exercised a stupefying influence upon flies, and that only after the flies had been dusted from one to two hours; their value, therefore, as insecticides, is very slight. In a scientific aspect it is, however, interesting to notice that up to the present time the action obnoxious to insects has only been observed in the genus *Pyrethrum*, whilst from other Composites approaching very nearly to that genus the property is absent.

Some years since, the *Journal de Pharmacie d'Anvers* contained an article, which was copied into various other journals, asserting that the insecticidal action of Persian insect powder was due to powdered flowers of *Anthemis Cotula*. As above stated, the author found the flowers of this species quite inactive, since flies which had been dusted with it were after four hours still able to fly away readily. The author conjectures that a species of *Pyrethrum* was mistaken for *A. Cotula*.

The cultivation of *Pyrethrum roseum* and *P. carneum* has already been attempted in various places in Austria. Paukert, an apothecary at Treuenbritzen, has cultivated them for several years, and in Hager's *Pharmaz. Centralhalle* (vol. vii., p. 49), has detailed his method of proceeding, from which it appears that the growth of the plants has been very successful in richly manured soil. The author's experiment also with *P. cinerariæfolium* yielded the flowers at a slight profit. But as very active flowers can be obtained from Eastern Asia and Dalmatia at a moderate price he does not think that the home cultivation would be remunerative.

PHARMACY IN DENMARK*.

BY HANS M. WILDER.

The number of pharmacies in Denmark (as is the case in most European countries) is limited by virtue of the control which the Royal Board of Health exercises over them. A privilege (licence) is granted only to persons who are recommended by the Board as competent pharmacists, and then only where a real want of a pharmacy exists. There are two classes of privileges: *real* and (chiefly since 1842) *personal*. A real privilege is transferable, and can be bought by any one who has fulfilled all the requirements of the law. (All privileges granted before 1842 are practically considered real.) A personal privilege, on the contrary, is granted only for lifetime, and is, consequently, non-transferable. When the owner of such a privilege dies, the place is open for a new competition, unless the widow, as is generally the case, is granted permission for one or more years to conduct the business under the supervision of a *provisor*.

Pharmacists are now trying to convert the "real" privileges into "personal" ones, but experience the same trouble as pharmacists do in Germany and elsewhere; and I think that Sweden is, as yet, the country which has approached a satisfactory solution the nearest. Respecting "free trade," there exists the same hard struggle, as in other countries, between pharmacists with stores and those without stores. The pharmacies emerged by degrees from the kitchen of the physician, until they became independent. The first privilege on record dates 1536 (Svane Apothek, Copenhagen); the six next, respectively, 1543, 1549, 1573, 1581, 1585, 1591. The whole number of pharmacies in 1870 was 115, to a population of 1,783,585, which makes an average of one to every 15,509; thus it will be seen that as a rule, pharmacies in Denmark must yield quite a comfortable competency.

The only collection of ordinances (pharmaceutical laws) begins 1660. Already in 1668 yearly inspection of pharmacies was insisted on, but it was first in 1672 that a full ordinance appeared, detailing, in thirty paragraphs, the duties and requirements of the apothecaries, and, incidentally, those of the physicians. I may be permitted to extract a few of the said paragraphs, in order to show that two hundred years ago the requirements were quite up to the modern standard.

None but regularly graduated physicians were permitted to prescribe. The pharmacies must be inspected at least once a year; twice or oftener, if deemed necessary. In these inspections the quality of drugs and preparations must be examined into, and whether the apothecaries in their prices adhered to the annually issued price-lists; likewise, accuracy of weights and measures. Poisons to be kept in a separate compartment (or room) under lock and key. Arsenic and sublimate only to be sold by the apothecary.

When poisons or active medicines (heroica) were prescribed, then the physician had to write out the name and quantity in full, neither abbreviation or *chemical signs* being allowed. None but graduates must keep pharmacies, and every apothecary must keep at least one examined assistant. Further, they were enjoined to let their apprentices attend the professor of botany in his excursions, and, as far as possible, cultivate medical plants in their gardens. No prescribing over the counter was allowed. All preparations had to be made by themselves, and electuaries (mithridate, etc.) to be prepared only in presence of several physicians, who had to duly label them and mark the date and quantity. In their preparations they had to conform to the Dispensatorium Hafniense, which from time to time was revised by the College of Physicians. In case of patients dying, the claim of the apothecary had precedence before any other claims. No *quid pro quo* (substitution) permitted; in case of doubt, they had to consult with the physician. No physician allowed to keep or have part in a pharmacy.

In 1753 an ordinance forbade any apothecary to keep more than one store in the same town. In 1796 appeared the first detailed poison law, which, among other things, contains the proviso that arsenic can only be sold on certificate from the respective mayor or parson, and then only one ounce at the time. An ordinance, from 1843, permits the sale of lead water without prescription.

In 1810 apothecaries were required to notify the *district physician* whenever they intended to leave town for more

---

* From the *American Journal of Pharmacy.*

than twenty-four hours, unless their assistant happened to be a graduate. In case the annual price-list was not strictly adhered to, the apothecary in fault was fined 50 dols. for the first offence, 100 dols. for the second, and if caught a third time, he *lost his privilege*. An assistant would be fined one-half, and the third time declared *unworthy to serve* in any pharmacy in Denmark. (April 21, 1812.)

The first Pharmacopœia Danica appeared in 1772; the subsequent revisions respectively were 1805, 1840, 1850, (1857), 1868. There exist, besides, collections of formulas for the use of the chief hospital, for the military, and for the poor.

Pharmaceutical life is as follows:—

The apprentice must be at least fifteen years of age, and have left high-school from one of the two upper forms. If the latter be not the case, he has to pass a preliminary examination to show that he possesses a fair school education, and is proficient in Latin.

He has to serve four years before he is permitted to take his first degree (Physikat examen).

At this examination he is required to translate the Pharmacopœia, recognize drugs, read abbreviated prescriptions, put up prescriptions, make one of the easier preparations, and show a fair knowledge of practical chemistry, poison laws and doses, and of indigenous medical botany. If successful, he is declared *assistant*, and as such has a right to put up prescriptions on his own responsibility, but is not allowed to take a charge of a store for a longer period than twenty-four hours. After further serving for a couple of years, or after attending two courses of lectures at the University, he may take his last degree, which makes him a *graduate* (candidat), and gives him equal standing with the apothecary (minus the ownership of a store).

This last examination requires him to make an official chemical preparation, one or more tests, and a qualitative analysis (of any mechanical mixture), on each of which three he has to write a report (thesis); these preparations and analysis being made, and reports written on three consecutive days within twelve hours each day, during which time he is not allowed to talk to anybody, or leave the room before his task is finished, nor are text-books allowed.

Then comes the theoretical part, which is conducted orally, and consists of questions in practical pharmacy, theoretical and practical chemistry, natural philosophy, botany, pharmacology. There are three degrees of qualification, according to the number of points made: *Laudabilis, haud-illaudabilis*, and *non-contemnendus* (praiseworthy, not unpraiseworthy, not to be despised); graduates with the last degree generally try to make the examination over again. For exceptional proficiency in all branches there exists a fourth degree: *Laudabilis præ ceteris* (praiseworthy above all others). There is one peculiarity, which obtains in putting up prescriptions, viz., that every prescriptionist must put his name on the label every time a prescription is put up; in case of mistake, it is at once traced to the guilty party.

In general, the Danish apothecaries are not permitted to sell other things but drugs and medicines (including cologne, pomatum, hair oil, chocolate); since in small places, the legitimate part of business is not likely to be sufficiently remunerative, permission is granted to deal in groceries and general sundries besides. As a curiosity, it may be mentioned that such a small apothecary was backed in 1804 by an ordinance forbidding the grocers and other dealers in the same place to deal, among other things, in spirits of turpentine, purified saltpetre, licorice, muriate of ammonia, and guaiacum wood.

The roll of graduates was kept regularly only since 1770, and numbered, in the one hundred years ending 1870, 1140. Of those graduates who have distinguished themselves must, first and foremost, be named H. C. Oersted (graduated 1797), the discoverer of electro-magnetism; W. C. Zeise (from 1815) is well known for his researches on mercaptan, thialic ether, xanthic acid, and ether, the action of chloride of platinum on alcohol, etc.; E. A. Scharling (from 1828), through his researches on some starches, fats, oleoresins, and balsams, is not entirely unknown as a chemist; Dr. William Neergaard, for many years Vice-President of the New York College of Pharmacy, graduated 1831; Baruch S. Levy, or Lewy (from 1835), became known through his investigations of the atmosphere, wax, etc., and his connection with the mint in Paris, France.

There exist two pharmaceutical journals; one, started in 1844 (*Archiv for Pharmaci og technisk chemi*), appears quarterly, and corresponds to the *American Journal of Pharmacy*; the other one is, properly speaking, a weekly sheet (*Pharmaceutisk Tidende*). Of associations there are two, viz., "The Apothecaries' Association," whose aims and purpose correspond to those of the American Pharmaceutical Association, and the "Pharmaceutical Association," which is more like American local pharmaceutical societies, besides a Pharmaceutical Relief Association.

The Royal Board of Health (Sundheds Collegium) consists of two physicians and two apothecaries.

In speaking of Danish Pharmacy, I must not forget to mention S. M. Trier, who in many respects stands in the same relation to Danish pharmacy as the late Professor Procter stood to American pharmacy. Mr. Trier started, and is still the sole editor of the above-named *Archiv*. He likewise set the different associations on foot, and it is no fault of his if pharmacy in Denmark is not officially recognized as equal with medicine.

CAMPHOR ICE.

The following table, showing various formulæ for the preparation of Camphor Ice, has been supplied to *The Pharmacist*, by Mr. Thomas J. Corell, Graduate in Pharmacy, of Denver, Colorado. The proportions are given in parts by weight.

INGREDIENTS.	1	2	3	4	5	6	7	8	9	10	11	12	13
Ol. Amygd. Exp.	16						8	8					
„ „ Ess.													1
„ Lavand. flor.				$\frac{1}{4}$	$\frac{1}{2}$								
„ Verbenæ flor.						$\frac{1}{4}$							
„ Citronellæ						$\frac{1}{4}$							
„ Ricini		12											
„ Olivæ			12										
„ Rosmarini flor.	$\frac{1}{8}$												
„ Myrciæ Ac.									$\frac{1}{2}$	$\frac{1}{2}$		$\frac{1}{4}$	
Aqua Rosæ	16												
Cera Alba	1	8	3	4	8	16	4		18	18	20	11	20
Cetaceum	1	6	12			8	3	1		8	10		10
Camphora	2	2	6	2	4	4	3	1	8	6	6	5	6
Sevum									36			22	
Sevum Benz.				16	16								
Adeps						24							
Stearin com.										24	24		24
Glycerin			1										

No. 1 is an English formula, and gives a variety of Cold Cream; No. 2 is a formula used by a Cincinnati Pharmacy; No. 3 is a modification of No. 2, by the addition of Glycerin; No. 4 is in use in Philadelphia, Pa.; No. 5 is an English formula; No. 6 is from a Broadway, New York, Pharmacy; No. 7 is of French origin; of No. 8 the pedigree is lost; No. 9 to 13 are formulæ of the writer, and have been extensively used for both wholesale and retail trade, and will give excellent results, with perfectly sweet materials. The perfume is not arbitrary but can be mixed to suit one's taste, but do not consider it economy to use Ol. Mirbane, for it will ruin any of the formulæ.

The manipulation is easy to be understood; in the first and third formulæ it is similar to that of the Cold Cream of the Pharmacopœia; in all the others, the wax is to be melted first, then the cetaceum and lard, then the camphor, and finally, when sufficiently cooled, the essential oils, and then cast into suitable molds.

THE ALKALI ACT AMENDMENT BILL.*

BY J. PATTINSON.

An important measure, especially affecting the interest of manufacturers and the general public in this district, has passed the imperial legislature and become law during the last session of Parliament. I allude to the Alkali Act Amendment Bill. It was quite evident that something more was required to check the escape of deleterious gases than could be enforced by the Alkali Act of 1862. Vegetation in the neighbourhood of chemical works was in many cases being seriously damaged, although the reports of the inspector showed that the amount of muriatic acid escaping was less than the five per cent. on the total amount evolved allowed by the Act. In our own district it is sad to see how, in many places, the hedges and trees are being rapidly destroyed, and it is certain that, unless a change for the better is soon produced, the only trees to be seen on the banks of the Tyne in a few years will be those in the shape of posts to carry the telegraph wires. How different must have been the appearance of Newcastle in 1759, when John Wesley wrote thus of it in his journal:—"I know no place in Great Britain comparable to it in pleasantness!" Dr. R. Angus Smith, the able Government inspector under the Alkali Act, has for many years advocated the amendment of this measure, and it is obvious that the new Act has been chiefly based upon the very numerous experiments and the suggestions made by him given in his valuable annual reports. Those who know the care, intelligence, and caution which always characterize the work and recommendations of this excellent chemist, will not doubt that the alterations, so far as he has been able to control them, are of a practical character, and that whilst due regard is paid to the interests of the populations living in the neighbourhood of chemical works, the restrictions to be imposed to prevent the escape of gases injuriously affecting animal and vegetable life are such as will not unnecessarily interfere with the growth and prosperity of valuable industries.

The first important amendment is to define the term "alkali work," so as to include works in which the treatment of copper ores with common salt is carried on. As large quantities of muriatic acid are evolved in this process, which no doubt in some cases are allowed to escape into the air, the placing of these works under inspection and under the same restriction as alkali works proper, will be attended with benefit.

Another marked improvement in the Act is in restricting the amount of muriatic acid escaping in the chimney gases, or from any part of the works, to one-fifth of a grain per cubic foot of the gases or air leaving the works. The old mode of measuring the percentage of escape in relation to the total amount of muriatic acid evolved is still to be retained in the new Act as a protection in certain cases. By allowing only the escape of a definite amount of muriatic acid per cubic foot of escaping gases a certain state of dilution is insured, and this is a matter of great importance, for it is found that when diluted with air the destructive effects on vegetation are much lessened. The system of measuring per cubic foot is moreover simpler of execution and more easily understood, and allows of the escapes from the body of the works being determined, which could not be done by the other method of measuring by relative percentages.

The most important alteration, however, is that with reference to the escape of other noxious gases than muriatic acid. The noxious gases enumerated which are to be included in the operation of the new Act are, sulphuric acid, sulphurous acid excepting that arising from the combustion of coals, nitric acid or other noxious oxides of nitrogen, sulphuretted hydrogen, and chlorine. In one of his reports Dr. Smith gives an account of some experiments proving that the destructive power of sulphuric acid on vegetation is two or three times greater than that of muriatic acid, and about ten times greater than that of sulphurous acid. He further shows that the gases emanating from the furnaces where copper regulus is calcined contain large quantities of sulphuric acid, and attributes the well-known deleterious effect of the so-called copper smoke to this cause. Mr. Gossage had also pointed out the same thing some time before, and both gentlemen suggest that the copper smoke should be passed through a condenser to wash out the sulphuric acid before being allowed to pass into the air. This suggestion has not yet, I believe, been acted upon in any works. Those amongst us who have been acquainted with Tyneside for some years cannot but have observed how much more rapidly the hedges and trees in the neighbourhood of copper smelting works have been, and are being, destroyed than they were in former years in the neighbourhood of chemical works where this operation was not carried on. Possibly this more rapid destruction may be to some extent owing to the larger scale on which chemical operations are now carried on, but I am strongly inclined to think that it is chiefly owing to the sulphuric acid contained in the copper smoke which at present is allowed to pass unhindered into the air. This state of things will probably now soon be altered. There is no attempt in the new Act to define the amount of other noxious gases than muriatic acid allowed to escape per cubic foot of air. This no doubt will come afterwards, when more is known about the amounts it is possible to condense or render harmless. For the present, it is simply specified that the manufacturer shall use the best practicable means of preventing their discharge into the atmosphere, or of rendering such gases harmless when discharged. The onus of proving that the best practicable means are *not* used, and that an undue amount is being discharged into the atmosphere, rests with the inspector. It is obvious, therefore, that the amount of benefit the public will derive from the amended Act will depend, in a great measure, on the vigilance and care with which the work of inspection is conducted, and on the manner in which its requirements are enforced. Under the judicious management of Dr. Smith we may be sure that the duties of inspection will be carefully and faithfully carried out, and that the new Act will be the means of helping to secure around our manufactories that purity of air which is so essential to the growth of vegetation, and to the health and comfort of the people who are gathered together by the requirements of the manufactures.

One effect of the Act will certainly be to cause more attention to be paid by the manufacturer to the nature and amount of the gases leaving his manufactory by way of his chimneys and otherwise, and the sooner this is done the better it will be for his own gain, in some cases, judging from some of the results of the analysis of waste gases taken from the exits of vitriol chambers given by Dr. Smith. Sulphur acids were escaping, in some cases, equal to sixteen, twenty, and even twenty-seven per cent. of the total sulphuric acid capable of being formed from the sulphur burnt! I am glad to say these cases were not from the Tyne, and I should hope that it is impossible to find such instances of wicked waste in this district.

It appears to be an omission in the new Act that manure works and other works where sulphuric acid is manufactured, together with lead smelting works, and copper smelting works where salt is not decomposed, are not included in its operations. It is difficult to see on what principle these works should be allowed to continue their operations without being placed under the same restrictions as to the escape of noxious gases as alkali

* From a Presidential Address delivered before the Newcastle-upon-Tyne Chemical Society.

works. When more experience, however, has been gained by the inspectors, the present tentative measure will no doubt give way to a more comprehensive one, which shall include in its operation all works liable to evolve deleterious vapours.

I would here like to call the attention of those of our members who are not engaged in the alkali manufacture, and who may therefore not have occasion to read Dr. Smith's reports, to the very great value of these documents. They are not simply a record of the testings of the amount of muriatic acid escaping from the various works, as they might have been had Dr. Smith been content to confine himself strictly to the line of his official duties; but they contain an immense number of analyses showing the amounts of other gases, such as carbonic, sulphurous, sulphuric, and nitric acids, ammonia and various organic substances found in the air near manufactories and in towns, and these are contrasted with the amounts found in country places away from manufactories and habitations; the effect of these substances in the air on the health of the people as well as upon vegetation is attempted to be shown; great number of analyses of rain collected from various parts of Great Britain, showing the impurities which had been washed out of the air, are also given; the work of the same kind done by other chemists on the Continent is duly recorded; in short, these reports form a complete store-house of facts relating to the condition of the air we breathe. The methods of analysis followed are also detailed, and a number of valuable suggestions are scattered throughout their pages. Dr. Smith is doing an immense amount of valuable work tending to throw light upon many of the hidden causes of disease amongst our populations, and his writings are well worth the study of all those interested in this important question. In work of this kind it is absolutely necessary to have great numbers of analyses of air taken from a variety of places and under different circumstances before general conclusions can be drawn. The amount of work it is thus desirable to have is far more than any one man can possibly accomplish or even direct, and I am sure Dr. Smith would be glad to find that other chemists were working in the same field of research. I would advise some of our young chemists to turn their attention to this branch of analysis. They will be amply repaid for any labour and time they may bestow upon it, for the time is fast approaching when the examination of the air of a place will be frequently required to enable us to judge definitely, as Dr. Smith puts it, of its healthiness, without waiting for the evidence in the disease or death of human beings.

HYDRATE OF CHLORAL AS A SOLVENT, AND SUGGESTIONS CONCERNING ITS EMPLOYMENT.*

BY ROBERT F. FAIRTHORNE.

In an article published in October, 1871, in the *American Journal of Pharmacy*, I suggested the use of chloral, when dissolved in oil, as a topical application, and thinking that its power as a solvent might open the way to a greater extent of usefulness, I would draw attention to its value when thus employed in connection with the alkaloids and a few other substances.

A solution consisting of nine parts of hydrate of chloral and three of water I find capable of dissolving the following substances to the extent named:—

One grain of morphia is dissolved by a portion of the liquid containing twelve grains of the hydrate, one grain of veratria by a portion containing five grains, and one grain of atropia by a portion containing twenty grains.

These active principles should be in powder, mixed with the solvent in test-tubes, and heated by means of a water-bath, with occasional agitation.

The solutions thus made are in a convenient form for employment, either alone or when mixed with oils, ointment, or with glycerin. Camphor, too, is freely dissolved by them, and in some cases can be added to them with advantage.

Glycerin I find to be a convenient agent for forming solutions with chloral and the above-named substances, and the following will be found, when properly combined, to produce permanent and elegant preparations, viz.:—

Chloral Glycerite of Morphia.

℞ Morphia (Powd.) . . . 5 grains.
Chloral hydrate . . . 1 drachm.
Glycerin . . . . half a fluid ounce.
M. Sec. art.

Chloral Glycerite of Veratria.

℞ Veratria . . . . 5 grains.
Chloral hydrate . . . 1 drachm.
Glycerin . . . . half a fluid ounce.
M. Sec. art.

Ointment of Chloral and Veratria.

(Corresponding in strength to the Ung. Veratriæ, U. S. P.).

℞ Veratria . . . . 10 grains.
Chloral hydrate . . . ʒi.
Water . . . . 6 drops.
Lard Ointment . . . half an ounce.
M. Sec. art.

Chloral Glycerite of Morphia and Camphor.

℞ Morphia . . . . 5 grains.
Chloral . . . .
Camphor . . . . . each 1 drachm.
Glycerin . . . . half a fluid ounce.
M.

Lotion of Chloral and Iodine.

℞ Iodine . . . . 20 grains.
Iodide of Potassium . . 6 grains.
Glycerin . . . . 1 fluidounce.
Chloral hydrate . . . 2 drachms.
M. Sec. art.

Chloral can also be combined with collodion, in which it dissolves after the addition of a few drops of alcohol.

* From the *American Journal of Pharmacy* for December.

THE MOVEMENT OF WATER IN PLANTS.

Dr. W. R. M'Nab, of Dublin, has been making a further series of experiments on the amount of transpiration from the leaves of plants and on the ascent of sap through the stem, with the following results, the plants experimented on being the cherry-laurel (*Prunus laurocerasus*), privet, and elm:—1. That under favourable circumstances a rate of ascent of 40 inches in the hour can be obtained. 2. That, contrary to the generally received opinion, direct experiment has shown that the upward rapid current of water does not cease in the evening. 3. That checking the transpiration for a short time by placing the branch in darkness does not materially retard the rapid current of water. 4. That the removal of the cortical tissues does not impede the rapid current in the stem, which moves only through the wood (*xylem*) portion of the fibro-vascular bundles. 5. That a well-marked rapid flow of fluid will take place in a stem after the removal of the leaves. 6. That fluid will rapidly flow downwards as well as upwards in the wood (*xylem*) portion of the fibro-vascular bundles, as seen in a branch in which lithium citrate was applied at the top. 7. That pressure of mercury does not exert any very marked influence on the rapidity of flow, in the one experiment made with a pressure of 110·53 grammes of mercury. Dr. M'Nab points out with great force the disadvantage under which research in vegetable physiology labours in this country, from the fact that neither at Dublin nor elsewhere is there a physiological laboratory in connection with a botanical garden, a conjunction almost necessary for the carrying out of original research.

MEDICAL AND PHARMACEUTICAL DUTIES.*

Under the above title the last number of the *Lancet* contains the following remarks *à propos* of a subject recently discussed in our editorial columns.

"Some of our contemporaries have been exercising themselves in defining the line of demarcation which divides or should divide the druggist from the doctor. It is unsatisfactory that there should be any need to make clear a distinction which should be so obvious. A medical man is one who is supposed to be possessed of special knowledge of the processes of disease and of the methods by which they may be controlled. A druggist is one who deals commercially in some of the articles by which disease is controlled. The doctor's essential wares are opinion and advice; the druggist's wares are drugs. It is lamentable to have to admit that there are some doctors who cannot get a livelihood, or who think they cannot, without supplementing their proper wares—opinion and advice—with a perfectly heterogeneous class of articles, such as tooth-brushes, enema syringes, patent medicines, etc. There is a still larger proportion of druggists who overstep the line, and give themselves out as dispensing not drugs only, but opinion and advice on subjects and cases in regard to which they can know no more than the persons for whom they prescribe. We appeal to druggists themselves if this be not so. We are not speaking now of trivial ailments, like that of a man who has a slight cold, or who has been dining out over night and wants a little corrective, but of graver conditions which druggists prescribe for often too long for the patient's welfare or their own reputation. We should gladly see all respectable medical men wipe their hands completely of the sale of drugs and other articles, which constitutes the legitimate occupation of druggists. We go further, and say that we should like to see every medical man relieved of the drudgery of dispensing his own drugs from his own premises. But at present this seems impracticable, chiefly owing to the costliness of dispensing by druggists. If the Pharmaceutical Society would devise a means of supplying the community with good drugs at a reasonable cost, and would discourage the assumption of medical functions by its members, then there would be a prospect of medical dispensing being bodily handed over to druggists — a consummation devoutly to be wished in the interest of druggists, practitioners, and the public."

THE SOUTH LONDON SCHOOL OF PHARMACY.

The annual dinner of the students of this institution was held on Friday evening, Dec. 18th, at the Horns Assembly Rooms, Kennington, under the presidency of Dr. Muter, Mr. Baxter occupying the vice chair.

The cloth having been removed, and the usual loyal and patriotic toasts having been given—

The chairman in proposing the toast of the evening, "Success to the South London School of Pharmacy," said, he would not enter into any of the points that had been freely discussed during the past session with regard to other schools, but he could not do better than refer to the encouraging spread of pharmaceutical education in the country. Pharmaceutical education as it now existed was a great fact, of which those present were living witnesses, being able to go into business, and understanding the nature and properties of the things they dealt in. There were, he hoped, now no assistants who did not understand the difference between sulphate of zinc and Epsom salts. He thought the examinations had now been brought to such a point that they were a thorough test of a man's practical knowledge, that they were now conducted in a fair and proper manner at Bloomsbury Square, and that the best men only passed. It was a test that could only be passed by thoroughly practical men, and it was to make such men that the South London School was established. Not only had there been a great improvement in the standard of education, and in the practical manner of conducting the examinations, but young men generally had now a desire to get a good foundation of knowledge before presenting themselves. They took a longer time to do it in, but were more sure of their future prospects. He was not one of those who said that a man who made the examination the end of his studies was to be altogether despised, and for this reason, they were not all blessed, to put it mildly, with too much of the filthy lucre. Many students had to be in the shop all day, at a very small salary, and men in such a position who studied attentively and attained their object, that of getting into business, were, in his opinion, deserving of praise. It was another thing with men who had money and time at command; they did those around them great injury if they stopped short in their studies. They were the men who ought to go on and not be satisfied until they got more than a qualification for their examinations. What was one man's meat was another man's poison; and the man who had money and time at command was the man who continued studying and never tired. The man who had not the means might have the same wish for study, and he was to be commended if out of his hard earnings and in hours snatched after closing time, he succeeded in passing his examination and establishing a business. Both classes were equally to be praised. The examinations as they now stood were amply sufficient to test a man's qualifications, and he thought they were sufficiently strict, and they might rest a while before any alterations were made with regard to the recognition of schools. The South London School was in such a state that it could not be ignored if any schools were recognised. There were cases where young men could not attend the lectures in the daytime, and for such evening schools would be good things; but when evening lectures were established at that school only two students entered, one of whom never paid the fee. The examinations in chemistry at Bloomsbury Square were now very rigorous, and men must now be well up both in theory and practice in order to pass; but as they did pass it showed that education was improving. In conclusion, he hoped the new regulations would have a fair trial before any alteration was attempted.

The toast having been drunk the Vice-Chairman gave "the Successful Candidates," coupling with it the name of Mr. Knight.

Mr. Knight, in response, said he must say the examiners at Bloomsbury Square treated him with great kindness, sympathy, and consideration, and the examination was thoroughly practical.

The "Unsuccessful Candidates," "The Press," and other toasts having been proposed and responded to,

The Chairman, in proposing "The Medical Profession," said a good deal of discussion had lately arisen as to the relative merits of doctors and chemists. He considered the limit of the profession was that the education of a medical man only fitted him to go to the bedside of the patient, diagnose the case and write the prescription, whilst the education of a chemist fitted him to dispense the prescription, and put it up in the most attractive and palatable form. Pharmaceutical chemists were now allowed to compete for the appointment of public analysts, and he hoped all young men would qualify themselves for such a position. He begged to couple with the toast the name of Dr. Abbott Smith.

Dr. Abbott Smith, in responding, said he thoroughly endorsed all that the Chairman had said as to keeping the two branches of the profession distinct. Fifty years ago they were distinct, and he hoped they would be so again.

Several other toasts were given in the course of the evening, and the proceedings were also enlivened by various songs and choruses.

Mr. Hayho ably acted as toast-master.

---

* From *The Lancet*, December 19.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 26, 1874.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed* "*Pharm. Journ.*"

MEDICAL AND PHARMACEUTICAL DUTIES.

RATHER grudgingly, but apparently a little afraid of being left behind by the healthy advance of medical opinion respecting the line of demarcation which divides, or should divide, the druggist from the doctor, the *Lancet*, as will be seen by a reference to p. 508, at last virtually admits the justice of the views so frequently urged in these columns. We are content to accept this admission without even contesting the assumption put forth that druggists are the most prone to overstep this line, however much we may be inclined to doubt its correctness, because we feel certain that the remedy of the acknowledged evil lies mainly with the medical profession.

We note, however, an incidental omission, because it is characteristic, and explains a certain amount of obtuseness, which is not characteristic of our contemporary. The *Lancet* pragmatically says, "The doctor's essential wares are opinion and advice; the druggist's wares are drugs." And why are not "opinion and advice" to be included amongst the druggist's wares. We do not mean of that kind which is known under the name of "counter prescribing;" but opinion and advice upon the subject in which they are especially educated, the scientific preparation of medicines for administration. If the pharmacist's special knowledge and skill are to be appraised as valueless, or as a kind of makeweight to be thrown in with the drugs, what mean the demands for the higher education of pharmacists and the stringent examinations they have to undergo? Or are the examinations supposed only to guarantee that the pharmacist has acquired an amount of pharmaceutical knowledge equal to that the medical practitioner possesses intuitively? If it were not for the descriptive title of our contemporary's article, which is the same as we have adopted, it might have been supposed that the definition was an attempt to limit the functions of the herb doctor or drysalter.

The *Lancet* is now panting for the time when every medical man shall be relieved of the drudgery of dispensing his own medicines from his own premises; but its faith is obscured, chiefly owing to an assumed costliness of dispensing by druggists. It however looks to the Pharmaceutical Society to act as the *Deus ex machinâ* in this emergency, by devising a means of supplying the community with good drugs at a reasonable cost. This would appear to indicate that the *Lancet* believes such a desideratum to exist; but we are inclined to class such a belief as equally an assumption with that previously indicated. Indeed, were the Pharmaceutical Society to undertake such a foolish and impracticable task as the regulation of the charges for drugs under all conditions and circumstances, it is very probable that the *Lancet* would be among the first to censure the attempt as being beyond its functions. Therefore, notwithstanding the tempting bait of medical dispensing being bodily handed over to the druggists, which our contemporary thinks is "a consummation devoutly to be wished in the interest of druggists, practitioners, and the public," we cannot hold out any hope of the medical profession being allowed to shirk its share of the work in that way. Meanwhile, we would ask the *Lancet* to make a choice between the two horns of a dilemma. Is there anything inherent to the calling of a chemist and druggist which removes him from the ordinary rules of competition that compel all other tradesmen to supply their "wares" at a moderately remunerative price? Or does the medical practitioner who now does his own dispensing supply his medicines at a rate which is not remunerative; in fact, throw them in as a makeweight with his medical advice?

We are glad to notice that the subject also shows evidence of progress in the United States. The joint committee, consisting of delegates from the Society of Physicians and Surgeons, the Medical Society, and the College of Pharmacy of Chicago, the appointment of which was mentioned last month, has now presented its report. It condemns the exercise by physicians in any way of an interested preference for particular pharmacists; the practice of any branch of medicine by pharmacists; the use by physicians of prescription blanks bearing the name of a pharmacist; and the prescribing of medicines by adding to their titles that of a proprietor or patentee. The Chicago College of Pharmacy has passed resolutions endorsing the report, and also a further one condemning the practice of physicians who write prescriptions in a manner and form unintelligible to educated pharmacists.

OPIUM IN CHINA.

GOVERNMENT interdicts and proclamations notwithstanding, the poppy continues to be cultivated with increased activity in China. Interfering tax-gatherers and subordinate officials are "squared" by bribes, the exaction of which forms quite a revenue to the venal bureaucracy of the Flowery Land. Indian opium, however, is consumed in nearly as large quantities as ever—the native drug being only used for mixing with the former. Nor is this to be wondered at. Indian opium is prized for its freedom from the bitter and disagreeable flavour characteristic f its Chinese counterpart, which has also the reputation of causing eruptions of the skin, small boils, and ulcers, and even dysentery if taken *per se.* Quality, according to the reports of the British Consuls at Newchang, Hankow, and Kewkiang, is the pivot on which the whole future of the opium trade with China turns; and if it can be shown that the inferiority of the Chinese drug is neither absolute nor inherent—due neither to soil nor climate, but to want of skill on the part of producers, or to adulteration on the part of dealers—then, with improved cultivation and greater honesty, it may prove a serious rival to the Indian article.

Smuggling opium is more prevalent than ever. According to Mr. Hughes, the consul at Hankow, last year was exceptionally prolific in smuggling operations, "the triennial examinations for the degree of Master of Arts having attracted great numbers of candidates who are said to have carried considerable quantities of opium in their baggage which, in such cases, is exempt from Customs' examination." So adroit, indeed, are the Chinese as smugglers, that the returns of the import of opium are quite illusory.

The physiological effects of opium smoking—so long at least as the indulgence is moderate—are much less baneful than have hitherto been represented. Mr. W. C. King, Vice-Consul at Kewkiang, reports that when on a tour on the Upper Yangtoze, and in Szechuen, he saw no physical or moral deterioration among the junk sailors and others, who smoked with impunity. They seemed *bien conservês* and had prodigious appetites, while their work was very hard, lasting from dawn to dark with scarce an interval, and requiring them to take constant headers into the stream at all hours and in places highly perilous from under-currents. "The two persons," he says, "most addicted to smoking were the pilot and the cook. On the incessant watchfulness and steady nerve of the former the safety of the junk and all on board frequently depended, and the second worked hard from three in the morning till ten at night, and often longer, and seemed independent of rest and sleep." The cook, it appears, had a self-manufactured conserve of sugar and opium, which he chewed during the day—when, of course, he could not smoke. But at night he lit up and puffed like his neighbours. From these and similar observations Mr. Consul King contends that opium smoking or opium chewing, while practised in moderation as a sedative or a stimulant, is quite compatible with health, long life, and full physical and mental activity.

THE SUMBUL PLANT.

The *Gardeners' Chronicle* quotes a statement made by Mr. Wobst, of the Moscow Botanic Garden, to the effect that he has this year succeeded for the first time in raising the Sumbul plant (*Euryangium Sumbul,* Kauff.) from seed. He sowed the seeds in the autumn of last year in a dung bed, and covered them up later with snow and lights; they freely germinated in the spring. One notable characteristic is the manner of the development of the first leaves, which appear below the cotyledons, a peculiarity not infrequent in *Anagallis arvensis,* several species of *Euphorbia, Antirrhinum,* etc., and previously observed in some species of Umbelliferae. Mr. Wobst has found that the Sumbul invariably dies after once flowering; of all the plants that have flowered with him not one has thrown up a second flower.

GURGUN OIL AS A CURE FOR LEPROSY.

According to the *Homeward Mail* recent reports from the Andamans have afforded such additional evidence of the value of Gurgun Oil as a cure of leprosy, that the Marquis of Salisbury is very desirous of the widest publicity being given throughout India to this mode of treatment, as originally recommended by Dr. Dougall. The medical agencies at the disposal of the Government are to be employed to assist in the promotion of this object, and notice is given that the principal medical storekeeper at Calcutta has made arrangements for obtaining a large supply of the oil from the Andamans for distribution to the different hospitals and dispensaries upon application. The President in Council invites the co-operation of all the local governments and administrations towards the extension of the use of this medicine in cases of leprosy, and requests that careful reports on the results may be submitted at the end of the year for the information of the Government of India.

THE DANGERS OF CHLOROFORM.

Under the above title the *Scientific American* records the death of a patient in the dental chair, whilst under the influence of chloroform, as having taken place at Boston. The medical evidence at the inquest was to the effect that the lungs of the deceased were affected with phthisis, and unable to throw off the influence of the chloroform. The jury, however, returned a verdict that the death was due directly to the inhalation of the chloroform, and added a rider recommending legislation to prohibit the administration of chloroform, as in their opinion, in the present imperfect state of knowledge respecting its action, its use as an anæsthetic is quite unjustifiable. The *Scientific American* deprecates special legislation against the use of chloroform as an anæsthetic, which it considers to be unnecessary, because the growing tendency of the medical profession in the United States is to use either pure sulphuric ether or a mixture of chloroform, ether, and alcohol, whilst the employment of nitrous oxide in dentistry is greatly extending.

QUACKERY FINDING ITS LEVEL.

The introduction of a Bill into the Texan Legislature to regulate the practice of medicine in that State, has afforded, according to the *Druggists' Circular,* an opportunity for the Texas Medical Society to bring forward a rather eccentric amendment. This amendment provides that any person, who is not a citizen of the State, who shall advertise therein his ability to cure disease or perform surgical operations, shall pay the same tax as is paid by persons exhibiting a circus performance or menagerie, and shall be liable to the same penalties if he commence his public performances before paying the tax.

ROYAL INSTITUTION ARRANGEMENTS FOR 1874-5.

We have received from the Secretary of the Royal Institution the programme for the coming session at that institution. The following are mentioned as the probable arrangements for the Friday evening meetings before Easter, 1875:—

Jan. 15th. Professor Tyndall, D.C.L., LL.D., F.R.S.:—"Some Acoustical Problems."

Jan. 22nd. Sir John Lubbock, Bart., M.P., F.R.S., M.R.I.:—"Wild Flowers and Insects."

Jan. 29th. Professor Huxley, LL.D., F.R.S.:—"Recent Work of the 'Challenger' Expedition, and its Bearing on Geological Problems."

Feb. 5th. James Dewar, Esq., F.R.S.E.:—"Physiological Action of Light."

Feb. 12th. W. R. Greg, Esq.

Feb. 19th. Professor Frankland, F.R.S., M.R.I.:—"Climate."

Feb. 26th. W. R. S. Ralston, Esq., M.A.:—"Popular Tales: their Origin and Meaning."

March 5th. The Lord Rayleigh, M.A., F.R.S., M.R.I.

March 12th. Professor Abel, F.R.S.:—"Accidental Explosions."

March 19th. Richard Liebreich, M.D., M.R.C.S., M.R.I.:—"The Real and Ideal in Portraiture."

The following are the Lecture arrangements for 1874-75:—

John Hall Gladstone, Esq., Ph.D., F.R.S.—Six Christmas lectures (adapted to a juvenile auditory), on the "Voltaic Battery," on Dec. 29 (Tuesday), 31, 1874; Jan. 2, 5, 7, 9, 1875.

E. Ray Lankester, Esq., M.A.—Six lectures on the "Pedigree of the Animal Kingdom." On Tuesdays, Jan. 12 to Feb. 16.

Alfred H. Garrod, Esq.—Four lectures on "Animal Locomotion: including Locomotion on Land, in the Air, and in Water." On Tuesdays, Feb. 23; March 2, 9, 16.

Professor P. M. Duncan, F.R.S.—Three lectures on the "Grander Phænomena of Physical Geography." On Thursdays, Jan. 14 to 28.

Professor Tyndall, D.C.L., LL.D., F.R.S.—Seven lectures on "Subjects connected with Electricity." On Thursdays, Feb. 4 to March 18.

Edward Dannreuther, Esq.—Two lectures on "Mozart and Beethoven: with Pianoforte Illustrations." On Saturdays, Jan. 16 and 23.

J. T. Wood, Esq.—Four lectures on the "Discovery of the Temple of Diana, and other Results of the Government Excavations at Ephesus." On Saturdays, Jan. 30, Feb. 6, 13, and 20.

Professor W. K. Clifford, M.A., F.R.S.—Four lectures on the "General Features of the History of Science." On Saturdays, Feb. 27 to March 20.

LEGACY TO THE BENEVOLENT FUND.

The Secretary has received from the executors of the late Mr. Henry Tertian Sissmore, of Cranbrook, a legacy to the Benevolent Fund of £10. Mr. Sissmore became a Chemist and Druggist Member of the Pharmaceutical Society in 1873.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 16th, 17th, and 18th, 1874.

Present on the 16th—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

17th—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

18th—Messrs. Allchin, Benger, Bottle, Carteighe, Corder, Cracknell, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

Dr. Greenhow was present on the 16th and 18th on behalf of the Privy Council.

MAJOR EXAMINATION.

Ten Candidates were examined. *Four* failed. The following *six* passed and were declared qualified to be registered as Pharmaceutical Chemists:—

Knight, Benjamin..................Yeovil.
Cox, William Dennis ....Grantham.
Stacey, Henry George ....London.
Shapley, Charles ....Torquay.
Flint, Charles Bruce...............Glasgow.
Newton, Thornton Albert C. ...Devonport.

MINOR EXAMINATION.

Sixty-four candidates were examined. *Forty-eight* failed. The following *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

	Thomas, Harry Alma	London.
	Izod, James Hickman	Sittingbourne.
	Green, Charles Henry	Hastings.
Equal.	Cook, Robert, jun.	Great Grimsby.
Equal.	Sandwith, William Henry	Scarborough.
	Jones, William	Oswestry.
	Handford, Joseph John	Great Torrington.
	Kennett, John Nash	Havant.
	Phillips, Frank Leslie	Birmingham.
	Walker, Benjamin	Sheffield.
Equal.	Maxwell, James Ashworth	Altrincham.
Equal.	Stephens, George Thomas	Hereford.
Equal.	Barker, Charles Dexter	Birmingham.
Equal.	Fletcher, Howard Bennett	Leicester.
Equal.	Westwood, Amos	Stone.
	Litchfield, John	Longton.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The following six certificates were received in lieu of this examination:—

Certificate of the College of Preceptors.

Phillips, James Arthur............Penge.

Certificate of the University of Cambridge.

Humphries, Charles Josiah......Ipswich.

Certificate of the University of Durham.

Longstaff, William Luther ......Sunderland.

Certificate of the University of London.

Mountford, Mountford Wyche...Matlock Bridge.

Certificates of the University of Oxford.

Oldham, William ....Peterborough.
Skinner, Robert......................Liverpool.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Carbon and certain Compounds of Carbon.*

BY PROFESSOR BARFF.

(*Concluded from page* 497.)

Lecture VI.

A well-known illustration of conductive power is to put some common wire gauze over a flame; no flame passes through it—gas passes through, but not flame. The wire gauze conducts the heat away, so that there is not sufficient heat above to ignite the gas which passes through it. That is the principle on which the action of the Davy safety lamp depends.

Another interesting experiment is to put a coil of wire over the candle, and simply by its conducting power it will take away so much heat that the candle cannot go on burning; combustion will cease, that is to say, the candle gas cannot go on being formed, and, even if it were formed, it would not be at a sufficiently high temperature to unite with the oxygen of the air. If the wire be made hot, and put over the candle flame again, then the candle will go on burning, because, being hot, it cannot conduct the heat away from the burning candle.

To pass on to another method by which heat passes from one body to another, namely, by radiation. Take a metal cube filled with boiling water and coated on one side with lamp-black, and on the other polished. The heat will leave the cube more rapidly from the side coated with lamp black than from the side which is polished metal. We therefore say that rough and blackened surfaces are better radiators of heat than bright, polished, metallic surfaces.

The most perfect idea of a heating apparatus is one that will retain its heat for a length of time, and which will give out its heat gradually. The heat from it is then distributed throughout the whole of the chamber. If we have a chimney up which a quantity of heat escapes impelled by the draught in the room, necessary to promote and keep up the combustion of the substances burning in the grate, we are losing a portion of the heat. Some grates, called American stoves, give promise, and deserve a trial. The principle on which they are constructed is good, and a fair amount of heat is sent out into the room, and as little as possible up the chimney. But even they are far from perfect. What we want to see, and what inventors ought to turn their minds to produce, is this—a stove, the products of combustion from which shall, before they leave the chamber, become cold or nearly so. Now, such a stove can be made, and can be made without interfering with our English liking for a bright cheerful fire. There is no difficulty whatever in conducting the products of combustion from a fire-place through an apparatus of winding tubes, provided you ensure sufficient access of oxygen to the fire to keep up the burning. That is all that is requisite. "In our present fire-places," said the lecturer, "we may have the stove standing with its front exposed where we can see all the coal. But on the top of it have a plate which can be put down and taken off at pleasure, then let the products of combustion come from the front near the bottom of the fire, for in that way what usually now escape as unburnt gases will be burnt in their progress through the fire; then lead the product through pipes, arranged in a picturesque way if you like, covered by an iron grating, but have them so arranged that they will give out the heat resulting from the hot products of combustion to the air, which will pass through the tubes enclosing the flue tubes, through which these products of combustion pass, and I believe in that way for the purpose of heating rooms, you will be able to get all the heat into the room that could possibly be got from the fire."

* Abstract of a course of Cantor Lectures, delivered before the Society of Arts.

Another subject intimately connected with radiation is the absorption of heat. Take two tin plates; one with a bright surface, while the surface of the other is blackened. Two balls are fixed by means of wax to these plates, and one put on each side of a gas burner. One of these balls will fall before the other, and that will show that the plate to which it is attached has got hotter than the other. The ball attached to the blackened plate will fall first. Black is a good absorber of heat, as well as a good radiator. If a black substance radiate heat, it is quite certain that we must not blacken those vessels which we desire should contain water, or any other substance, at a high temperature for a length of time. If we want to retain the heat as long as we can we must use polished surfaces. For example, a bright silver teapot will keep tea hot longer than a black one; on the other hand, suppose we want to keep water hot in a teapot and we put it on the hob, then a black teapot is better than a polished one, because the black teapot will absorb the heat from the fire, whereas the bright metal teapot will reflect back the heat and will not absorb it readily.

The bearing which this radiation of heat has upon all apparatus which are used for cooking or heating is evident. To blacken a fire-grate is to cause it to absorb heat, and if the thing blacked be metal, the heat is absorbed, and the metal conducts the heat away into the brick work of the chimney. If you have a fire-clay back to your grate, and if, from a wish to make the fire-stove look neater and cleaner, you blacken that, you are actually, in fact, defeating in part the object for which you have the fire-clay back. If you have a fire-clay back, leave it the colour of the fire-clay, and if you have a metal back polish it. There are certain grates which were made some time ago, the backs of which were like that of a mirror, a hole being in the back to let the products of combustion pass up the chimney. If you stand in a large room, facing the fire, with such a grate, the heat is oppressive. Such a stove or fire-place is not handsome to begin with, and it is very unpleasant to sit directly in the focus of such a mirror, and to have the heat directly cast upon you. But at all events a very considerable portion of the heat which otherwise would be conducted away by the iron, is reflected by the polished metal. If you do have metal at the back of iron fire-places keep it polished, but it is much better to have fire-clay.

Whenever you want to prevent the escape of heat from anything, whether it be a fire-place fixed in a room or from a cooking apparatus, use fire-clay for the outside coating.

There are substances which will not allow heat to pass freely through them, of which class of substances glass is a very fair representative. These substances are spoken of as being *adiathermanous*. Glass is one of those which is not diathermanous; that is, it will not allow heat rays to pass freely through it. Therefore, if we want to shut off heat from any part of a room, we cannot do better than put a plate of glass between the source of heat and the thing we want to keep cool, for the heat will not pass readily through it. There are certain substances which allow heat rays to pass through very readily, of which rock salt is a good example. It will allow about 90 per cent. of the heat to pass through, whereas glass will only allow a mere trifle. But we know that glass in time will get hot, if it is near the source of heat, and then it will radiate, so that it does not do, if we want to use glass to keep off heat from any object, to allow it to get hot. Glass is also transparent to rays of heat of a high intensity, but it is almost opaque to rays of heat of a low intensity. For instance, it is transparent to the rays of the sun. You know that the sun's rays pass through the glass of a greenhouse and make it hot, but when the heat has passed through the glass, that heat is reflected back by the ground and by the walls of the greenhouse, and then becomes heat of low intensity; and that heat is not able to pass through the glass, and this is how it is that the sun's rays heat a greenhouse. Heat, then, of high intensity can pass through glass readily, but not heat of low intensity.

Now, then, to pass on to what is perhaps the most interesting portion of this subject—its practical applications, though we have already had many practical applications of those principles which have been enunciated. As general principles on which all fire-places for warming rooms should be constructed, two things have to be remembered. There is a heating material which is only able, by its combustion, to give out a certain amount of heat, and care must be taken by some means to isolate that from any substance which will conduct away the heat. One thing we must have—we must have a cheerful-looking fire; and another thing we should aim at, and that is to lose no heat, but to get all the heat out of the substances we burn. We cannot create heat. When we put chalk or other substances with coal, we perhaps produce a beneficial result, because the chalk or similar substances acts as a store house of heat, retains it for a while and gives it out slowly. But it is simply impossible that chalk, by its decomposition and the evolution from it of carbonic acid, which carbonic acid in the fire is said to be converted into carbonic oxide by the carbon of the fire, can produce heat; it is simply impossible that more heat can be got out of the coal by this operation. For the amount of heat which is required to drive off the carbonic acid from that chalk is lost as heat, it is doing chemical work and therefore ceases to act as heat, and it only becomes heat again in exactly the same quantity when that carbonic oxide unites with the oxygen of the air to form carbonic acid. A certain weight of carbon will unite with a certain weight of oxygen, and in so doing will give out, say, 25,000 thermal units. The product of the decomposition is carbonic oxide. Now, that carbonic oxide unites again with more oxygen and forms carbonic acid, and here we have 69 thermal units given out in this second union between the oxygen and the carbon—why that is need not be explained now, though there are many explanations of it which are extremely rational. If, then, carbonic acid is driven off from chalk—and those who have ever seen a lime-kiln burning know what a high temperature is required to perform the operation—the heat there absorbed is lost as heat. Use the chalk and use the fire-clay as store-houses for the heat, and to moderate the rapidity with which it is given out, and these are most valuable properties for any apparatus or furnace that is used for warming rooms.

Many cooks think that they are doing their work better by boiling things rapidly and quickly. But it is not so. Water boils at 100° C., or 212° F., but you do not require that heat or anything approaching it to cook meat thoroughly and properly. A series of experiments have been performed in the laboratory at University College. Albumen, or white of egg, subjected to a temperature of 58° to 60° C., or about 140° F., was coagulated on the outside of the vessel. Now, when the albumen or white of egg was exposed to a temperature of 65° C., the albumen was shortly coagulated all through its mass—that is to say, if we had been speaking of an egg we should say it was perfectly done, and the white was well set. This would take place at about 150° F., very much below the boiling point of water. Other experiments were performed on a slice of meat a quarter of an inch thick; a slice of meat was exposed in an air bath to a temperature of 65° C., for an hour, and it was not quite cooked through; but when it was exposed to a temperature of 88° C. it was thoroughly cooked, and not only thoroughly cooked, but the outside of it was thoroughly browned, and this took place at a temperature considerably below the temperature of boiling water.

To those who have not been accustomed to consider these matters, this must let a flood of light into their minds. What is the use of exposing our meat to the high temperature to which we do expose it, and of so wasting our fuel? The meat continually gets charred outside, whilst it is raw in the centre, because the coagulated albumen on the outside acts as a non-conductor of heat to the underdone meat in the inside, and the heat cannot pass through to that which has to be cooked. The same happens when meat is put into boiling hot water, and kept boiling as fast as possible, the albumen on the outside gets coagulated, and the heat is not able to penetrate into the centre, and it does not get properly done.

To give you an idea of what can be done, the Lecturer exhibited a small apparatus, which he described as follows: "Here is a simple gas-burner over which a flask of water is placed, and steam is being generated and is passing into a zinc vessel containing some water in which is placed a piece of meat, the whole being enclosed in a wood box. Here is a thermometer to show the temperature. It is now 80° C. It is not a large piece of meat, but I have not the least doubt it will be cooked before we leave the room this evening. The meat was first put into cold water, the steam was then introduced, and has heated the water up to 80°. This steam keeps going into the water, and supposing I had another box here, and another one here with sufficient tubes, the steam would pass into all these boxes, and warm the water in each box contained in the cooking vessel, and thus the meat and potatoes, and various things, might all be cooked from one vessel generating steam. How is it, then, that the heat would not be lost here? The temperature is 80° C. inside this box, but it is cold outside. This is a box simply containing a quantity of sawdust, which is placed around the metal vessel in the centre, into which the steam passes. You have only then to have a series of boxes, and you can cook your dinner very economically. But some persons may say we cannot always be living on boiled and stewed meat, we must have it sometimes roasted. That is perfectly true. But all you have to do is to adopt the principle of Captain Warren's cooking apparatus, which is a most excellent one. Have a dry vessel inside, without any water in it, so arranged that the steam can play round between the two vessels. Then the steam will warm the inner vessel, and your meat will thus be cooked without water, but it will not be browned." He then explained a rough diagram of the sort of apparatus he would recommend. "In the centre is a Bunsen gas burner, burning about 9½ to 10 cubic feet of gas per hour; above it there are lumps of fire-clay, and around it is a vessel containing water, which is a bad conductor of heat. To insure that no heat is lost, it is jacketed and filled in round about with powdered charcoal, or some non-conductor. The water boils, the steam passes off into this vessel on the right hand side, and cooks something there, and also passes off into the vessel on the left hand side, and cooks something in it. Now, suppose for a moment that we have no water in this one on the right hand side, but that we have a vessel jacketed so that the steam may pass round outside it, and your meat is put in that, then the meat will undergo the first process of roasting. The heat also heats these fire-clay lumps above, and if you want anything fried you can fry it above there, or you can put it on a gridiron, and can grill it, or you can put on this cap. That is a little apparatus round which the heat will travel and come out at the top, and so at the other side. The heat has been doing all this work in cooking these various substances, and we must not mind at present, with our limited knowledge, if a little escapes at the top, but I think we might even utilize it. Here we have a dry heat —a temperature sufficiently high to brown the meat, because it is much higher than the 90° C., which was shown to frizzle the meat and brown it outside, so that you may take out the meat from the jacketed vessel where it has been partially cooked, and then put it into this chamber where it can be browned, and thus you can with such an apparatus easily cook, I believe, a dinner for ten or twelve people, because here on the top you can fry your cutlets or anything else before the browning takes place." Such an apparatus could be worked at a very small cost.

Next, as to the application of these principles to lighting. Messrs. Dietz and Co.'s lamps are flat-wicked lamps. The air is allowed to pass in through slits in the side, and is so arranged that it is claimed to produce the greatest amount of light possible for the size of the wick, and the quantity of oil burnt. It is stated that a wick three-eighths of an inch gives the light of six candles, with a consumption of half an ounce an hour,

$\frac{5}{8}$ inch wick . .	12 candles . .	$1\frac{1}{8}$ oz.
$\frac{3}{4}$ " . .	14 " . .	$1\frac{1}{3}$ "
1 " . .	20 " . .	$1\frac{3}{4}$ "
$1\frac{1}{2}$ " . .	25 " . .	2 "

Messrs. Silber's lamp has a different arrangement. Mr. Silber admits air in two ways to the wick. His wicks are circular, and the air comes up through two places. The wicks are very porous; a certain quantity of oil rises, and a small quantity of it is vaporized. If there be the proper adjustment of the draught to the consumption of the oil, a current of air meets the vaporized oil, and it will burn, if the thing be properly managed, at a certain distance above the wick. That is what Mr. Silber says is managed in his lamps when they are properly arranged, so that, provided the lamp be properly burnt, you do not get any charring of the wick. There is a ship's lamp, in which colza oil is burnt without a glass. Inside that lamp is a dome, which comes down upon the oil-chamber, which can be drawn easily out of the lamp. At the back of the oil-chamber there is a slit, through which the air passes to the wick, so that the whole of the air that is used for the combustion of the oil passes in from the top round the back and underneath into the wick; no air whatsoever getting into the lamp by any other access. The consequence is that a light is obtained which is perfectly steady, and which can be waved or moved about, as in the case of a vessel lying at anchor, without any danger whatever. There is another point in connection with Mr. Silber's invention which is of great scientific interest—namely, the way in which he prevents the draught or anything interfering with the flame in such lamps as this. No gale of wind will cause the flame to flicker, because no air whatever has access to it except through the proper channel. There must be in a lamp like this such an adjustment of air as that you get the most perfect combustion consistent with luminosity, but we have a lamp also that no gust of wind can affect. At the top there is a cone, and the heat products from the lamp pass round the sides, and the air can play against it, but cannot enter against those heated currents, and in that way all flickering of the light is prevented.

The lecturer concluded by describing a gas burner in which these principles are applied, the admission of air being regulated in a somewhat similar manner to that in the ship's lantern. These gas burners, however, are not yet brought into the market, Mr. Silber having something yet to do to perfect them.

PHILADELPHIA COLLEGE OF PHARMACY.

The second pharmaceutical meeting of the present session of the above College was held on November 17, Professor Remington presided.

Specimens illustrating the various stages of the process of preparing "compressed camphor" were exhibited by Professor Maisch. Compressed camphor is prepared from Japanese crude camphor, the colour of which is grey to pinkish-white, layers of various degrees of purity being often found in the same tub. Japanese camphor contains some water and volatile oil, but is not as impure as Chinese camphor. To convert it into compressed camphor it is placed in a still, and a moderate heat applied. The condenser is a large chamber, having projections so arranged as to lengthen the course of the vaporized camphor. In the first partition the product is mostly in the pulverulent form; in the last it crystallizes in beautiful snow-flake-like crystals. It yet contains water and volatile oil, on account of which the ordinary refined camphor is preferable for medical purposes. The crystalline powder is then placed in iron moulds which are moistened with water to prevent the camphor from adhering, and by hydraulic pressure pressed into rectangular blocks of various weights. The iron rust of the moulds somewhat colours the exterior of this camphor, which is used to prevent the ravages of moths, and the object of this form is to prevent too rapid evaporation. It was stated that very handsome refined camphor is now produced in Philadelphia, and also in New York. Refined camphor was formerly imported from Europe, where it is sublimed in glass spheres, which are broken to obtain the camphor. In the United States the subliming vessels are of a form that will allow of their being taken apart. The volatile oil contained in the crude camphor is also collected. The changes in this industry have been owing to the tariff.

Professor Remington remarked that the sublimed camphor, if free from moisture and volatile oil, might be used as powdered camphor, it being essentially the product recommended by Mr. John C. Lowd, in the Proceedings of the American Pharmaceutical Association, 1871.

Dr. A. W. Miller presented some Feé-jee nux vomica, so-called, and desired some information in regard to it.

Professor Maisch stated they were the seeds of *Strychnos potatorum.*

Dr. Miller also showed oil of sassafras containing 14 per cent. of resin, which is left upon evaporation, and was probably added as oleo-resin.

Professor Maisch exhibited American asbestos in its natural state as found in the United States, also the same purified, both being in very long fibres. The purifying process, which is patented, is based upon the use of acid, and afterwards forcing steam through the fibres, which are thus cleaned and preserved unbroken. It is intended to be used for filters, and fire-proof articles of small size.

Professor Remington had seen it applied in the manufacture of a small spirit stove. This stove heats quickly, and is convenient for travellers.

Mr. R. V. Mattison said it was used for making fire-proof paper by a company in Philadelphia, but as yet this paper was not in the market.

Professor Remington exhibited and described a percolator stand, made by Mr. D. Benjamin, Camden, N. J. It is not patented, and the inventor offers it as an effort to assist the apothecary who desires to prepare his own galenical preparations. It is difficult to explain the many advantages of this stand, but practical use in the laboratory will show its conveniences. It will hold any size of percolator from half a pint to sixteen gallons with perfect ease and firmness, by means of the adjustable clamps at the top. Several percolators and funnels can be used on it at the same time by means of the moveable folding shelves. There are two of these, which may be elevated or depressed, and held in perfect safety, and each has three folding parts; they can be adjusted to the height of any counter or stove, for holding condensers, receivers, funnels, and dishes. It is constructed of wood, occupies but little space either when in use or not, is neat, ornamental, and affords great protection to the apparatus in use; is not liable to wear or get out of order. In ordinary percolations or filtrations it covers the various sized instruments, excluding dust, and preventing evaporation, and is especially convenient for self-feeding percolators. It is a very good press for small operations, the mass being enclosed in a bag, then screwed up in the clamps and allowed to drain.

CHEMICAL SOCIETY.

Thursday, 17th December, 1874. Professor Gladstone, F.R.S., Vice-President, in the chair. After the usual business of the Society, a paper "On Groves' Method of Preparing Chlorides," by Dr. Schorlemmer, F.R.S., was read. He finds that the process does not answer well for the higher primary alcohols, although secondary chlorides can readily be prepared by it. The other papers were

"On the Precipitation of Metals by Zinc," by Mr. J. L. Davies; "Researches on the Paraffins Existing in Pennsylvanian Petroleum," by Mr. T. M. Morgan; Some remarks on the preceding paper, by Dr. Schorlemmer; and "A Note on Aricine," by Mr. D. Howard, who finds that this is really a distinct alkaloid existing in certain kinds of reputed cinchona barks.

The Chairman announced that Professor C. Maxwell had promised to give a lecture on the 18th February, "On the Dynamical Evidence of the Molecular Constitution of Bodies." The meeting was then adjourned until Thursday, 17th January next.

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act.

Adulteration of Pickles.

On Wednesday, December 16, Mr. Christopher Blade, chemist and druggist, was summoned before the magistrates sitting at Leek, Staffordshire, for selling as unadulterated a bottle of pickles, which, upon analysis by Mr. Scott, of Wolverhampton, was declared to contain a quantity of copper and a small amount of sulphuric acid, which he further declared to be injurious to health. An assistant to the inspector, said that on the 30th October, he went to defendant's shop and asked for a bottle of pickles. He was supplied with one, for which he paid 1*s*. At the time, he mentioned the purpose for which the bottle of pickles was required, and also informed the defendant when they would be forwarded to the county analyst at Wolverhampton. In cross-examination, the witness said that to the best of his knowledge he did not choose the bottle analysed; he did not remember seeing two bottles on the counter. The inspector spoke to receiving the goods, and forwarding them to Mr. Scott on the 3rd of November. The bottle was marked 8,428. Mr. Silvester addressed the Bench at considerable length on behalf of the defendant. He said it was a case of great importance to the manufacturers of the pickles, Messrs. Lazenby, of London. He also said it was well known that vinegar made entirely of malt would not keep, consequently there was no vinegar made which did not contain sulphuric acid, and he read an extract from an Excise Act, 38 Geo. 3, cap. 65, wherein sulphuric acid was permitted in small quantities. He asked the Bench to allow the remaining portion of the pickles to be analysed by some other analyst, and to adjourn the case until the answer came. After some conversation, the case was adjourned for a month, that the remaining sample might be analysed by Dr. Roscoe, Mr. Silvester reserving the right of asking for a special case.

Mr. Andrew Morton, grocer, was also charged with selling pickles as unadulterated, which were subsequently found to be adulterated with copper. The analyst declared the pickles to be distinctly injurious to health. The manufacturer of the pickles, Mr. Williams, of Manchester, was present, and said he was prepared to swear no copper could possibly get into the pickles in the process of manufacture. This case also was adjourned for a month.

Mr. Henry Bostock was also summoned for selling as unadulterated pickles which were found to contain poisonous matter. Mr. Johnson proved purchasing the pickles at defendant's shop on the 30th ult., and admitted that before the purchase was made the defendant said he would not warrant the pickles was pure. Under this circumstance, the magistrates considered the defendant had protected himself by declaring his unwillingness to guarantee the pickles, and therefore dismissed the case.

On the following day, at Tunstall, Mr. Boyce Adams, of Messrs. Adams and Lamb, grocers, Hanley and Tunstall, was charged with selling one bottle of adulterated pickles on the 23rd November. The certificate of analysis showed that the pickles contained a preparation of copper. Mr. Silvester, who appeared on behalf of Messrs. Lazenby and Son, manufacturers of the pickles, contended that the offence had not been proved, and that there had been no express representation that they were unadulterated. He also pointed out that the pickles had passed through several hands, and that the certificate was very vague and not reliable. He therefore asked for the other half of the bottle of pickles to be given up to an independent analyst to decide whether they were really adulterated. The case was adjourned for a month for an independent analysis to be made.—*Staffordshire Daily Sentinel.*

Adulteration of Pepper.

At Leek, on Wednesday, December 16, Benjamin Price, shopkeeper, was charged with selling one oz. of adulterated black pepper. Mr. Scott had analysed the pepper, and declared it to contain husks, starches, and micaceous and ferruginous sand, to an extent injurious to health. The assistant who proved the case, said that after the purchase had been made, and defendant had been told for what purpose it was wanted, he said he would not warrant it. Defendant was fined 5*s*. and costs.

Edward Walker, for selling 1 oz. of adulterated black pepper, on the same date, was fined 5*s*. and costs.—*Staffordshire Daily Sentinel.*

Conviction of Chemists and Druggists for selling Adulterated Precipitated Sulphur.

On Thursday, December 17, Mr. John Dixon, chemist and druggist, Tunstall, was charged before the magistrates at Tunstall with selling a certain drug—viz., "precipitated sulphur," on the 23rd November, which the analyst's certificate stated was adulterated with gypsum to the extent of 62 per cent., and injurious to invalids and children.

Defendant said had he sold the drug as "milk of sulphur," and not as "precipitated sulphur," he would not have been amenable to the law.

The magistrates said they had no alternative but to inflict a fine of 10*s*.

Mr. Joseph Keightley, chemist and druggist, Tunstall, was also charged with selling precipitated sulphur, which the analyst's certificate showed, contained 42 per cent. of gypsum. Defendant, who had nothing to say, was fined 10*s*.—*Staffordshire Daily Sentinel.*

Lead in Lemonade.

On Thursday, December 17, Andrew Stout, lemonade dealer, was charged at the Glasgow Central Police Court, before Baillie Young, under the Adulteration of Food, Drink, and Drugs Act, with having, on the 8th December, either by himself or his servant, sold two bottles of lemonade adulterated with lead, and thereby rendered himself liable to a penalty not exceeding £20.

Defendant pleaded that he had put no lead into the lemonade, but he had just put in a new receiver, and had some of the pipes lined with block tin.

Sanitary Inspector Walker said that he had purchased the two bottles of lemonade labelled, and paid fivepence for them. He said to the seller that he would take them to the city analyst, and invited him to go with him, but the accused declined. The inspector had previously called at Stout's place and informed his wife that lead had been found in soda water sold in the city, and that her husband should take care not to use lead pipes in the manufacture of his liquors.

The accused here said that he did not dispute the analysis, and that after he had been warned, he had as already stated put in a new receiver, and lined all the pipes with block tin.

Dr. Tatlock, city analyst, deponed that the lemonade in question was contaminated with lead to the extent of one-sixth of a grain per gallon—a proportion which clearly showed that lead had been employed in the construction of the apparatus with which this lemonade had been manufactured. In answer to a question he said that no lead should be employed in those parts of the apparatus with which the liquid came into contact. He always understood that lead was a mineral poison. He also understood that a very much smaller quantity was very dangerous.

Dr. Russell, medical officer of health for the City, said that his attention had been frequently directed lately to the fact that lead to a dangerous extent was held in solution in some descriptions of lemonade or soda water. This had become a matter of notoriety. Steps had therefore been taken by the inspector of nuisances. There were authentic cases on record where one-hundredth part of a grain of lead per gallon had produced symptoms of poisoning, and one seventy-fifth part of a grain in other cases. One-sixth of a grain was a very serious proportion. No person could partake of such an adulterated liquid without incurring very much risk. By the magistrate—Do you think that to a person drinking a bottle of such lemonade it is dangerous? Dr. Russell—Yes. By the procurator-fiscal—Is lemonade very often used in hospitals? Dr. Russell—It is used in all hospitals, and it is indispensable that it should be pure. I believe that the lead in this lemonade arises from the character of the apparatus. Those who make lemonade free from lead use a special apparatus.

The accused said that he had no witnesses, and that he did not know till now there was lead in his apparatus. He had made alterations to avoid this risk.

The Magistrate: You should consult Dr. Tatlock or some other analyst before you make alterations.

The Accused: Some of the manufacturers have put in block tin pipes, and have afterwards got an analysis made which showed that the liquid was pure.

The Fiscal: At Dumbarton there was a conviction for a somewhat similar offence. Such a penalty should be imposed here as would act as a check sufficient to prevent persons exposing the public to such dangers.

The Accused: It used to be all lead together. The receivers were all lead.

The Fiscal: You must not fill your pockets at the expense of the public health. I do not think you would willingly do it; but the public must be protected.

The magistrate said this was rather an aggravated case. The inspector had called and delivered previously a warning to the wife of the accused.

The Assessor: This is a far more dangerous adulteration than adulterated milk.

The Magistrate: The sentence of the Court is a fine of five guineas, and outlaid expenses 28*s.* 6*d.*

Adulteration of Milk.

At Greenwich Police-court, on Saturday last, Mr. Daniel Phillips, an extensive farmer and cowkeeper, of Lewisham, appeared to an adjourned summons at the instance of the Lewisham District Board of Works, charged with selling milk adulterated with water. Mr. Edwards, solicitor to the Board, attended to prosecute. Special interest was excited owing to the prosecution having three analysts in attendance to support the certificates made in this and other cases by Mr. Heisch, the district analyst, whose accuracy, or rather whose standard of milk-purity was questioned by Mr. Phillips, because in April last a friend of Mr. Phillips had drawn a sample of milk from a cow, and handed it to Mr. Heisch, who reported it as containing at least 12 per cent. of water, whereas, according to Mr. Phillips and his friend, it contained none.

On the evening of the 19th November, between six and seven o'clock, a girl was sent to the farmyard of the defendant by the inspector appointed under the Adulteration of Food Act, and obtained two pennyworth of milk from a servant to the defendant in a jug given to her by the inspector, who was in waiting, and who took the jug and milk from her to the wife and daughter of the defendant, telling them it had been bought for the purpose of analysis. The milk so bought was then placed in a bottle, which was corked and sealed, and was forwarded to Mr. Heisch, whose analysis showed an adulteration of 10 or 11 per cent. of water, and the present proceedings were instituted. The defendant had been twice previously summoned and fined on similar complaints. The correctness of the analysis being disputed, the case was adjourned. In support of Mr. Heisch's analysis Dr. Dupré, Lecturer on Chemistry at Westminster Hospital; Dr. John Attfield, Professor of Practical Chemistry of the Pharmaceutical Society of Great Britain; and Mr. Wigner, Public Analyst for Greenwich and Plumstead districts, were called. Dr. Dupré and Mr. Wigner stated that portions of the same milk analysed by them after the dispute arose (one analysis only taking place the previous day, the milk then being just a month drawn) contained as much as 12 per cent. of water. This was after making proper allowance for decomposition. The defendant produced two analytical certificates of milk drawn from the same cows, one, signed by W. Baxter, stating that the amount of solids, not fat, was 8·33 per cent., which on a standard of 9·3 per cent. of solids, as shown by the three analysts, was equivalent to 10 per cent. of water in the milk, or on a standard of 9 per cent. solids to milk containing rather less than 10 per cent. of added water. Respecting the April milk from the person since stated to be Mr. Phillips's friend, Mr. Heisch said he found it to contain at least 12 or 15 per cent. of added water and to be otherwise so abnormal that he placed samples of it in the hands of the three analysts for their opinion. The analyses all agreed and quite confirmed his own. Professor Attfield said he had analysed the April milk and found at least 12 per cent. of added water in it and three times as much common salt or chlorides as ought to have been present. A fair percentage of non-fatty solids in pure milk was 9·3, especially in the case of large dairies or herds of cows, but in order to give the milk-seller the benefit of any doubt, analysts assumed that milk placed in their hands for analysis had been yielded by the poorest cows, the minimum of whose non-fatty milk solids was 9 per cent. In reporting on the April milk he had taken 9 per cent. of non-fatty solids as a standard, a lower percentage than he had ever known to be contained in genuine milk from a herd of cows. Dr. Dupré said in answer to Mr. Balguy that it was admitted that there was so much difference of opinion among professional men that a meeting had been held, at which to fix the standard for analytical purposes, and although that standard had not been publicly mentioned hitherto it was said that some analysts have adopted 9·0 and others 9·3 per cent. He himself was in favour of 9·3, because if they adopted 9, which was the extremely exceptional minimum for the very poorest milk, milk-dealers would dilute all ordinary milk of fair average quality down to the quality of the poorest possible. But even taking the lower standard, these two milks in question contained 10 or 12 per cent of water. Mr. Balguy, in giving his decision, said the case was not only of public importance, but it was most important to the defendant himself, who, as the supplier of milk which was largely retailed through a wide district, ought to be above all suspicion. In the first place he had to remark that the evidence given for the prosecution was not to his mind of a satisfactory character, and that the sending of a girl by a public officer with a jug for the milk in the dark of the evening, when it could not be seen whether the jug contained any small portion of water, was a course of proceeding he should advise not to be again adopted in cases which were intended to be prosecuted. In these cases a man's character was at stake, and the charge ought, in common parlance, "to be proved up to the hilt." Neither the inspector nor the girl had turned the jug upside down to show that there was no water in it. He gave the analysts every credit for the accuracy of these analyses generally, but he was of opinion that there was evidently still a difficulty in accurately determining the question of standard, especially in a case in which the adulteration was stated to be so near as ten per cent. to the standard adopted by the analysts themselves. Then the defendants' friend had, indeed, sworn that the April milk was not watered. These doubts he thought the defendant should have the benefit of, and the summons would be dismissed. The defendant applied for costs, which, however, were refused.

Death from Poisoning.

Mr. Payne, city coroner, held an inquiry on Friday, the 18th inst., at Bartholomew's Hospital, respecting the death of Agnes Sophia Gilfin, aged 23. From the evidence it appeared the deceased was in the habit of taking a medicine to promote digestion, and on the Wednesday morning previous the deceased being in bed when her mother came to her, she said she had used the last of her own medicine and asked her mother to get some of the same medicine (out of another room) belonging to her brother, who also used it. Deceased's mother returned from the kitchen with a bottle and deceased took a dose, believing it to be the medicine; but almost immediately became ill and vomited. A cab was got and she was taken to the hospital. On the way deceased said, "What can I have taken? It must have been some of our William's (brother) poisonous stuff he cleans the clocks with." On being admitted she was found to be in a state of collapse, breathing slowly and heavily, and very pallid. The pupils of the eyes were much dilated. She had all the symptoms of poisoning. A stomach pump was applied, but to no purpose; she died in about fifteen minutes. An open verdict was returned.—*Times*.

Suicide by Chloroform.

At Selley Oak, Worcestershire, on the 16th inst., Mr. Docker held an inquest on the body of Deborah Frobisher, the wife of a chemist and druggist. It appeared that the deceased, after having sprinkled the bedclothes with chloroform, covered herself up, and died in a few minutes. A verdict of suicide while in a state of insanity was returned.

Reviews.

A Practical Handbook of Dyeing and Calico Printing. By William Crookes, F.R.S. London, Longmans, 1874.

We always receive technical handbooks of this kind with some degree of doubt. There is no question whatever about the value which a really complete and trustworthy book would possess, but the difficulties which beset the path of the author are so great as to render the task well-nigh impossible, even to a man of the highest attainments.

In the first place, technical methods are very commonly of a purely empirical nature, and often even the inventor himself knows but little of the *rationale* of his process; he cannot say why he used such-and such proportions of ingredients, or why a certain temperature will succeed and one a little above or below will fail. An equally great, or perhaps even greater difficulty, is the almost universal practice of secrecy. Whether wisely or unwisely, the majority of the processes in use are kept carefully concealed, either as a whole or, if this be impracticable, in part, some constituent or step in the process which is considered essential being kept secret. Even when a discovery is patented, it is doubtful if all the details, apparently insignificant, but yet really necessary to complete commercial success, are published. One result of this practice of secrecy, very important for our present purpose, is that a great proportion of the published processes are those which are thought to be of little value, in short *failures*, or untried and not very promising schemes which are freely made known, while the proved and successful methods are jealously reserved for exclusive use.

Mr. Crookes proposed to himself no light task in compiling a standard work on dyeing, calico printing, and their auxiliary arts which should "cover the whole of the subject" in 730 pages. His plan is of no less extent, for he objects in his preface to some other works, because "none of them can be said to cover the whole of the subject." We will now mention some of the subjects included in his scheme.

After an interesting introduction, giving a sketch of the history of the art of dyeing, the impurities encountered in water are considered in relation to dyeing, and a brief account is given of the general nature of fibres. Then the constitution of cotton is described in some detail, followed by an account of the process of bleaching cotton. After this, the bleaching and dyeing of linen, the nature of hemp and jute, the methods of distinguishing the principal fibres, the various kinds of "thickenings" and their use, the treatment of wool and silk, and the nature of the principal chemicals used, are successively described. The second division is devoted to the general principles of the fixing of colouring matter upon fibrous textures and the classification of dye materials. In this we find chapters on mineral pigments; artificial organic colouring matter—chiefly, of course, aniline, naphthalin, and alizarin products; organic colouring matters, not artificially obtained, such as madder and red woods, cochineal, orchil, indigo, galls, etc.; mordants; printing; and lastly, the detection of various dyes on the fibres. After this, an appendix of some thirty pages contains a number of processes, tables, etc., put together with little or no classification.

Such an extensive list as this will sufficiently show the large area over which the author passes, and will give an idea of the amount of condensation necessary to keep the book within such narrow limits as to size. The actual amount of matter included is perfectly bewildering, and we fear will somewhat detract from the value of the book. So many processes are given to attain the same end that one is often reminded of the old-fashioned cookery books with their incessant "another way." In consequence of this, we fear it will be of but little service to the inexperienced, for it is rarely stated that one process is better than another, and therefore the tyro would have to try several, and this under some considerable difficulties. For amid this wealth of recipes we find that a great many, if not the majority, are rather *outlines*, some important details being omitted. For example, the quantity of water to be used in a dye beck is very commonly omitted, and thus we are left in the dark as to the strength of the dye solution, a point which must often be of great importance. Many processes too, have the appearance of laboratory experiments which have never been tried commercially, or the results compared with products of established reputation obtained by other methods. Many old friends we meet with of this kind who we had hoped were dead ere this of mere inanition.

Faults of compilation and style are not few. We cannot look with any complacency on such words as "incrustating," "fixation," and "oxidisation," and we can only attribute to careless correction of proofs the repeated occurrence of the name "Cavento*n*" instead of "Cavento*u*." The indiscriminate use of old and new formulæ also gives great annoyance, and may lead to mistakes; carbonate of soda is sometimes NaO, CO_2, and sometimes Na_2CO_3; aniline is sometimes $C_{12}H_7N$, and sometimes C_6H_7N. Another fault of the same kind is the frequent mixture of systems of weight and measurement. We are told to boil 200 *kilos.* of dye wood in 80 *gallons* of water; and, what is of still greater importance, there is commonly nothing to tell us whether the temperature is given according to the Fahrenheit or Centigrade scale. It would not have greatly increased the labour of preparing the book if the numerical details had been reduced to some uniform system, and the solidity and usefulness of the work would have been largely increased. We cannot see the utility of the long account of the soda manufacture, occupying more than four pages, for no dyer or calico printer would ever make his own soda; and if he did, this account would be of no practical use to him, and the space would have been better bestowed on other matters. Even the more novel Weldon's chlorine process, valuable as it is, seems to us somewhat out of place here.

While we cannot think that this work covers the whole of its subject, since, apart from the difficulties attending the acquisition of information which we mentioned at the outset, it would be, in our opinion, impossible to squeeze the necessary matter into so small a space; yet we quite agree with the author "that it may still point out remunerative fields of research to the student," and probably its usefulness will lie chiefly in the way of suggestions to the initiated, while comparatively barren in the hands of the tyro. We can faithfully commend it as a storehouse, closely packed with matter, a careful examination of which could scarcely fail to be repaid by some valuable ideas and suggestions.

Searches for Summer: showing the Anti-Winter Tactics of an Invalid. By C. Home Douglas. William Blackwood and Sons, Edinburgh and London, 1874.

Mr. Home Douglas writes chiefly for those invalids, whether English or American, whose ailment is functional merely, and who, if transported to milder and more equably tempered latitudes, have a fair chance of recovery. For the organically or hopelessly diseased he would be very chary of prescribing estrangement from home, with its comfort and companionship. In this we believe him to be right; while in cases of the first-mentioned class he shows equal judgment in drawing the line between what climate can and what it cannot do.

To imagine, with many patients, that change of scene or sojourn in a climate milder or more bracing than the one they have left, absolves from strict attention to the regimen appropriate to the case is sheer nonsense; and climate as a therapeutic agent has often to bear the blame of failing to effect what should never have been expected from it. Efficacious, however, it cannot fail to be—if selected in accordance with the nature of the malady—its influence is reinforced by judicious management in the details of food, clothing, and exercise, whether of mind or body.

Mr. Home Douglas took his wife, who had for some time been suffering from spasmodic irritation of the respiratory organs, first to Gibraltar, then to Malaga, Cordova, and Seville, and finally through Madrid to Biarritz and Pau. Of all these places of invalid resort he gives minute estimates based on meteorological observations regularly made. Malaga, as a winter climate, he pronounces to be as nearly perfect as any in the world; though the patient must remember that not even there is the weather always fine, and that it will sometimes be his duty to keep the house for days. Mr. Home Douglas is a keen observer, with an appreciative eye for local humours and a graphic pen for their pourtrayal; and his descriptions of places, incidental though they are to his exposition, are very entertaining. Biarritz, that deserted haunt of the late emperor and his myrmidons, retains its climatic and scenic, while shorn of its social attractions, and the contrast between its past and its present aspect forms a very animated bit of writing in Mr. Home Douglas's book.

The remaining sections treat of Algiers and the Riviera; and both receive at Mr. Home Douglas's hands a more discriminating examination than has yet been vouchsafed them. The description of Algiers is particularly good—its meteorological virtues being analysed with the precision of a man of science, and its natural features reproduced with the vividness of a poet. In spite of its liability to sudden change of temperature, nay, even to tempestuous visitations, it might attract far more invalids than it does did it not share the chronic and deep-seated *malaise* of all French colonies. Compared with Malaga—the comparison is pursued with minute detail by Mr. Home Douglas—its climate is warmer in winter, though infinitely less steady; though usually fine, it is as fickle as that of Edinburgh in summer:—

"You are sitting out on your balcony at ten at night, in a flood of moonshine, the dark cypress trees seeming to whisper round you of everlasting peace. Imagination can hardly picture a calmer or more holy scene. But if fair as fairy land, it would hardly seem to be more substantial, for when you awake in the morning, behold! it has vanished! No mountains with dreamlike shades are there; in place of them a pale and sombre mist. And can that dull, barren, dimly visible plain be the same sea which you saw last night, dimpled with pools of silver moonshine, and breaking in diamond showers upon the shore? The beauty of the garden, too, is all gone. True, roses and lilies are still there, but soiled and bespattered as they are, they look like the belles of a ball-room who have fallen in the mud, or, if you choose, like gentle sprites who have become the prey of an evil genius now triumphant in the form of an Atlantic gale. For hours it will rage with the fury of a conquering demon, driving one tornado in fast succession after another over the livid landscape. There is no need to despair, however, as it is more than likely that before sunset it will have spent its fury, and that the morning will be ushered in with a north-east wind and a sky again serene" (p. 97).

Algiers, if less steady than Malaga, "has the pull" in its exemption from foul odours, for which, not only in their variety but in their intensity, Malaga bears the palm.

Habent sua fata Baiae: dogs and health-resorts have their day. Mr. Home Douglas's description of the Riviera points this moral, particularly in the case of poor Hyères, which figures so prominently in the domestic memoirs of twenty or thirty years ago. His account of Nice may be read with profit, certainly with pleasure, after Dr. Henry Bennet's elaborate treatise on the Riviera—indeed, the layman has the advantage of the physician in nearly every respect but a show of professional language. Mr. Home Douglas's programme for the invalid is so attractive; his climatic *menu* so "fetching" that invalids, real or supposed, will soon be "flying, flying south," like so many swallows or Scotchmen. In respect of literature alone his "Searches for Summer" has merits which are rare even in works of purely æsthetic or descriptive pretension.

A Year's Botany: adapted to Home and School Use. By Frances Anna Kitchener. Rivingtons. 1874.

We have seldom met with a book better adapted for interesting young people in the study of this science. Instead of frightening the student by presenting him with an interminable list of formidable technical terms, it leads him on step by step in an examination of flowers for himself, introducing the technical expressions only as they are actually wanted. At the commencement of each lesson a list of flowers is given with which the learner is to provide himself; the conspicuous points of structure are first of all explained; and then, before the student is wearied with a number of details of external morphology, the simpler and more interesting physiological processes are described in a manner that cannot fail to arrest the attention. This is a great improvement on the old method, by which many were deterred at the outset from prosecuting the study, and from which the science has got the evil and altogether undeserved repute of being extremely dry. The book ought to have a large circulation, especially among those who have children whom they wish to interest in a subject with which every one who lives in the country ought to have some acquaintance.

BOOKS RECEIVED.

HISTORY OF THE CONFLICT BETWEEN RELIGION AND SCIENCE. By JOHN WILLIAM DRAPER, M.D., LL.D., etc. London: H. S. King and Co. 1875. From the Publishers.

A MICROSCOPICAL EXAMINATION OF CERTAIN WATERS SUBMITTED TO JABEZ HOGG, AND A CHEMICAL ANALYSIS. By DUGALD CAMPBELL. Third Edition. London: Baillière, Tindall, and Cox. 1874. From the Publishers.

Notes and Queries.

ADULTERATION OF SERPENTARIA.—In the *American Journal of Pharmacy* for November, Mr. P. L. Milleman states that he has met with an adulteration of Radix serpentariæ by a large admixture of the rhizomes of golden seal with the rootlets attached. Serpentaria is found in the United States market generally in a loose and unpressed condition, and the practice of allowing its long twisted and knotted rootlets to retain some adhering earth facilitates the perpetration of the fraud.

ARTIFICIAL AGEING OF OIL OF CLOVES.—M. Stanislas Martin notices (*L'Union Pharmaceutique*, xv., 346) the occurrence in commerce of two kinds of volatile oil of cloves: one, which is amber coloured, being sold at 40 francs the kilogram; the other, mahogany coloured, being sold at 45 francs. These, he states, are frequently the same oil, the darker having undergone a manipulation based upon the fact that oil of cloves is coloured by exposure to light, and that its flavour improves with age. In order to hasten this change, the oil is exposed in unstoppered bottles to sunlight or the gentle heat of a stove, until it has lost rather more than one-tenth of its weight, and its specific gravity has been increased from 1·055 to 1·060. The alteration in flavour M. Martin considers to be due to the presence in the new oil of an empyreumatic oil which is volatilized at a low temperature; whilst the colouration he attributes to the oxidation of caryophyll, a certain quantity of which he has found to disappear from oil of cloves submitted to the influence of time or a forced evaporation.

DEODORIZATION OF CARBON BISULPHIDE.—M. Yvon states (*Journ. Pharm. Chim.*, xx., 377) that carbon bisulphide may have its disagreeable odour removed, sufficiently to allow of its use as an anæsthetic, by digesting it with copper turnings. No stirring is necessary; the carbon bisulphide quickly becomes colourless and then possesses an ethereal odour which has nothing unpleasant in it.

GRANULATION OF CHLORATE OF POTASSIUM.—The danger attendant on the pulverization of chlorate of potassium, may be entirely avoided by pursuing the method recommended by Gawalovski. A hot, saturated solution of chlorate is prepared, and into this is dropped a plate of glass. When the glass is withdrawn it is soon covered by a layer of the granular salt, which is removed, and the operation repeated until a sufficient quantity is obtained.—*Canadian Pharmaceutical Journal.*

LIQUID GLUE.—A writer in the *Comptes Rendus* describes a method of making liquid glue which remains liquid in bulk, and is still very tenacious when dry. Reduced to English weight the proportions of the ingredients are about as follows:—Two and a quarter pounds of glue are dissolved in thirty-six fluid ounces of water, in a glazed vessel set in a water-bath. Seven ounces, by weight, of nitric acid, sp. gr. 1·32, are gradually added, stirring well after each addition. This produces effervescence, hyponitrous acid being evolved. When all the acid has been added, the operation is finished, and the product may be set aside to cool.—*Canadian Pharmaceutical Journal.*

PRESENCE OF PERCHLORIDE OF MERCURY IN SACCHARATED CALOMEL.—Dr. Polk (*Philad. Medical Times*) corroborates the statement of Vulpius, that "when calomel is mixed in powder with white sugar, or calcined magnesia, or bicarbonate of soda, corrosive sublimate is formed in twenty-four hours." Dr. Polk found the administration of ten grains of saccharated calomel, which had been prepared a month previous, was attended with poisonous effects. Examination revealed the fact that a considerable quantity of perchloride of mercury was contained in the remainder of the sample.—*Canadian Pharmaceutical Journal.*

Correspondence.

*** ***No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.***

LEGISLATION FOR PROMOTING EARLY CLOSING.

Sir,—Allow me to thank you for your article of the 19th inst. upon our annual report. At the same time permit me to correct the statement that the Early Closing Association evinces any "disposition to coquet with 'permissive legislation.'" This phase of coercion was merely mentioned in our manifesto as one of the forms which legislation might take without the expression of any opinion upon its merits. Indeed, the document quoted concludes thus:—"Although the Board of Management are prepared to consider any well-devised project for legislating on the subject of early closing, thus far they see no reason to depart from their reliance on that mode of operation which has achieved such valuable results in the past—a method which has conferred inestimable benefits on multitudes without giving anyone reason to complain of coercion or injury."

In conclusion, I beg to add that chemists' assistants have occupied the thoughts of the Society upon many occasions, and that the enclosed pamphlet was issued in 1857 to call public attention to their case.

It has, however, been generally found that what is wanted is a greater spirit of concord and agreement amongst the employers rather than any interference or pressure from without.

FRANCIS A. ALLEN, *Secretary.*

100, *Fleet Street, E.C.,*
December 21, 1874.

DISSATISFIED YOUNG MEN.

Sir,—On reading the letter of "Veritas" I must confess I was somewhat taken by surprise. It seemed to me to be the words of a man who had been in a trance the last twenty or thirty years, and being just awakened, was looking about him with astonishment at the somewhat altered state of affairs.

It is true that we who are young, "by being brought on the stage in these latter times" have partially escaped the evils of which he speaks. I say, partially, for they still exist, though, perhaps not to the extent they did at the period to which your correspondent refers. But he seems to forget that it is *now* necessary that we must spend the whole of our leisure time in study for some years, unless we are content to remain "asses of the Pharmaceutical Society," for life. If the apprentices of the "good old times" were "fond of reading" I should like to know how they would figure before our "Board of Examiners." Would the majority of them leave the dreaded room at Bloomsbury

Square with smiling faces or downcast eyes? Let "Veritas" answer.

As for the interests of employers—or masters if "Veritas" prefers the term—being injured by closing at a reasonable hour, I would recommend him to ask the drapers, grocers, ironmongers, etc., with whom he transacts business, whether their returns have decreased of late years, since the system of early closing has been so generally adopted, and communicate the result of his inquiries to the *Pharmaceutical Journal*, as it would no doubt be interesting—though, perhaps, not new—to most of its readers.

I will admit that the men who have newly-established businesses are frequently the "chief offenders, in keeping shops open late at night;" but it must be remembered that they form only a small proportion of the total number in business, and that most of them are men of little or no capital, who, if the hours of labour were moderate, and the salary equal to that obtainable by assistants in other trades, would remain assistants.

"Veritas" does not seem to be aware of the fact that in the greater number of pharmacies, especially where only one or two assistants are kept, there are at times half hours when "business being slack" and "stock well up" he must necessarily be either doing nothing, or making his work "spin out," so that a superficial observer would be led to think him an industrious man. I am informed that in the "good old times," when "Veritas" was an apprentice, the assistant's time was "filled up" by "killing quicksilver" for sheep ointment, etc., etc.; but it is now found that that work may be more economically performed by porters and machinery.

Lastly, as regards Sunday duty. I think it would be most unfair for the master to have the whole burden of it upon himself, and no assistant who expected to be in business on his own account would wish for such a thing, especially as the Sunday trade offers more interruption than it formerly did, owing chiefly to the fact that many medical men have given up the old custom of dispensing their own prescriptions since the modern pharmacist has become competent and conscientious enough to be trusted with that responsible duty. I, for one, would be sorry to deprive "A Dissatisfied Master," or anyone else, of the comfort to be derived from the ministry of Dr. M'Auslane or any other reverend gentleman.

AN EXAMINED ASSISTANT.

PRESERVATION OF INFUSIONS.

Sir,—In your last impression, Mr. Barrett disclaims having used carbolic acid for preserving infusions, although he admits having tried it as an experiment. He assumes that I implied that he was in the habit of using these for the patients, which I confess I did. One of my authorities for stating so had the opportunity of knowing at the time, but either he or I in the description given to me must have misunderstood the use Mr. Barrett made of the infusions so treated. As he is not so enthusiastic as Mr. Barrett or myself, he has forgotten the particulars of his statements to me, although they are so indelibly impressed on my memory that I remember he said that Mr. B. found carbolic acid would keep concentrated infusions if so little as one-fifth of a grain were contained in the ounce when diluted. Our "Mutual friend," whose honourable position, qualifications, and attainments, we both respect, certainly informed me *bonâ fide*, and as he has communicated privately with Mr. Barrett, Mr. B. will agree with me that however "good-natured" he may be, his word is "above suspicion."

WM. MARTINDALE.

10, *New Cavendish St., W., December* 23*rd*, 1874.

Sir,—The battle of the infusions fresh *versus* concentrated, had I believed been well fought out and long since settled in favour of the former; the only point not ceded by the latter being that of convenience.

Some recent suggestions which might possibly be useful on the score of economy in hospital, although not likely to obtain in private dispensing, have again brought the topic forward for discussion. The traveller offering concentrated infusions, on being informed by the pharmacist that he prepares them fresh, is ready with the rejoinder, But what do you do on an emergency? This is suggestive: emergencies do occur, and, although not very frequently, must be provided for; it is only on these occasions that the pharmacist is justified in using anything but a freshly prepared infusion, and even then is not justified in adding anything which is not ordered in the prescription.

In an early volume of the *Pharmaceutical Journal*, Mr. Alsop advocated the process of preservation of fresh infusions by filling bottles, heating to the boiling point, and hermetically sealing. From time to time Professor Redwood, in his lectures, has pointed to this process as the best known, and when a student at the Square, some fourteen years since, I remember him opening a bottle of infusion which had been so preserved for four years, it was quite good at that time.

In September, 1863, *Pharmaceutical Journal*, vol. v. 2nd series, I advocated its adoption for the preservation of lemon juice, using, however, a lower temperature for this (150°), and should not now make these remarks but that I find from his letter that Mr. Gudgen and probably many others still adhere to tying over with bladders. Now I believe that the bladder itself is occasionally the cause of spoiling, and in the article mentioned advise the use of corks—not filling too tightly, but cut off and sealed over with a little melted beeswax. After some thirteen years' experience of Mr. Alsop's method with this slight modification, I feel satisfied that infusions so preserved are the best substitutes on emergencies for those freshly prepared.

CHARLES SYMES.

Liverpool, December 19*th*, 1874.

We have also received a communication from *B. T. K.*, in which he expresses a preference for the plan of preserving infusions described by Mr. Gudgen, which *B. T. K.* finds also answers admirably for the preservation of mucilage. Further, he suggests whether the addition of chloroform to an infusion might not give some ingenious analyst an opportunity of certifying to an adulteration. We think enough has been said now and on previous occasions (see Mr. Allchin's paper in vol. i. of the present series), on this subject to evidence that there is no very great difficulty in preserving—at least without decomposition—properly prepared infusions during a considerable time, without the addition of any extraneous substance.

Amorphous Phosphorus.—We have received from Mr. Postans a letter in which he expresses the opinion that Mr. Greenish has failed to satisfy the reasonable demands for information he apparently possesses in respect to the discussion of this question from a scientific point of view. As personal considerations are introduced into this matter we must decline to afford any opportunity for dealing with it under that aspect, and therefore confine ourselves to stating the mere purport of Mr. Postans's letter.

R. G. Gould.—Blaine's 'Veterinary Art,' or Tuson's 'Veterinary Pharmacopœia, including the Outlines of Materia Medica and Therapeutics,' published by J. and A. Churchill, price 7*s.* 6*d.*

E. Lloyd.—You are recommended to address the question to the Editor of a medical journal.

G. F. G.—We are unable to answer your question, which is one that should be submitted to a solicitor, together with a statement of all the circumstances.

W. J. S.—Barber's 'Students' Pocket Companion to the British and London Pharmacopœias,' published by Philip and Son, 32, Fleet Street, E. C., price 5s.

R. B. Cotterill.—Tinct. Phosphori Ætherea. Sliced phosphorus ℈j, sulphuric ether ℥vi ʒij; macerate for a month in the dark, and decant. (Beasley.)

C. C. Thresh.—The woody fibre may have been introduced from the cask in which the chicory was packed, or it may have had its origin in the meditullium of the chicory itself; most probably the former. You appear to have overlooked our answer to your former question, which was to the effect that we had failed to identify the fungoid growth, and recommended you to send a specimen of it to the Editor of 'Grevillea.'

R. H. Cumine.—We are not acquainted with any published formula for Tincture of Guarana. See some appropriate remarks upon the subject in the concluding paragraph of Mr. Moore's paper on Fluid Extract of Guarana, before, p. 463.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. M. H. Stiles, Mr. A. W. Jones, Mr. Druce, Messrs. Evans, Lescher and Co.

NOTES ON MOROCCO DRUGS.

BY ARTHUR LEARED, M.D., F.R.C.P.,

Late Lecturer on Materia Medica Grosvenor Place School of Medicine,

AND E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

† Specimens of the drugs thus marked are in the museum of the Pharmaceutical Society.

‡ Specimens of the plants thus marked are in the herbarium of the Pharmaceutical Society,

§ The drugs thus marked were not recorded in the last paper.

The arrival of further specimens of drugs from Morocco has enabled us to identify with certainty several which, in a former paper,* were doubtfully named or not identified at all, owing to the fragmentary nature of the specimens then received. We are also able to add several drugs not before enumerated.

Leaves, Flowers, and Plants.

Aflau.—This is *Mentha Pulegium*, L., not a species of *Thymus*, as before stated.

†Artim.—This is *Retama Ræetam*, not Spanish Broom. At Tangier, the name "Artim" appears to be restricted to this species, but some dried flowers received from Mogador, under the same name, include also, *Genista candicans*, L.,‡ and *G. linifolia*, L.‡ "Artim," is probably, therefore, a generic name for several leguminous plants used as food for cattle.

The bitter roots are said to be used by the Arabs for internal pains, and the shoots macerated in water are applied to wounds. The shoots much resemble in appearance those of *Sarothamnus scoparius*, but are slenderer, more branched, and the branchlets are longer.

Azeer.—These leaves are those of *Rosmarinus officinalis*, L.

Effersue, *vide* Roots, art. Ipherscul.

†El Halhal.—This drug consists of two plants, *Lavandula stœchas*, L.,‡ and L. *dentata*, L. The first named occurs in by far the larger proportion, so that *L. dentata*, L., may be, perhaps, only an accidental admixture. The flowering specimens received under the same name are those of *L. stœchas* only.

§El Habeeka.—A single flowering specimen only received. It is *Parietaria officinalis, L.* Common Pellitory.

†Ghassoul.—The structure of the fruit which is mixed up with the stalks and leaves, is evidently that of some calycifloral plant, with a half-inferior ovary, nearly allied to the genus *Mesembryanthemum*, but we have not yet succeeded in identifying the species.

A specimen of a plant received under the very similar name "Ghussul," or "Tegaghust," is a species of *Silene*, but is evidently not the plant yielding ghassoul, for *Silene* has a superior ovary.

Flayu, *see* Timza.

§Grom-azdo.—These leaves resemble, in general character those of the *Cratægus oxyacanthus*, L., and probably belong to some species nearly allied to it. It is used by women after parturition.

†§Khobaizeh.—The whole herb is used. It is *Malva parviflora*, L., and is readily recognized by its wrinkled fruit. This name would, however, appear to include other species of the Malvaceæ, for a specimen consisting of flower and leaf received under the name of "Khobaizeh," belongs to *Lavatera hispida*, Desf. It is used as a demulcent in catarrh.

†M'roy, Maroui, or Marout.—These are several ways of spelling the Moorish name for *Marrubium vulgare*, L. The specimens examined all belong to the variety *β. lanatum*.†

Marout Zarbe.—The leaves are those of *Salvia triloba*, L., a plant with a woolly stem and leaves, which may perhaps owe its Moorish name to its similarity in this respect to *Marrubium vulgare.*

†Ruta.—This name probably includes two or more species of *Ruta*; a flowering specimen received under this name belonged to *Ruta Bracteosa*, D.C., while the drug consists of *R. angustifolia*, Pers.

†§Sabardo, or Asbardo.—The green stem. These curious cactus-like stems belong to a composite plant. *Kleinia pteroneura*, D. C., nearly allied to the common groundsel.

The stem is about the thickness of the fore-finger, leafless, except at the top, where there is a rosette of leaves, furrowed externally, and has a large discoid pith; the branches are nearly equal in size, quite erect, and parallel with the stem, and remind one of a candelabra with a number of candles in it.

It is used externally for "pains in the hands and feet," (rheumatism?).

†Sadear, or S'dia.—These words are different ways of spelling the Moorish name for *Teucrium polium*, L. A nearly allied species, *T. montanum*, L., was used in this country during the last century under the name of Poly-mountain, and appeared in the list of materia medica of the London Pharmacopœia as late as 1763.

‡§Shiba-el Agooz.—This name is applied to a species of Artemisia, *A. arborescens*.

†Taserkina.—These are the leaves of a variety of *Thymus vulgaris*, L., which has the leaves tapering more towards the base than in the common form.

Timza.—This is not *Mentha sylvestris*, L., but *Mentha rotundifolia*, L., which is distinguished from the former by its wrinkled, obtuse leaves. We have also received *M. rotundifolia* under the name of "Menta." A specimen without flowers, which closely resembles in appearance the common *M. viridis*, L., except that the leaves are stalked, is called "Flayu." The taste, also, is similar to that of *M. viridis*.

†Zater.—This is not a *Thymus*, but *Origanum compactum*, Bth.

Seeds.

†Sanous.—This seed is that of *Nigella sativa*, L. It is small, about one-eighth of an inch long, with projecting angles, quite black and reticulated. It is supposed by some to be the fitches mentioned by Isaiah.

Bark.

†‡§Edro or 'Dro.—This is the bark of the *Pistacia lentiscus*, L. It has been identified from a portion of the plant received from Morocco.

Roots.

†§Ablaluz.—This consists of the rootstock and tubercular roots of *Asphodelus ramosa*, Moench. The rootstock is about two inches long and three-quarters of an inch in diameter; of a pale brown colour, with numerous fleshy fusiform tubercular roots attached to it of about the thickness of the forefinger. The taste is insipid. The roots seem very tenacious of

* *Pharmaceutical Journal* [3], vol. iii., p. 621.

life, giving off shoots without being moistened, and in dry air.

§ADAD.—This is a large, somewhat cylindrical root, more than a foot long, and about two inches in diameter. It has a crown consisting of several stems, springing from the contracted upper portion of the root. The transverse section is white and starchy, but, nevertheless, is hard and tough, and shows about six ill-defined concentric rings, marked with horny looking radiating lines, which, under a lens, are seen to consist of vessels containing matter resembling caoutchouc. This caoutchouc has exuded from several parts of the root, where it was apparently injured in the fresh state. The smell and taste of the root are aromatic. The root is certainly not that of *D. mezereum*, L., as previously stated. A leaf received as that of Adad appears to belong to some species of thistle. Leo Africanus* says of Adad:—"The herbe thereof is bitter, and the root is so venemous that one drop of the water distilled thereout will kill a man within the space of an hower, which is commonly knowen even to the women of Africa." It is taken for debility and low spirits. Not yet identified.

†§ARK ABU.—This root occurs in pieces varying from one-third to half-inch in diameter, and several inches in length. It is dark brown externally, with numerous closely placed annular ridges and numerous small warts, and is sometimes branched in the upper part like dandelion root. The meditullium is large, white, and starchy, occupying about two-thirds of the diameter of the root. The cortical portion is white internally, and has a ring of resinous-looking rays next to the meditullium. The taste is insipid. It is used for "pains in the bones" (rheumatism?). Not yet identified.

†ARK SUS.—This consists entirely of the subterranean stem of a species of liquorice; the plant yielding it is probably *G. echinata*, L., judging from its bitterness and longitudinally cracked epidermis.

†BERESIMIS.—This root has a thick brown spongy cortical portion, and a white soft radiate meditullium. It tastes somewhat like turnip, but without any pungency. Not yet identified.

†§EMSLEH ANDER.—This is a tapering cylindrical root, varying in thickness from half to one inch, and from six to nine inches long, deeply furrowed, and of a dark brown colour externally. It is readily distinguished from other roots by its black, horny, cortical portion, which has a polished or waxy appearance when cut. The meditullium occupies three-quarters of the diameter, and is generally of a more or less dark grey colour, with sometimes a paler zone next to the bark. The taste is sweetish and slightly bitter. It is used for sore eyes, the root being ground very fine and passed under the eyelids. The leaves and stems attached to the root are evidently those of *Verbascum sinuatum*, L.

§IFERSCUL.—This drug is the root of *Cistus salvifolius*, L. It is a hard woody root of three-quarters to one inch or more in diameter, with a rather thick spongy cracked bark of a peculiar greenish or olive brown colour. The meditullium is of a dirty white colour, and is hard and woody. The plant appears to have grown in a reddish soil, as the surface of the root bark is of a reddish hue. A plant received under the somewhat similar name of *Effersue* is *Pteris aquilina*, L. The taste is earthy, gritty, and very slightly aromatic. It is taken for palpitation caused by sudden fright, etc.

†L'FUELY.—This root is not that of *Raphanus sativus*, L., that esculent being known in Morocco under the name of "Fijjil." The root of L'fuely is from half to one inch or more in diameter, rather smooth, and of a dull, dark red colour externally, and whitish and very fibrous internally. It appears to have been of a fleshy character when fresh, the cortical portion being very loosely attached to the meditullium. The taste is saltish. Not yet identified.

†ODEN EL HALOOF.—This consists of a short, prostrate rhizome, terminating in a hairy bud, and giving off below a tuft of straight, unbranched roots of a reddish brown colour, about the size of a crow-quill, and finely striated longitudinally. The odour resembles that of arnica, and the taste is aromatic and somewhat acrid. It is taken for strangury. Not yet identified.

†§TAFRIFA.—This root is of a dull brown colour, from half to one inch in diameter, with numerous transverse striæ and a few scattered warts. The meditullium is white, and the cortical portion thick, white, and spongy. The taste is saltish and pungent. It is supposed to strengthen the nerves, etc. The leaves and flowers received as those of Tafrifa belong to *Statice mucronata*, L.

†TASERKA.—This is a large somewhat woody root, 12 or 18 inches long, two inches or more in diameter at the top, and much branched and tapering to half an inch in the smaller branches. The cortical portion is brown, spongy, and rather thin in proportion, being on the average not more than a line in thickness. The meditullium is of a yellowish colour, with the concentric rings not visible, and in many of the pieces the medullary rays are of an ash grey colour (perhaps from imperfect drying), and thus gives a distinctly radiate appearance to the meditullium. The root is almost tasteless. Attached to the root are portions of leaves which appear to belong to some species of *Carlina* or *Carduus*. It is taken to mitigate thirst.

†TOWSERGENT.—This is the root of *Corrigiola telephiifolia*, Pour,‡ Nat. ord. Illecebraceæ. Specimens of the plant in flower, from Morocco, are in the herbarium of the Pharmaceutical Society. Externally the root is pale brown and twisted, rather knotty at the top, more or less fusiform, from a quarter to half an inch in diameter, and from two to four inches long. Its internal appearance is very characteristic. The transverse section is of a yellowish white colour, with 3-5 concentric rings, which have a horny and translucent appearance. The taste is acrid, causing a tingling sensation like that produced by Senega. Leo Africanus says concerning "Tauzarghente." "This root, growing in the westerne part of Africa upon the Ocean seashore, yeeldeth a fragrant and odoriferous smel, and the merchants of Mauritania carry the same into the land of Negros, where the people use it for a most excellent perfume, and yet they neither burne it nor put any fire at all thereto; for being kept only in an house, it yeeldeth a naturalle sent of itselfe. In Mauritania they sell a bunche of these rootes for halfe a ducate, which being carried to the land of Negros is sold again for eightie or one hundred ducates, and sometimes for more." The root we have received is not so powerfully odorous as represented by Leo Africanus; it has a very faint odour, like that of orris-root.

†WASKIZA.—This root occurs in slender pieces, of

---

* Translation by John Pory. London, 1600, page 357.

a pale brown colour externally, barely a quarter of an inch in diameter, and about three or four inches long. The root is sparingly branched. Internally it is pale, with a large and faintly radiate medi-tullium. The taste is earthy and slightly acrid. It is used as an emetic. The plant received as Waskiza is *Euphorbia terracina*, L.

Exudations.

†Alkeptum.—This resin occurs in small yellowish, rather dirty tears, in colour and taste resembling American frankincense. It is probably the product of some coniferous plants. Its Spanish name, "Gomma di Pinezia," gives probability to this suggestion, indicating as it does that it is derived from a species of fir. The resin is used in urinary complaints, accompanied by pains in the loins and deposits in the urine. It is administered mixed with bitters and honey. Not yet identified.

PREPARATION OF PURE CARBONATE OF SODA, AND PURE CARBONATE OF POTASH.*

BY J. LAWRENCE SMITH.

Pure Carbonate of Soda.—For many years all the carbonate of soda used by me in mineral analysis has been prepared in the following method, viz., by making oxalate of soda and then decomposing it by heat. It can be described in the shortest possible manner by giving the figures and method employed for obtaining a given result. The carbonate of soda commonly used has been the crystals of ordinary sal soda, washed with a little water to detach the adhering dust, or if one has pure soda at his command it can be used to advantage. The oxalic acid used is the ordinary oxalic acid of the shops once recrystallized, of which recrystallised acid I always have a supply of several pounds in my laboratory.

Sixty-three grammes of oxalic acid and 143 grammes of sal soda are dissolved by heat in 200 c.c. of distilled water. Filter the solutions, if necessary. To the solution of soda, when cold, add the solution of oxalic acid, just hot enough to keep from crystallizing; add it by degrees, stirring well; after the mixture is completed, it is expected that the solution will have an alkaline reaction, to keep any trace of soda in solution; the oxalate of soda will be precipitated in great part shortly after the operation is completed. Let stand for a short while to cool completely, decant the supernatant liquid, add a little distilled water, break up with a stirrer the lumps of crystals that may have formed, throw on a filter over a Bunsen aspirator, using a six-inch filter, wash with about a half litre of distilled water, and let dry. This may be placed aside in a glass bottle if not needed at once for forming carbonate of soda; the quantity of dry oxalate produced is 30 grammes. To convert into carbonate project the oxalate little by little into a platinum capsule over a good-sized Bunsen burner; after being strongly heated, the oxalate is decomposed into the carbonate, and, if heated high enough to be fused, will furnish about 23 grammes of fused carbonate of soda; fused or not, dissolve in water, filter, evaporate to dryness, dehydrate over a naked flame, and granulate it by stirring when hot.

Double or quadruple the quantities above given may be operated upon at once with similar results. The carbonate of soda thus made is perfectly free from chlorine, sulphuric acid, silica, or other impurity that will interfere with its use in analysis.

Pure Carbonate of Potash.—It may be wrong to use the word pure in connection with the preparation of this substance in the manner to be described, as it may contain at the end of the operation a trace of nitrate of potash. The starting point is pure nitre, which is a cheap potash salt, and can be readily purified by repeated crystallisation; the other is oxalic acid, the commercial acid recrystallized once or twice. 50 grammes of pure nitre and 100 grammes of oxalic acid are placed in a platinum capsule; to this is added a small quantity of water, and heated over a gas-burner; before the mixture is entirely dry, a second portion of water is added and the heat continued until the mass is brought to dryness, at which time nearly all the nitric acid of the nitre is expelled. The heat is now continued and the whole mass brought to redness, breaking up the lumps with an iron rod, when the oxalate of potash formed will be decomposed into the carbonate; the mass is treated with water, filtered, dried, and granulated over the flame; this furnishes about 31 grammes of carbonate of potash, which, as I have already said, may contain a little nitre, but this in no way interferes with the ordinary use of carbonate of potash in making fusions. For this purpose I commonly mix equal parts of carbonates of soda and potash at the time they are required for use.

*From the *American Chemist*.

MATICO.*

As to what plant is the "real original" Matico there seems some doubt. There are at least "two Richards in the field," and each has some claim to the title. According to Hartweg, whose remarks are quoted in a recent number of the *Pharmaceutical Journal*, "Matico is the vernacular name applied by the inhabitants of Quito to *Eupatorium glutinosum*, or the 'chessalonga' in the Quichua language. It forms a shrub three to five feet high, which is common in the higher parts of the Quitinian Andes, where its properties were discovered some years back by a soldier called Mateo, better known under his nickname Matico (little Matthew), who, being wounded in action, applied accidentally the leaves of some shrub to his wound, which had the immediate effect of stopping the bleeding. This shrub happened to be the Chessalonga, which has since been called, in honour of the discoverer' Matico. That it is the true Matico of the inhabitants of Quito and Riobamba I have not the slightest doubt; both the leaves and specimens have been gathered by myself, and upon comparing the latter with Kunth's description I found them to agree exactly with his *Eupatorium glutinosum*."

This origin of the name Matico, it may be remarked *par parenthèse*, reminds us of that of the genus Quassia, which commemorates a negro slave named Quassy, who first discovered its good qualities as a febrifuge, and employed its bark and wood as a secret remedy against the malignant endemic fevers which were so frequent in Surinam. He was at last induced to part with his secret for a considerable sum, by a Swede named Rolander, by whom, in 1756, the wood was first brought to Europe. This perpetuation of the name of the discoverer in association with the plant connected with him is common enough not only in scientific but in popular use; thus the "Tinker's weed" of North America (*Triosteum perfoliatum*) has reference to a Dr. Tinker, who was the first to employ it in medicine as an emetic; and Mr. Ransted, the introducer of the common yellow toad flax (*Linaria vulgaris*) to the United States, where it has become an agricultural pest, is commemorated in its popular name, "Ransted weed."

In spite of this identification of *Eupatorium glutinosum* as the original Matico, it is certain that the plant so called in commerce is in most cases not that species, but an *Artanthe* (*A. elongatum*), the *Piper angustifolium* of older writers. This was introduced to English medical practice by Dr. Jeffreys, of Liverpool, who published an account of it in the *Lancet* for 1839. It was recommended for use in cases of diarrhœa and cholera, but its real value is as a styptic, not from any astringent properties, but from its mechanical action, the structure of the leaf promoting the coagulation of the blood. It is chiefly imported from Peru, but specimens in the Exhibition of 1851 were from the province of Chiquas, in the eastern

* From the *Gardeners' Chronicle*.

extremity of Bolivia. Another species of *Artanthe* (*A. adunca*) is sometimes substituted for *A. elongata* in commerce. This was the case during the American war in 1863. According to Professor Bentley, however, "it may be at once distinguished from the official Matico by being in a less compressed state, by the upper surface of its leaves not being so tessellated or rough, and by the almost entire absence of pubescence on the under surface of the leaves." The true officinal Matico, as imported, "consists of the dry leaves, stalks, aad spikes (some unripe, others ripe), more or less compressed into a lump, which has a greenish colour. The leaves are from two to eight inches long, veined and tessellated on the upper surface, downy beneath, with an aromatic slightly astringent warm taste, and an agreeable, aromatic odour."

Another plant, which has also obtained the name of Matico, is *Waltheria glomerata*, the leaves of which are used as a vulnerary in the Panama region, where the shrub is known as Pado del Soldado, or Soldier's Tree; and a story similar to that given above is connected with it. Dr. Seemann says that "the same story, with more or less variation, is told of many other vulneraries of Spanish America." Martius was inclined to consider that the true Matico was furnished by a species of *Phlomis*, but that genus is only represented in America by *P. fruticosa*, which has been collected in Mexico, where it was probably an introduction.

THE BOTANIC GARDENS AT SAHARUNPORE, NEAR MEERUT.

An Indian medical correspondent of the *Medical Press and Circular*, writing from Meerut, thus describes a recent visit to the Botanic Gardens at Saharunpore, near that city.

"These gardens formerly belonged to a native prince, who, seventy years ago, started the place, now extending over 200 acres. The visitor familiar with Chiswick, Kew, and the Regent's Park, the Horticultural Gardens, the Crystal Palace grounds, and flower-shows generally, must make allowances for heat and climate; the chances are, Balaam fashion, he will return pleased, will bless instead of curse the place, which I found most enjoyable in the early morning, when the grass was wet with dew and the birds and insects singing and buzzing so merrily. Some of the flowers were still asleep—for instance, the twelve varieties of gorgeous, glorious passion-flowers; others, for instance, the great white mushroom-looking blossoms of the moon-flowers, which had an "up all night at a midwifery case" appearance, were jaded and worn; others, such as Ipomeas, the red, the white, the variegated convolvuluses never looked more lovely, especially the jalap, a gay dandy, who had entirely sunk all acquaintance with calomel and scammony. Of the twenty-seven varieties of roses, the King's Acre and the gloire de Dijon do the best; of the geraniums, the scarlet single and Tom Thumb are most hardy, but will only live five years, compared to twenty at home; likewise the fuchsia lives only ten instead of thirty years. From March to September the young tender plants are sent with the greatest benefit to the Hills, but, just as with men, the changes of climate do not universally benefit the old, indeed, may do harm. Dwelling too long on a congenial theme, although neither oaks, bays, or laurels are here, time and space will not permit even to enumerate the treasures of Saharunpore; so let us hurry on along the avenues, just glancing at acacias, cypresses, palms, yuccas, tamarinds, teak, chestnut, mahogany, india-rubber, the logwood for diarrhœa, croton for constipation, eucalyptulus globulus with camphor-smelling leaves—the antidote for malaria if it would only grow where required, so far a matter of impossibility that even the specimens here so carefully tended are but poor. One tree cuts like under-done beef—I forget the name and also the specimen in the spacious museum, there being no catalogue. Thousands of dried plants in paper, fossils of fish, flesh, fowl, and probably of medical practitioners, discovered in the Sewaliks; specimens of henbane, attees, kamala, curious fir-cones, shells found in kunkur, also rock crystal, green and blue malachite, asbestos, and that curious sandstone which bends and gives like india-rubber. But it was a sin to pore over old bones or stone when the sweetly-scented flowers of all colours were arrayed in review order, the smartest outside, awaiting inspection. Sir John Lubbock should have been here. The creepers are very grand. A water-lily-like, feathery jasmin, the *Valans Indica*, is curiously beautiful. There are forty acres of Rhæa running to waste until the great secret is discovered how to separate the glutinous matter. There are scented flowers, leaves, and shrubs, also vegetables, besides an experimental farm, worth visiting. The natives, wonderful herbalists, know a great deal more than we give them credit for on this as on other subjects, and on certain days they troop in to worship certain flowers—the *Jasminum mogrum*, a special favourite. The sacred monkeys, to kill which would be sacrilege, give constant trouble, grubbing up seeds, rooting up plants out of mischievous curiosity.

ZYMOTIC POISON.*

BY J. DOUGALL, M.D.

About 100,000 persons are poisoned to death annually in Great Britain, of which upwards of 4000 die in Glasgow. The number attacked, represented by these deaths, probably amounts to 10,000,000. This frightful mortality is not confined to our country, but prevails more or less from the same causes in every community in the world. This is no mere figure of speech in regard to the cause of death, nor simply an hypothesis as to the quantity of lives sacrificed. I mean what I say—these persons die by being poisoned, while the registrars' returns authenticate the number of victims. Doubtless, some of you will be startled at this statement, and will be already reflecting on what can be the nature and source of the potent agent that plays such terrible havoc with human life. Of course, you will say, it cannot be any even of the most active poisons we have in our laboratories—it cannot be such as prussic acid, or arsenic, or phosphorus, or any of the salts of mercury; neither can it be strychnia, atropia, aconitia, conia, or digitalin—that we know is ridiculously out of the question. What, then, can it be? Is it of vegetable, animal, or mineral origin? Is it solid, liquid, or gaseous? Does it taste sweet, sour, bitter, nauseous, salt, acrid, or is it tasteless? Does it smell pleasantly, or offensively, or is it odourless? Is it transparent or opaque, coloured or colourless, acid, alkaline, or neutral? Has it any known reactions with chemical reagents, or other distinctive propensities by which it can be known? Is it a simple, binary, ternary, or quaternary body? What is its name? Who was its discoverer? Has it no antidote? In short, has it been seen at all?

Such a sequence of ideas is likely to evolve in the minds of you whose daily avocation brings you in frequent contact with the pharmacopœial poisons, the toxicology of which you are supposed to know. But the substance to which I allude in no way resembles any of the toxic bodies in the materia medica, excepting that it is in the fullest sense of the term "a deadly poison," and yet it cannot be contained in stoppered bottles, weighed in grains, nor measured in minims. Moreover, it differs from all other poisons in this particular respect, that while their actions are confined to the person affected, its action renders the individual poisoned, poisonous. One may, without risk to life, attend assiduously upon, and sleep nightly in the same chamber with a patient suffering from a toxic dose of strychnia, opium, alcohol, etc., *qua* these bodies; but one who has not already been attacked by, and, of course survived the conflict with this virulent entity in all its phases, could not do so with impunity in the case of a person suffering from its effects. He or she might escape, but the peril incurred would be great, as the patient's blood

* A lecture delivered before the Glasgow Chemists and Druggists' Association.

undergoes a kind of destructive distillation, whereby it and the tissues are converted into poison, the body being often literally soaked and enveloped in an atmosphere of keen infection; saliva, urine, fæces, breath, sweat, and skin scurf, may all be saturated with it.

This baneful entity is known by the generic term zymotic poison, from the Greek word ζυμη, leaven, and a person under its influence is said to be in a state of zymosis or fermentation. It has received this name, because, when it infects the blood, certain phenomena are evoked, very analogous to those caused by the addition of yeast to a substance susceptible of fermentation. Supposing it possible to add to an aqueous solution of grape, or other fruit juice, or a mixture of honey and water, a single cell of the yeast plant *Torula cerevisiæ;* this speck of matter may be about the size of a human red blood corpuscle, that is about the 2500th of an inch in diameter, and, of course, only visible under the microscope. Supposing, further, the solution is kept at a temperature near 70° Fah. Then in a fews days, probably hours, from the single cell millions are generated, so as to render the liquid turbid, and form a scum at the top, and a sediment at the bottom. During this process the temperature of the fluid is sensibly higher than the surrounding medium, and carbonic anhydride is evolved in large quantity. Ultimately the escape of gas gradually ceases, and the saccharine solution is now found converted into a mixture of alcohol and water, incapable of further fermentation. Now, to illustrate the other side of the analogy, supposing I were to wet the point of a needle with the smallest possible portion of lymph from the body of a small-pox patient, and push it under the skin of a person unvaccinated, who had not suffered from small-pox, then, a thousand chances to one, in a few days, perhaps hours, the recipient of the lymph feels out of sorts—has headache, backache, nausea, vomiting, thirst, a high pulse, and hot skin. In about three days after the onset of these symptoms, a papular eruption appears on the body which soon forms vesicles or blebs. These may be few or many, separate or confluent, but the clear fluid with which they are tumid has the same specific infective nature as that with which the needle was wet, which has obviously caused them; that minute portion having now probably multiplied to an immeasurable extent. If the patient survive, he or she is now insusceptible of a second attack of these symptoms, which I need scarcely say are those of small-pox, and the lymph innoculated by the needle is zymotic poison.

These, you observe, are both cases of pure infection, and the analogy is about as perfect as possible, considering that in the one case we are dealing with what, in a sense, is dead matter, and in the other with a living organism. You observed: 1. The minute speck of yeast and of small-pox lymph, which evoked their respective phenomena. 2. The elevation of temperature in both cases—the fermenting liquid is abnormally warm, the small-pox patient highly fevered. 3. The enormous multiplication of the yeast and of the lymph. 4. The yeast frothing to the periphery or surface of the fluid, and the small-pox eruption forming, as it were, lymph bubbles on the skin. 5. Both are infectious—a portion of yeast from the alcoholic solution would cause fermentation, a portion of lymph from the innoculated patient would cause small-pox. 6. The alcohol will not again ferment, the patient will not again take variola. 7. The saccharine solution will ferment, as it were, spontaneously, because torula cells are constantly floating about and fall on its surface—so may a person, as it were, take small-pox spontaneously, by breathing air contaminated with that specific poison. These are also both cases of pure infection, though in neither is the infecting agent previously visible.

Now, I have chosen small-pox to compare with fermentation, simply because it is a typical species of the genus zymotica, the other chief members of which are scarlatina, measles, diphtheria, typhus and enteric fever, and cholera. These diseases are generically related, in respect that they are caused by a something which, entering the blood, reproduces itself enormously, rendering the secretions and excretions of the affected person poisonous if inhaled or swallowed by a healthy individual susceptible to their action. Also that they commonly only make one attack, and always cause a hot skin and high pulse. Their specific differences are so remarkable and distinct that, with few exceptions, physicians think each zymotic disease caused by a separate poison. For example, the doctor may be called to see a patient who sickened two days before, and finds him complaining of thirst and headache; he is fevered, prostrate, the eyes suffused, the tongue probably dry, furred, and studded with red points, the throat swollen and tender, and the skin covered with an exuberant efflorescence of bright scarlet dots, and he pronounces the case scarlatina. Or the patient may have swelling of the eyelids, with eyes red, watering, and intolerant of light, sneezing, dry cough, and hoarseness, with difficulty of breathing. On the fourth day of the fever the skin gets covered with small red dots, which coalesce into slightly raised crimson crescentic blotches, and the case is diagnosed as measles. Or the patient may have stiffness about the neck, slight diarrhœa, nausea, pain on swallowing, salivation, fetid breath, the back part of the throat covered with specks or patches, like damp, dirty, wash-leather—symptoms indicating diphtheria. Or the patient may have frequent chills, a soft pulse, dry brown tongue, constipated bowels, heavy, flushed, smoky countenance, stupor, prostration, wakefulness, delirium. About the seventh day of the fever the skin is covered with irregular spots of a dusky or mulberry hue, at first disappearing on pressure, slightly elevated, but soon becoming persistent—symptoms showing the case to be typhus fever. Or the patient may have pains in the limbs, great weakness, loose bowels, with very offensive stools, which may contain blood, glazed dry tongue, with ammoniacal breath, a pale languid face, with a hectic flush on each cheek, clear eyes with dilated pupils, and the mental faculties unaffected. About the eighth day a few elevated and isolated rose-coloured dots probably are found on the abdomen or chest, vanishing on pressure, appearing in successive crops, which last two or more days; and the doctor finds himself face to face with enteric fever. Or the patient, quite well a few hours before, may have severe diarrhœa, with evacuations like rice-water, cramps in the limbs, causing the muscles to be hard as wood, or contracted into knot-like masses; the circulation and respiration impeded; the nose, tongue, ears, breath, and extremities icy cold; the lips and general surface, blue or livid; the eyes sunk, the pupils contracted and fixed, the complexion muddy, and the features pinched; the whole body shrunk and intensely prostrate; perhaps death taking place before the doctor has time to prescribe for what is too obviously a case of Asiatic cholera. The differences in the symptoms of these diseases are held as sufficiently pronounced to justify medical practitioners, as already stated, in regarding them as specifically distinct. But, moreover, they have other characteristics which seem to prove this beyond a doubt. Supposing a person exposed to any of these distempers, and becoming infected, he would only suffer from the symptoms peculiar to the virus he had imbibed; if it were that of scarlatina, he would be affected with scarlatina only; and should he infect others, it would be with scarlatina and not small-pox, typhus, or cholera; and so with the others, each producing offspring identical in kind, though varying in degree, with the primary poison. Another strong proof of the specificity of the causes of zymotic diseases, is the fact already noticed, that one attack usually confers immunity from a subsequent attack of the particular disease with which the person is affected. Furthermore, an attack of one zymotic affection does not confer exemption from attacks by the other members of the group. Notwithstanding these strong and convincing proofs that zymotic diseases are the results of specific causes, some have endeavoured to show that there is one common cause to all, and that the variety in the disease depends upon the channel by which the noxious agent enters the body. If it come directly in contact with the blood, it is said to cause syphilis, dissecting wound fever, and other cognate diseases; if swallowed, enteric fever, and cholera; if breathed, scarlatina, measles, etc. These views are especially advocated in a pamphlet published three years ago on the correlation of zymotic diseases, by Mr. Wolff, of London; and although, judging from the present state of our knowledge, it is possible he may, to a certain extent, be correct, still a large balance of evidence points in the opposite direction. For example—small-pox matter only produces small-pox, by whatever channel it enters the body. I now come to consider the probable nature of zymotic poison. This question has engrossed the attention, and, I may say, baffled the skill of the most profound thinkers and patient workers in medical science. It has been fertile in endless and fruitless discussions; it has elicited untold, deeply interesting, but unprofitable memoirs; it is susceptible of the most ingenious, fascinating, but vain speculations; and has been the incentive to numberless of the most delicate, protracted, and even dangerous, but withal, valueless experiments. All the logic of the reasoner, all the results of the experimenter, anent the nature of zymotic poison, have hitherto practically ended in vague theories and conflicting hypotheses; such being the case, you will not of course expect a solution of the question from me, I can only promise to lay before you some of the more prominent points on which observers have dwelt, and some of the conclusions at which they seem to have arrived.

There are two leading theories extant of the nature, origin, and operation of zymotic contagia, viz., the germ theory, and the physical, or physico-chemical theory. Believers in the germ theory hold that zymotic diseases are caused by living vegetable organisms or ferments, or fungus spores, which, entering the body, reproduce themselves, and pass through various changes that evoke the characteristic phenomena pertaining to the special organism in the body, which may be a scarlet-fever germ, a small-pox germ, a cholera germ, etc., each disease having its special ferment or germ. This theory is founded on the analogy between zymotic disease and fermentation already noticed, and also putrefaction, because the blood and other fluids in the body of a zymotic patient seem undergoing a putrescent change. The germs theorists also affirm that putrefaction, in all its phases, is originated and maintained by germs, which, especially in densely populated places, are floating in myriads in the atmosphere, and only need a congenial soil, such as dead organic matter, or a weakly vital organism, in a condition favourable for their reception, to set them fructifying. Now, in order that you may fairly comprehend the theory, it is necessary to say something of putrefaction. If a portion of urine, blood serum, flesh-water, or other animal fluid be set aside for twenty-four hours, and then examined microscopically, it will be found swarming with organisms in active motion, called, generically, monads, bacteria, and vibriones. The first, from their being the smallest and simplest of all animalcules, measuring from 1-40,000th to the 1-100,000th of an inch; the second, from their rod-like shape, and the third from their vibratile movements. The fluid also soon gets slightly turbid, and distinctly fetid; its reaction is neutral or alkaline, but never acid. It continues thus about twelve months, when the organisms, turbidity and fetor, gradually disappear, and it now gives no response to the tests for albumen. These are the chief physical phenomena constituting putrefaction, and bearing on zymotic disease. But if a portion of any of these substances be put into two flasks and boiled a few minutes, and during ebullition the necks of the flasks stuffed with cotton-wool, and the steam allowed to issue through it a short time, and if the flasks be now set aside, their contents will be found months after, pure and unchanged. If the plug be now removed from one of the flasks, then in a few days its contents will begin to putrefy, while those of the other flask keep sweet and clear. Furthermore, if a portion of a putrescible fluid be boiled in a flask with the neck drawn out into a tube and bent downwards, and if the tube be heated so as to destroy any particles present in the air, which enters the flask as its contents cool, these will keep pure and fresh for an indefinite time; nay, here is such a flask (flask shewn) with flesh-water boiled in it ten months ago, and where the tube was not heated as the contents cooled, and yet these shew no signs of decay. Again, if the bent tube be broken so as to leave about an inch projecting from the neck of the flask, the result is the same as the withdrawal of the plug of cotton—in a short time the contents putrefy.

Now, these experiments show it is not the air which causes putrefaction, because the cotton-wool is pervious, and the bent tube open, neither can the cotton have any antiseptic action on the fluid, nor chemical effect on the air, because, as in the flask with the bent tube, it is dispensed with altogether, and yet the result is the same. The cause of putrefaction must therefore be something in, but distinct from, the atmosphere, and this something is obviously filtered by the wool from the air entering the flasks, while it cannot fall into the bent tube, as the orifice of the latter looks downwards, and, there being no currents in the flask, neither can it rise upwards in the tube.

Now, for no other reason that I know, than that monads, bacteria, and vibriones, are found in all putrefying fluids, the germs of these organisms are said by the germ theorists to be *the something* that is stopped by the cotton, and by the tube. M. Pasteur, a distinguished French micrologist, a brilliant experimenter, and chief of the germ theorists, has, it is said, even seen those germs in cotton-wool which had served as a filter in such experiments. Not only so, he has, by an ingenious process, actually managed to sow them in nitrogenous soil, and they gave rise to living organisms. Now, this looks very beautiful, but I am sceptical about it. Let it be admitted, however, that, *omne vivum ex vivo*, that no plant or animal, however minute, arises *de novo*, but springs from a pre-existing germ. What, then, must be the size of those germs which give rise to organisms of about 1-40,000th and less of an inch in diameter? A drop of a putrid solution, according to Ehrenberg, contains as many as there are human beings on the surface of the globe, viz., about 500,000,000. Why, if their germs bear the same proportion to their adults, as that which obtains between the germs of plants or animals familiar to us, and those when fully developed, the difference in some cases may amount to no more than tens of thousands, but in others it must be hundreds of millions. Compare, for example, an acorn with an oak; a turnip seed to the large succulent bulb it produces; the human germ measuring about the 250th part of an inch, to a man weighing sixteen stones, and it will be obvious that the germs of organisms in putrefying fluids, if such exist, are minute beyond comprehension, and that the highest powers of the microscope must ever be immeasurably inadequate to detect their presence. But it is by no means proved that all life comes from pre-existing life. The ingenious and apparently exhaustive experiments of Dr. C. Bastian, are to my mind as convincing as those of M. Pasteur, and these go to prove that many minute organisms arise *de novo*, or, in other words, that life may spring from that which has no life. Dr. Bastian, while admitting that urine, weak infusion of turnip and of hay, boiled in flasks with bent necks or with necks stuffed with cotton wool, may remain for an indefinite period without becoming turbid or undergoing any apparent change, has found that if the turnip solution be neutralized by ammonic carb. or liq. pot., or even if half a grain of new cheese be added to the infusion before it is boiled, the fluid soon gets turbid, owing to the appearance of multitudes of bacteria. In short, he has shown that in these experiments only certain weak nitrogenous fluids do not change, while solutions of a more complex nature produce living forms in abundance.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, JANUARY 2, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W.* *Envelopes indorsed "Pharm. Journ."*

1874.

Now that "the old year lies a-dying" we again take up the pen to record as best we may the pharmaceutical history of another year. To "gather up the fragments that nothing be lost," and arrange them as a consistent whole, is a task of no slight difficulty; but the interest and value of the result is in proportion to the completeness with which it is performed. Therefore, as we have the ambition to hope that these periodical reviews may prove acceptable to the pharmacist of the future as well as to his representative of to-day, we shall, notwithstanding the multiplicity of subjects, do the work as thoroughly as lies in our power.

The important modifications that have been introduced into the mode of conducting the Pharmaceutical Examinations this year have attracted, perhaps, a larger amount of attention from pharmacists than any other subject.

The Preliminary examination, to speak of that first, came to the front early in the year, in consequence of a Report from a Special Committee appointed by the Council to consider certain proposals from the Board of Examiners in reference to the Preliminary and Prize Examinations and the JACOB BELL Memorial Scholarships. This Report, whilst recognizing the valuable services rendered by the Local Secretaries in previously conducting those examinations gratuitously, and generally in their own houses, recommended that in future the examinations should be held in hired rooms in a limited number of towns, under the superintendence of persons, especially appointed by the Council, who should be called superintendents of examinations, and receive a fee for their services. These suggestions were adopted, and the wisdom of them will be obvious if it be remembered that this examination, like the Major and Minor, is no longer only a preliminary test of the examinee's fitness to enter a private Society, but is also the first step in testing his qualification to exercise a public privilege conferred, under certain conditions, by Act of Parliament. The time had passed, therefore, in which this examination could be looked upon as a *quasi* private affair, requiring or allowing of voluntary services. Sundry other regulations having the same tendency were also adopted in order to avoid any appearance or possibility of partiality or unfairness, and at its meeting in March the Council appointed Superintendents and Deputy-Superintendents for fifty-two centres of examination in England, and seven in Scotland. During the year 1251 persons presented themselves for the Preliminary examination, of whom 601 passed, or 48·04 per cent., contrasting rather unfavourably with 1873, when out of 1454 candidates 765, or 52·61 per cent., passed. At the October examination the amended regulation, requiring a thorough knowledge of the British and Metrical Systems of Weights and Measures, came into operation, and in January the Council decided that medical Latin should be discontinued in the Preliminary examination after the end of the year 1874. Notwithstanding these alterations and improvements there has been a manifest growth in opinion that this purely scholastic examination should not be conducted at all by the Society; and a motion made to that effect by Mr. ATKINS at the Annual Meeting failed not so much because it was opposed as because it was unexpected.

The approach of the time for enforcing the amended regulations for conducting the Minor and Major examinations, which were adopted by the Pharmaceutical Society and sanctioned by the Privy Council in 1873, was marked by what might almost be termed an examination panic. The number of persons seeking to pass the Minor examination increased at each successive meeting of the Board of Examiners until it culminated in June at 343. Of course, where the passing of the qualifying examination under the least stringent conditions was so manifestly the main object, the inevitable sequence was the appearance in the examination room of an unusually large proportion of imperfectly educated men. The result is obvious. Of 1064 Minor candidates, examined under the old regulations, only 352, or 33·08 per cent., passed, against 51·95 per cent. in 1873; and on the last occasion in London the percentage of successful candidates fell below 32 per cent. It is matter for regret that in some quarters the true significance of these figures has been misconstrued, and instead of adequately estimating the value of the services of the Board of Examiners to the cause of pharmacy, it has been implied that the painful duty of the Board ought to have been further complicated by a consideration of the possible effects the rejections might have upon the supply of assistants. It is yet too early to judge whether the more practical form which the Minor examination now takes will fulfil Dr. GREENHOW's prophecy in combatting the evils against which it is directed, or whether its failure will strengthen the hands of those who demand a compulsory curriculum.

The statistics of the Major examination are somewhat more satisfactory; for although the number of candidates has been somewhat smaller the proportion successful has been larger. The figures are—1873: of 83 examined, 54, or 65·06 per cent., passed;

1874: of 69 examined, 51, or 73·91 per cent., passed. We think it would not be too much to assume that the result of making the Minor examination a more searching test of a thorough pharmaceutical education will be manifested in a larger number of men seeking the then not so far removed Major qualification, and a larger proportion of them obtaining it.

It is satisfactory to know that the whole of the modifications in these examinations, conducted by the Pharmaceutical Society on behalf of the public, have the emphatic sanction of the Government visitors, Dr. GREENHOW and Dr. MACLAGAN; and it may be hoped that the words used in his last report by the former respecting previous alterations may be extended to those now on their trial—that "they have worked satisfactorily as regards the candidates themselves, and advantageously for the public service." With a view of securing as much uniformity as possible in the conduct of these examinations there has been an interchange of visits by deputations from the Boards in London and Edinburgh.

The only other alterations that need notice here relate to the prize examinations. The JACOB BELL Memorial Scholarships examination being now entirely a written one it has become possible to hold it at any of the examination centres concurrently with the July Preliminary examination; whilst in future the examination for the Pereira Medal and Prize of Books will be held in London and Edinburgh only.

This portion of our *résumé* would be incomplete without an allusion to the large amount of attention that has during the year been directed by public men towards examination as a means of testing education; and especially to speeches on this subject by the Bishop of Exeter and Professor Huxley.

Though somewhat in reversal of a natural order, the consideration of Pharmaceutical Education may well follow here. Concerning the success or failure of the important changes effected last year in the Society's School of Pharmacy it is yet premature to speak with certainty, the more so as the subject is now under the consideration of a Committee. So far, however, as may be gathered from the reports of the Professors, from an educational point of view they are working satisfactorily. Professor REDWOOD thinks the two five months' courses of lectures preferable to one of ten months, and Professor BENTLEY appears to give a general acquiescence to his views; whilst Professor ATTFIELD reports favourably of the laboratory, although he looks forward to the time when the School will revert to the ten months' courses of lectures.

An unusual amount of discussion respecting education has taken place during the year, especially in its aspect towards what is popularly termed cram; and it has been thought in some quarters there has been a disposition, in Mr. GILES's able address and on other occasions, to animadvert upon particular schools. It is only necessary to turn to the Council's report for the key to the position of the Council in respect to this subject, as given in the following definition, that "although it is one of the objects of the Society to promote pharmaceutical education, it is not its duty to defray the cost of educating young men coming into the trade." From this it may be gathered that the executive of the Society is inclined to welcome every effort to provide self-sustaining means of education; and as we have before said, "where a shadow of obloquy has fallen upon school or pupil it has been perceptible to the outside world only in proportion as the one has advertised its willingness to provide methodical assistance in baffling the examiners, or the other has sought out and adopted such methods." Nevertheless, the Council has always shown its readiness to go beyond this point, by contributing from the Society's funds towards the provision of educational facilities, and although Mr. SCHACHT's proposal in January to establish ten scholarships was not adopted mainly for financial reasons—a course which was ratified by the Annual Meeting—the Council recently voted fifty pounds to assist a provincial school at Manchester, which was thought to have made out a fair case. But one of the most remarkable features of this question is that the praiseworthy offers of the employers in different parts of the country to assist unexamined men to prepare for the examinations have met with such slight response as to put but few associations in a position to ask for grants in aid. This was recognized at the Annual Meeting by an unsparing critic of the Council, Mr. ATKINSON PICKERING, when he admitted that he now felt ashamed so small a portion of the funds had been applied for by the provincial members in aid of pharmaceutical education. There can be little doubt that Mr. SANDFORD spoke the feeling of the other members of the Council at its last meeting when he said he would like to have an opportunity of considering a score of other applications for £50 grants. Probably many of those who now neglect to make use of these facilities will live to realize the fate of those who fail to seize the forelock of Opportunity when it presents itself.

> "Rem tibi quam nosces aptam, dimittere noli;
> Fronte capillata, post est Occasio calva."

The value of apprenticeship as a practical means of education has been enforced; the object and necessity of a pharmaceutical education have been described by Professor MAISCH; and a valuable address on Study has been delivered by Dr. SYMES: these are but representatives of many other papers and addresses on the same subject. It will also be appropriate to notice here that the accomplished Yorkshire College of Science and the projected West of England College deserve the welcome of all who are interested in the teaching of science.

The year 1874 has been rendered notable in the history of the Benevolent Fund by some fundamental alterations in the rules and in the principles upon which the Fund had previously been administered. The probability which existed during a short time that in 1873 only one person would be elected as an annuitant upon the Fund, provoked a considerable amount of expostulation against the practice by which the total amount of annuities granted was limited to the interest received upon invested capital. This led to the appointment of a Special Committee to consider the subject, which presented a report in February. To this Committee Mr. Robbins, who had devoted much attention to the subject, submitted a proposition to increase the number of annuitants to twenty and rely upon a consequent increase in the annual subscriptions to make up the sum required. Although the Committee did not feel justified in recommending the Council to fetter the action of a succeeding Council, it was understood to concur in the spirit of Mr. Robbins's proposals. Upon its recommendation, therefore, and with a view to create a more general interest in the Fund, the Council decided to make an important alteration in the relation of the number of votes to subscriptions. Previously, each half-guinea subscribed had entitled the subscriber to one vote at each election of annuitants. Without altering the number of votes appertaining to Membership and Associateship respectively, the number of votes in return for subscriptions was doubled,—each half-guinea subscribed now entitling the subscriber to two votes,—whilst the power of giving a single vote was extended to every subscriber of five shillings. Although the subject of increasing the number of annuitants was tentatively mentioned in the Report of the Council presented at the Annual Meeting in May, it did not elicit much discussion, and what little was said was more conservative in its tone than might have been expected from the tenor of the numerous letters that had appeared in this Journal from time to time. Nevertheless, the new Council, at its first meeting, in June, resolved upon the motion of Mr. Bottle (the Vice-President), that four pensioners on the Benevolent Fund should be elected in the following October, bringing the number of annuitants up to seventeen, receiving £30 each. It is satisfactory to know that this policy has been endorsed by an increase in the year's receipts on behalf of the Fund of upwards of £150, whilst in no case has a subscriber of 10*s*. 6*d*. reduced his subscription to 5*s*., as had been feared. At the last meeting of the Council, amongst some other amendments in the regulations of the Fund, it was proposed to further reduce to 2*s*. 6*d*. the amount of subscription entitling to a vote. This proposition, however, was overruled, to the regret of the Secretary, who was hopeful of an extension of the area of subscribers by this method. We hope to be excused for remarking that in this, as in many other operations of the Society, the services of the Local Secretaries are indispensable; but some idea of how much remains yet to be done towards making the interest in this Fund coextensive with the bounds of British pharmacy is suggested by the fact that only about one half of the Society's Local Secretaries are themselves subscribers to the Benevolent Fund.

The question of Female Students has again cropped up in consequence of a request to the Council from Professor Attfield for permission to comply with some applications for admission to the Laboratory course. Mr. Hampson moved that the request be acceded to; but after discussion it was resolved that under the present arrangements the Council could not agree to the reception of female students in the Society's laboratory.

The Annual Meeting of the Pharmaceutical Society was, as usual, held in May. No particularly exciting topic was broached; but a general approval was expressed of the manner in which the affairs of the Society had been managed by the outgoing Council. The Benevolent Fund, the Proposed Scholarships, and the Preliminary Examination were the principal subjects discussed, with results that are mentioned under their respective heads.

As consequent upon the presence of many members of the Society in London to attend the Annual Meeting must be mentioned the Annual Dinner at the Crystal Palace and the Conversazione at South Kensington. Nor must the Chemists' Ball in January be forgotten.

We are glad to note that there has been a great improvement in the Evening Meetings of the Pharmaceutical Society since we had occasion to call attention to the subject last year. The present session especially, inaugurated by a most able address of Mr. Giles to the students, has been well supplied with papers, which have been followed by interesting and animated discussions. There is still, however, room for much improvement in respect to the attendance. The principal subjects brought forward have been—A Note on Iodide of Iron, by Mr. W. M. Holmes; Note on a Decomposed Lozenge, by Mr. T. Greenish; A Peculiar Camphor from China, by Mr. D. Hanbury; The Chemistry of Ngai Camphor, by Mr. S. Plowman; A Method of Storing and Dispensing Small Quantities of Hydrocyanic Acid, by Mr. F. B. Benger; Note on Chloro-Mercurate of Morphia, by Mr. W. Martindale; Tincture of Perchloride of Iron, by Dr. De Vrij; The Additions to the Pharmacopœia, by Mr. Charles Umney; The Nomenclature Proper to an International Pharmacopœia, by Mr. T. Greenish and Professor Attfield; The Pharmacy of Amorphous Phosphorus, by Mr. A. W. Postans; An Additional Test for Glycerine, by Prof. Godeffroy; The Preservative Effect of Chloroform upon Vegetable Infusions, etc., by Mr. J. B. Barnes; and The Preservation of the Liquid Extract of Liquorice Root, by Mr. C. Umney.

The Library has been enriched by the addition of about one hundred works, nearly half of which have been presented. These are in addition to the completed volumes of about forty periodicals which are purchased or presented. The average attendance of readers is hardly so high as might be expected in so valuable a library, being about 15 in the daytime, and about 6 in the evening. Last month, in compliance with the request of a petition presented to the Council by a number of the students, a Conversation Room was provided, which will be open to persons entitled to use the Library daily, except Saturday, from 5 till 10 p.m. The Library is consequently open now from 9 a.m. to 10 p.m.

Under the superintendence of the Museum Committee and the active care of the Curator, the Society's Museum at Bloomsbury Square has been rendered even more valuable as a means of study and reference than in previous years. During the last twelvemonths no less than one hundred and twenty specimens have been added to the General Collection, and one hundred and twelve to the Herbarium. The Collections of Brazilian, Chinese, Morocco, and Indian Drugs have been arranged, and many of the specimens previously unnamed have been identified. Last year we referred to a Catalogue that had been prepared and we expressed a hope that it would be printed. This Catalogue is now being enriched by historical and explanatory notes which will make it useful, for reference, both to students and business men. A portion is already in the printer's hands. All the Museum specimens are being numbered to correspond with numbers in the Catalogue. The Museum, like the Library, is now open during the evening.

The North British Branch of the Pharmaceutical Society appears to be making satisfactory progress; about eleven hundred attendances in the library, reading room, and museum during the year having been reported. In May more convenient rooms having been obtained in George Street the Council authorized the transfer, and gave orders for the necessary alterations to be carried out. A deputation appointed by the Council to visit Edinburgh on the occasion of the examination in September, expressed great satisfaction with the arrangements made for conducting the examinations.

At the close of November, the Registrar published a list of 390 names and addresses which had been found incorrect, and he gave notice he should erase them from the Register of Pharmaceutical Chemists and Chemists and Druggists, unless the persons referred to communicated with him before the 31st December, 1874. This is the second time since the passing of the Pharmacy Act, 1868, that the Registrar has found it advisable to publish such a list. On the first occasion, in 1872, about 25 per cent. of the persons concerned communicated with the Registrar in time to save the erasure of their names; on the present occasion the proportion doing so is under 20 per cent. Although this is an improvement, there is yet ground for complaint that so many persons should involve the Society in the trouble and expense of at least two registered letters to each, and for regret that no provision has been made for stimulating their attention to their own affairs by a pecuniary goad.

The effort to place pharmacy in Ireland on a more satisfactory footing, to which we alluded last year, has been developed considerably, mainly through the introduction into the House of Commons, in June last, by Mr. ERRINGTON, on behalf of the King and Queen's College of Physicians of Ireland, of a Bill which proposed a simple extension of the Pharmacy Act of 1868 to Ireland. This event put an abrupt termination to the long-pending negotiation between the Apothecaries' Hall of Ireland and the United Society of Chemists and Druggists of Ireland, and for a time at least they acted in accord in opposing the Bill before the Select Committee to which it was referred. Strange as it may seem, the Pharmaceutical Society of Great Britain, which would have been called upon to carry out the provisions of the Bill had it passed, was not consulted in this matter, and there was barely time given for the provision of the evidence of two members of the Council, upon their own authority, as to the working of the Pharmacy Act in England and Scotland. The tendency of the largest portion of the evidence,—including some most astounding statements,—was to the effect that it was advisable to establish a separate Pharmaceutical Society for Ireland, exercising reciprocal rights with the Society in Great Britain, and the Committee reported to the House accordingly. There was a charmingly childish faith manifested in the evidence of some of the witnesses, which appeared to lift them above financial considerations, and reminded one strongly of Mr. HORACE SKIMPOLE; one witness, however, naïvely confessed that the object being *pro bono publico*, he thought a grant might be made from the public funds. Should this plan be adopted, upon the principle that "what is sauce for the goose is sauce for the gander," the Pharmaceutical Society of Great Britain might claim to be reimbursed an amount of expenditure "for the public good" during thirty years that would well justify Mr. SCHACHT in re-introducing his proposal for the establishment of scholarships without any fear of being met by objections as to want of funds. Since the issue of the report, a communication has been received by the Council of the Pharmaceutical Society from the Chemists and Druggists' Association of Ireland, on the subject of extending the Pharmacy Act to that country, and at its meeting in October the Council passed a resolution to the effect that such a course was desirable offering its co-operation in framing a measure, and appointing as a Committee to act in the matter, the President and Vice-President, and Messrs. BETTY, BROWN, GREENISH, HAMPSON and SANDFORD. It is probable, however, that an attempt will be made next session to legislate in the sense of the Select Committee's report.

In April a Juries Bill, containing a provision extending to Registered Chemists and Druggists the exemption from Jury service now enjoyed by pharmaceutical chemists, was once more introduced into the House of Commons. But, as in former years, after repeated postponements, the Bill was crowded out by more urgent—or more clamourous—legislation. Whilst the Bill was before the House, however, the Secretary of the North British Branch of the Pharmaceutical Society, Mr. Mackay, obtained promises from the Lord-Advocate, Earl Dalkeith, and Mr. Duncan M'Laren, that they would endeavour to secure the extension to Scotland of whatever rule might be adopted respecting the exemption from jury service of chemists and druggists in England.

The growing dissatisfaction and distrust with which the operation of the Adulteration of Food Acts has been regarded by tradesmen in general has been shared by pharmacists also. This feeling did not necessarily arise, as has been assumed in some quarters, from a fear of being disturbed in a career of sophistication; for it was due at least as much to the uncertainty as to what might be held to be an adulteration by analysts and magistrates. Therefore the appointment in May of a Select Committee of the House of Commons to inquire into the working of the Acts was welcomed, and care was taken by the Council of the Pharmaceutical Society that the difficulties and dangers to which pharmacists are peculiarly liable under the Acts should be represented to the Committee. The Report of this Committee recognized that although the Act of 1872 had accomplished much good, it had at the same time "inflicted considerable injury and imposed heavy and undeserved penalties upon some respectable tradesmen." This result was attributed mainly to the want of a clear understanding as to what does and what does not constitute adulteration; and in some cases to the conflicting decisions and inexperience of analysts. The construction of the Act upon which was based the decision of the Court of Queen's Bench that the facing of tea is an adulteration, the spirit of which ruling has been followed by magistrates in many subsequent cases, was considered by the Committee as defective, and it recommended that a "fairly faced tea" should not be condemned as an adulterated article. The Committee forbore from recommending that a "certain percentage should be allowed for colouring matters and *impurities* in tea," not because it disapproved of an allowance being made—on the contrary, it considered this advisable—but because it was thought impolitic to set up what might become a standard of depreciation. However it is evident that legislation in this spirit is a *sine quâ non* to pharmacists, to relieve them from danger of prosecution for the presence of a reasonable amount of impurities which are in some cases inseparable from their wares. Another recommendation of the Committee was that the sale of mixed articles of food, such as cocoa and mustard condiments, should be allowed, provided the fact of the article being a mixture were indicated by a conspicuous and legible label; a verbal declaration was considered impracticable. With respect to the chief cause, according to the Committee, of the cases of hardship in carrying out the Act, little was contributed in the Report towards defining adulteration, and that little had reference rather to what should not than to what should be deemed an adulteration. The evils resulting from conflicting evidence of analysts, however, it was suggested, might be remedied by the formation of a board of reference to which magistrates might turn for trustworthy and impartial advice, and, speaking confessedly upon imperfect information, the Committee pointed to the Laboratory at Somerset House as available. The idea of a Board of Reference has been received with considerable satisfaction; but the proposition that the Chemists to the Inland Revenue Board should act in this capacity has evoked much opposition. Suggestions on this point have differed widely: from a single Board sitting in London to ten or a dozen Boards distributed through the country; and from the referees being all nominated by the Government to their being elected by the public analysts themselves. There can be little doubt that in order to gain general confidence such a Board should include those who might be deemed representative both of the public and of the public analysts. By the formation of the Society of Public Analysts a coherence has been given to the latter body which it did not possess at the time of the issue of the Committee's Report, but which would probably enable it to influence materially any attempt to legislate on the snbject. This new Society has devoted its maiden efforts to the defining of adulteration; but at present it has not got further than a tentative description of an adulterated article. A most gratifying circumstance connected with this subject has been the widening recognition—as evidenced by appointments—of the peculiar fitness of pharmaceutical chemists for the office of public analyst; and although the Pharmaceutical Society cannot be expected to adopt the advice of a medical contemporary and specially occupy itself with the work of providing suitable men for this new office, there is little doubt that the desired result is incidentally obtained by the Society's efforts to heighten the standard of pharmaceutical education.

Although the Act has been somewhat in abeyance since the issue of the Committee's report, the prosecutions and convictions during the year have nevertheless been very numerous. Amongst those recorded in this Journal the following present points of special interest to the chemist and druggist:—Conviction of a druggist for selling mustard containing flour, on the grounds that its efficacy as a drug was thus impaired; three prosecutions for the sale of sulphur containing varying quantities of gypsum, the first being abandoned because the preparation had been sold as "milk of sulphur," the others resulting in convictions, because the preparation had been sold as "precipitated sulphur;" a prosecution for selling citrate of iron and quinine adulterated with cinchonine and quinidine, dismissed because of the small proportion of alleged adulterants and their possible origin from the same source as the quinine; a conviction for selling quinine largely adulterated with sulphate of cinchonine; two convictions for the sale of scammony containing in one case only 46·01, and in the other 47·96 per cent. of resin; a prosecution for selling scammony alleged to contain 5 per cent. of flour and 3 per cent. of chalk, but admitted to contain upwards of 70 per cent. of resin, which was dismissed and led to the abandonment of other prosecutions that had been initiated; a prosecution for the sale of red precipitate alleged to contain 5 per cent. of oxide of lead, which was dismissed, but defendant ordered to pay costs; a prosecution for the sale of soda-water devoid of soda, which was dismissed, but a case was granted; a conviction for sale of lemonade containing lead; and prosecutions for the sale of preserved vegetables containing copper, and vinegar containing sulphuric acid. Amongst the curiosities of analytical prosecutions may be recorded one for selling "conversation lozenges" containing one-ten-thousandth part of powdered glass, and one-tenth of starch, and another for selling "burnt almonds" containing too large a proportion of bitter almonds. Another conviction was for selling a "liquid extract of beef," described as consisting chiefly of extract of beef, wine, a small quantity of fine old brandy and quinine, but which the analyst certified to contain but a very minute quantity of beef, no quinine, and no brandy. Early in the year Mr. J. Mackay, of Edinburgh, brought forward a case in which a firm of analysts certified that some Natal arrowroot taken from an original package contained from 10 to 20 per cent. of torrefied arrowroot or other starch, a statement that was flatly contradicted by four other eminent analysts to whom samples were submitted. In this case the mistake only resulted in the annoyance of having the package returned by the customer as adulterated; but in July a prosecution was commenced for selling arrowroot that was certified by a public analyst to be adulterated with another starch, which was dismissed by the Bench acting upon a certificate of Dr. Voelcker that the arrowroot was pure. Another case of adulteration that has been before a law court, though not under the Adulteration Act, was in respect to a sale of adulterated musk pods. We had occasion also to mention a few months since that a large parcel of "sulphate of quinine" had been offered for sale at a low price on the plea that it contained a trifling percentage of cinchonidine, but which on examination proved to contain 60 per cent. of sulphate of cinchonidine.

One result of the increased attention directed to the subject of the purity of food and drugs has been an enormous increase in what may be called the "literature of adulteration," a large proportion of which has appeared in these pages. Amongst others may be mentioned the articles on Milk by Dr. Voelcker and Dr. Macadam; Mr. Wanklyn's books on Milk Analysis, and Tea, Coffee, and Cocoa Analysis; Mr. Wigner's paper on the Ash and Extract of Teas; Mr. Greenish's paper on Scammony Starch; M. Mene's data for detecting an admixture of Japan Wax with beeswax; M. Cazeneuve's micro-chemical examination of Angustura bark; Mr. Horsley's description of a new lactometer, and Mr. Stoddart's application of it to the analysis of butter; Mr. Cleaver's method for the detection of alum in bread, and his experiments upon the decomposition of milk by keeping; Dr. Atcherley's Adulteration of Food, with Short Processes for their Detection; and Dr. Hassall's article on Mustard and its Adulterations. Amongst the adulterations, substitutions or impurities that have been noted are, an opium of good appearance that yielded less than 3 per cent. of morphia (Mr. B. S. Proctor); a specimen of opium containing a lump of earth equal to 10 per cent. of its weight (Mr. Gostling); a falsification of cinchona bark by the external saturation of a comparatively worthless bark (M. Bernatzik); the substitution of the stem of Pareira Brava (*Chondodendron tomentosum*) for the root (Mr. J. Moss); the substitution for Chiretta of another species of *Ophelia* (Professor Bentley); the bleaching of ginger by coating it with from 2 to 3 per cent. of whitewash (Mr. Garside); the adulteration of opoponax with other aromatic gum resins (M. Marais); the general substitution of other starches for the wheat starch o the Pharmacopœia (Mr. Abraham); the adulteration of ipecacuanha powder with almond meal (Mr. Mercer); the occurrence of sulphuric acid in tartaric acid; and the adulteration of "putty powder" with oxide of lead (Mr. Wellborn). In consequence of the vagueness of the assertions commonly made respecting the use of cocculus indicus in the adulteration of beer, an attempt was made to collect some information upon the subject, but although the question provoked several replies, no satisfactory evidence of the berries being so used was forthcoming, a result which is in accord with the failure of the chemists at Somerset House to detect the presence of this adulterant in any of the numerous samples of malt liquor constantly examined by them.

We have thus devoted a considerable space to the subject of adulteration, but as we believe that it is one that is likely to become of peculiar interest to pharmaceutists we hope that the collation of this information here will not be deemed out of place.

The foregoing failures to legislate may be supplemented by the mention of an Act, not without interest to chemists, that was passed, namely, the Alkali Act Amendment Act. This important Act defines "alkali work" so as to include works in which copper ore is treated with common salt; restricts the escape of muriatic acid gas to one-fifth of a grain per cubic foot of other gases leaving the works; and includes amongst noxious gases subject to the operation of the Act, sulphuric acid, sulphurous acid (except that arising from the combustion of coals), nitric acid and other noxious oxides of nitrogen, sulphuretted hydrogen, and chlorine.

Another subject that has engaged the attention of Parliament is Co-operative Trading, especially that phase of it in which the business has been principally conducted by civil servants of the Crown. In a temperate speech Sir THOMAS CHAMBERS urged before the House of Commons various objections to this practice, especially instancing the dispensing of drugs, and asked for an assurance that it had not the sanction and approval of the Government. Premising that the subject was a difficult one, the Chancellor of the Exchequer only promised that it should have the careful consideration of the Government. During the year numerous communications to this journal respecting Co-operative Trading have been received; but although as a rule it has been thought not advisable to publish them, the writers may feel assured that this has not occurred through undervaluation of their importance.

The Excessive Hours of Labour in Pharmacy have been the subject of many letters and more than one editorial article, but at present with only very partial effects. Still, as it will be something gained to familiarize pharmacists with the idea that at some future time they may limit business within the same hours as other tradesmen, it is proposed to revert to the topic at every convenient opportunity. The subjects of the charges made for medicines, the prices charged for proprietary articles, the practice of allowing percentages, and the kindred one of using obscure formulæ, have all been discussed, and to the latter we are indebted for introduction to an interesting couple in Mr. PIL PHILIP and Miss COMP. In January a new Scale of Medicines and Medical Stores to be carried by Merchant Ships was issued by the Board of Trade.

The number of deaths from poisoning recorded in this Journal during the year has been 46,—or five more than last year,—the majority of which were suicides. The details are—opium, 1; morphia, 3 (in one case dispensed in mistake for pepsin); laudanum, 1; strychnia, 3; vermin killer, 2; oxalic acid, 2; phosphorus, 1; prussic acid, 3; chloral, 1; chloroform, 1; chlorodyne, 1; arsenic, 6; lotion, 1; liniments, 3 (taken in mistake for medicine); ointment, 1; carbolic acid, 6 (in five cases taken instead of medicine); sulphuric acid, 2; spirit of salt, 1; oxalic acid, 2; hellebore, 1; teething powders, 4. The small number of deaths from vermin killer again testifies to the wisdom of including them in the poison schedule.

Six prosecutions under the Pharmacy Act, 1868, have taken place during the year. The first summons was taken out by the police against a chemist and druggist for selling a packet of vermin killer without registering the sale; of the other cases, in which the Pharmaceutical Society was the prosecutor, one was for the use of the name "druggist" by an unregistered person; one for the sale of a "vermin killer" at Stradbrooke, Suffolk, by an unregistered person; one for the sale of oxalic acid in Clerkenwell by an unregistered person, who was afterwards summoned for keeping open shop for retailing, dispensing, or compounding poisons; and one for the sale at Woburn of prussic acid without labelling with name and address. The last was virtually a prosecution of an unregistered person for dispensing a prescription containing a poison within the meaning of the Pharmacy Act. In all these cases penalties were recovered.

During the year several other cases, besides the Adulteration cases already mentioned, interesting to chemists and druggists, that have been before the law courts, have been recorded in this Journal. The case of *Hunter* v. *Freeland*, where the defendant suffered heavy pecuniary loss through the accident of his apprentice; the committal of a chemist and druggist for trial on a charge of manslaughter at the Devon assizes, where the Grand Jury ignored the Bill; some charges of fraudulently imitating labels, and the still-pending Excise prosecution for the sale of "morning cordial" at Hull, are amongst the most important. We are informed that the hearing of this case is fixed for the 15th January.

The meeting of the British Pharmaceutical Conference this year was so far exceptional that it having been thought impolitic to accompany the British Association to Belfast, the opportunity was taken to hold it in London and—upon the invitation of the Council—in the premises of the Pharmaceutical Society. The meeting, which was inaugurated by a Conversazione, was marked by the election of a large number of members, but was not nearly so well attended as might have been expected. Mr. T. B. GROVES's Presidential Address, which was confined to purely political topics, was followed by the reading of twenty-eight papers, of a nature well qualified to keep up the reputation of the Conference. These papers are noticed in another column. There were the usual social accompaniments of a dinner and an excursion, and the arrangements throughout were admirably made and carried out. There was also an Exhibition of objects relating to pharmacy. The Conference is to meet next year at Bristol, again under the presidency of Mr. GROVES.

The Fourth International Pharmaceutical Congress was held in August at St. Petersburg, and was attended by Messrs. SUTTON and GREENISH on behalf of the Pharmaceutical Society of Great Britain. Although the subjects discussed, with the exception of the International Pharmacopœia, were generally those which primarily affect continental pharmacists, there can be little doubt that the Council acted wisely in securing the utterance of British opinions even upon these, and the satisfaction which their action gave to continental pharmacists has been marked by the conferring of the Honorary Membership of different societies upon the delegates. An interesting report was presented to the Council by the delegates in October, and its reading was followed by the passing of an unanimous resolution inviting the Congress to hold its next meeting in London.

The British Association held a successful meeting in Belfast, presided over by Professor TYNDALL. The eloquent address of the President provoked more than an usual amount of protest from those who assume to be orthodox; indeed, the Professor himself has since appeared to shrink from the inferences drawn from some of his sentences. Another notable feature of the meeting was Dr. HOOKER'S paper on Carnivorous Plants. The meeting of the British Medical Association, at Norwich, was also a success, and the Centenary of the discovery of oxygen by PRIESTLEY was the occasion of interesting meetings at Birmingham, in England, and Northumberland, in the United States. The annual meeting of the Royal Society was made more than usually noteworthy to pharmaceutical chemists, by the placing of the names of two more members of their body on the Roll of Fellows, those of Mr. H. B. BRADY, and Mr. J. E. HOWARD.

In March the issue of a reprint of the British Pharmacopœia furnished the opportunity of appending some "Additions," which were also published in a separate form. The "Additions" included thirty-four items and formed the subject of an elaborate review and criticism by Mr. CHARLES UMNEY at one of the evening meetings. The presence of some and the absence of other preparations, and some of the formulæ, provoked a considerable amount of rather sharp criticism, but on the whole the addendum was ably defended by its editor, Professor REDWOOD. There was a considerable manifestation of opinion, however, that it is unsatisfactory that pharmacists should have no legal right to take part in a work for which they are so peculiarly fitted as the preparation of a national pharmacopœia. In July this part of the subject was brought before the Council of the Pharmaceutical Society, by Mr. HAMPSON, and after discussion a resolution was passed respectfully urging upon the General Medical Council the desirability of associating more practical pharmacists with any Committee which may be appointed for the purpose of preparing a future edition of the British Pharmacopœia or any further additions to the present one. The resolution was forwarded to the Medical Council and read at its meeting in July, but no motion was made respecting it, and a series of resolutions presented by Dr. A. SMITH, including some suggestions in the same direction, had previously fallen through by want of a seconder.

The wide subject of an International Pharmacopœia has also attracted some attention from having been under the consideration of the International Pharmaceutical Congress at St. Petersburg. A scheme which had been drawn up by a Committee of the Paris Société de Pharmacie was received and entrusted to various delegates to report upon. In the meantime, it was resolved that it is desirable an International Pharmacopœia should be formed, and certain principles were adopted as recommendations to any commission that might at some future time be entrusted with that work, as also for adoption in compiling national pharmacopœias. As to the nomenclature an expression of opinion from the different societies was solicited. The subject was therefore brought before the Pharmaceutical Society of Great Britain, at an evening meeting, by Mr. GREENISH and Professor ATTFIELD. Though no formal resolution was then adopted, the preponderance of the opinion expressed was in favour of the system of nomenclature advocated by Professor ATTFIELD and already adopted in the United States Pharmacopœia. Mr. INCE'S recent paper on a uniform method of expressing spirit strength is also a contribution towards uniformity.

Although the construction of an International Pharmacopœia, including all the Continental States, is probably yet somewhat remote, a suggestion which has been made for the construction of a Pharmacopœia for Great Britain and the United States deserves serious consideration, especially on account of the position of our Canadian brethren, who are supposed to be guided by the British Pharmacopœia, but largely follow that of the United States. The *Tennessee Pharmacal Gazette*, commenting on the proposition, says, "Our Pharmacopœia needs a revision badly, and from the criticisms brought out by the recent British Addendum we were induced to believe a revision of the British Pharmacopœia, if properly conducted by practical pharmacists, would be very popular in England. The necessity for an Anglo-American Pharmacopœia is admitted by all, and we hope to see the good work commenced at once."

In technical pharmaceutical literature the most prominent place has been taken this year by cinchona products, little having been heard of trimethylamine, to which that position was assigned last year, except that it could be prepared from the skate. A most important fact is the confirmation of the very large alkaloidal yield,—principally quinine,—of the bark of what is at present known as *Cinchona Calisaya*, var. *Ledgeriana*, a confirmation practically manifested at a sale in Amsterdam, where a parcel of it realized about three times the average price given for other Calisayas offered at the same time. It would appear from Dr. HESSE'S recent article that, upon chemical grounds, he is inclined to think that the plant now associated with Mr. LEDGER'S name is the true Calisaya, and that the plant grown for so many years under that name really belongs to another species. This is vehemently disputed by Dr. DE VRIJ, and until these doughty combatants have spoken their last word it would almost be presumption to express any opinion as to which is right. A recommendation to adopt the plan of coppicing cinchonas led Mr. HOWARD to express his opinion that the result would be a bark rich in astringent substances and useful as a tonic, but not rich in quinine, on the ground that the alkaloids are not formed in the leaves and carried downward by the descending sap, but in the cellular tissue of the bark. Mr. Howard has also described what is probably a hybrid between *C. Calisaya* and *C. succirubra*, which not only presents externally characteristics of both its presumed progenitors, but also in something like equal proportions, their alkaloidal properties. Although the plants were sent to England as a variety of Calisaya, the bark yielded a large quantity of cinchonine, which latter is almost, if not quite, absent from true Calisaya, and, moreover, yielded Hesse's new alkaloid, quinamine, which previously had only been observed in bark from East India growth *C. succirubra*. The importance of this observation as indicating that degeneration is consequent upon hybridization is obvious. It is announced that the experiment of cinchona cultivation is to be resumed in the island of St. Helena; and the rather startling yield of 14 per cent. of quinine by a bark from the isle of Reunion is reported last week in the *Lancet* as a "good beginning," but we confess we have failed to find authority for more than one-tenth of that quantity. The appearance of Dr. Hesse's exhaustive history of the cinchona alkaloids will help to clear up the confusion respecting them, and with the exception of the use of the name conchinine for Pasteur's quinidine, will probably be generally received as authoritative. The alkaloids which he considers have been proved to be obtained from cinchona barks are seven in number—quinine, cinchonidine, cinchonine, paricine, quinamine, paytine, and conchinine (=quinidine). Dr. Hesse has also pointed out pure chloroform as an excellent separatant of the sulphates of the principal cinchona alkaloids. Dr. Weidel has described four crystallizable acids obtained as oxidation products of cinchonine, and he has traced their analogy with oxidation products from other substances. Further, Herr Bauer has described a series of compounds of iodine with the cinchona and other alkaloids. In a valuable paper read before the Conference, Dr. De Vrij contributed some tests for estimating the value of barks for pharmaceutical purposes, and in the discussion which followed comment was made upon the anomaly that only the American grown barks are official. Dr. De Vrij further expressed the opinion that the only form in which cinchona ought to be prescribed was as an alcoholic extract, and Mr. Broughton testified to the use in India of the whole of the alkaloids precipitated together. In other contributions to the pharmacy of cinchona Mr. Brown has shown that heat is unnecessary in the preparation of Tinct. Quiniæ Ammoniata; a solution of lactate of quinine has been recommended as most suitable for hypodermic injection; a neutral hydrobromate of quinine (soluble in five times its weight of water) has been recommended by M. Boille as greatly superior to all other compounds of quinine; and tartaric acid and glycerine have been indicated as forming a good pill excipient for sulphate of quinine.

Boldo, the leaves of a Monimiaceous plant growing in the Chilian Andes, has attracted some attention as a new remedy for liver complaints, and as a useful tonic in cases where quinine is unsuitable. The action of the drug appears to be mainly due to an essential oil which is abundant in the leaves of the American plant, but was not developed in a plant grown in Paris. Little is known yet of the real value of this substance as a remedy, but its pharmacy has been worked out by M. Verne.

In Jaborandi, however, of which the origin is not yet cleared up, we have what promises to be a valuable addition to the materia medica, since it is undoubtedly a powerful sudorific and sialogogue. The drug was first brought under the notice of the French faculty by Dr. Coutinho, and the experiments with it have been repeated in University College Hospital, and described by Mr. Martindale. The specimens hitherto received have been so fragmentary that its botanical origin is uncertain, and whilst Professor Baillon looks upon it as a Rutaceous plant, others consider it to be one of the numerous Pipers for which Jaborandi is a generic term in South America.

Eucalyptus globulus is another plant which has elicited diverse opinions during the year; for whilst it has been asserted that its antimalarial influence has been established by experiment in Algeria and elsewhere, and Mr. Bosisto has asserted that the whole atmosphere of Australia is beneficially influenced by the exhalations from eucalypti, an English Secretary of State has expressed his opinion that its effects have been greatly exaggerated. This plant furnished the subject of an able lecture by Professor Bentley at the Royal Botanic Gardens. The essential oil has recently been recommended as a vermifuge.

Still another plant which has been mentioned as a new—or rather recovered—remedy, is the "driâs," attributed to the *Thapsia Silphium*, of Vivani, and considered by some to yield the famous silphium of the ancients. A considerable quantity of this plant is reported to have been collected in the Cyrenaica and shipped to France, and there used with considerable success. The claim of *Rhamnus Frangula* bark to a place in the Pharmacopœia was again urged by Mr. Baildon, at the meeting of the British Pharmaceutical Conference, on which occasion its value as a mild but effectual aperient was testified to by several speakers, and a concentrated decoction recommended as the most convenient form of administration. The root bark of *Ailanthus glandulosa*, Desf., has been mentioned as a remedy used in dysentery in China and Japan, and a vegetable vesicant used in Africa, according to Dr. Schweinfurth, is the *Adenia venenata*, a climbing passion flower. Mr. Henry Groves has given an laborate description of the popular remedies of the Tuscans. The uses of *Geranium maculatum* for dysentery, *Gerardia quercifolia*, Pursh., as an antidote to snake bite, trompatilla (*Bouvardia jacquini*, H. B. K.), for hydrophobia, and an infusion of the branches of *Verbena bracteosa*, Mich., in the treatment of scrofulous affections, have been mentioned by Professor MAISCH, and Mr. STACEY has described some remedies used by the North American Indians. The use of *Gelsemium sempervirens*, which is official in the United States Pharmacopœia, has extended to this country and has been recommended by Dr. SAWYER, of Birmingham, for the relief of neuralgic pains in the face and jaws. The anti-scorbutic properties of the *Agave Americana* have also been described, and Dr. DE VRIJ has referred to the value of pomegranate root bark as an anthelmintic.

The acclimatization of ipecacuanha in India may now be looked upon as an established fact, as many as 63,000 living plants being in existence there at the date of the last report. An interesting experiment has also been made to acclimatize the tea plant in Anjou. The successful application of sewage in the cultivation of labiate plants is reported from the neighbourhood of Paris, and a suggestion has been made that in the cultivation of these and similar plants railway embankments might be profitably utilized. The increasing use of vanilla has justified the reproduction of information respecting its cultivation, as well as that of the so-called wild vanilla (*Liatris odoratissima*). One of the most notable chemical exploits of the year has been the preparation of vanillin, the odorous principle of vanilla, from pine juice, by Messrs. TIEMANN and HAARMAN, a discovery that has already been turned to industrial account. It may be mentioned here that a number of cases of suspected poisoning through eating vanilla ice have occurred in Vienna. The collection of gamboge was the subject of an interesting communication from Mr. JAMIE, of Singapore, to the North British Branch of the Pharmaceutical Society. In answer to numerous queries our pages have been supplied with ample directions for the preparation of herbaria of both land and water plants.

A further investigation of the chemistry of the Aconites formed the subject of a contribution from Mr. GROVES to the Conference meeting. His principal result was the determination that aconitine, pseudaconitine, and another, and probably new, bitter body are polymerides, a remarkable circumstance being that the latter is inert. Some experiments of ZINOFFSKY upon different species of *Aconitum* appear to show that the flowers are always richer in alkaloids than the leaves or stalks. Aloin has been the subject of some researches which have led Dr. SOMMARUGA to the conclusion that the aloins from Barbadoes, Natal, and Socotrine aloes may be represented by formulæ differing by one and two atom groups of CH_2 respectively. In a like manner Professor FLUCKIGER is of opinion that the constituents of elemi are an essential oil, a crystallized resin, an amorphous resin (?), and bryoidin, constituted by $C_{10}H_{16}$, and progressive proportions of H_2O. Professor FLUCKIGER has also found that the crystalline matter separating from oil of nutmegs, and sometimes called myristicin, is myristic acid. He has also pointed out some peculiar characteristics in the histology of buchu leaves. Professor SPIRGATIS has found that scammonin prepared from the root of *Convolvulus Scammonia*, and that obtained from Aleppo scammony, are identical in composition. A curious toxical property possessed by the colchicum plant at the time of flowering has been pointed out, and a remarkable case of poisoning by colchicum wine has heen reported from Canada. The occurrence of nitrate of potash in some plants has been noticed on various occasions, and its presence in considerable quantity in *Ricinus communis* has been recognized by Professor WAYNE. M. CARLES has come to the conclusion that the acid of balsam of tolu is pure cinnamic acid. Mr. POWER has found that the podophyllum rhizome is almost entirely exhausted of its cathartic properties by percolation with alcohol; also that the portion of the resin soluble in ether is much more active than that which is insoluble. Mr. JUDGE states that sarsaparilla is not injured medicinally by the heat of a water bath, and Mr. BARTON recommends the use of more spirit in preparing the liquid extract. Coca (*Erythroxylon Coca*) has been considered pharmaceutically by Mr. SHUTTLEWORTH, and formulæ for different preparations given, and a similar service has been performed for guarana by Mr. MOORE.

Experiments made by different observers confirm the fact that ammonia is absorbed by the aerial portions of plants, although the plants do not appear to thrive when access of ammonia to the roots is prevented. Further, Professor GABBA states that some remarkable changes in the colour of flowers take place under the influence of ammonia, and that asters acquire a pleasant odour after exposure to its fumes. M. TRUCHOT has been testing the proportion of ammonia present in the air at different heights, and finds that it varies inversely as that of carbonic acid. It has been supposed that ozone is formed during the oxidation of essential oils, and the alleged antimalarial properties of scented flowers have sometimes been so explained. But Mr. KINGZETT is of opinion that the active agent produced by the oxidation of essential oils is a monohydrated oxide of turpentine ($C_{10}H_{16}O.H_2O$). M. VOGEL has founed water containing oil of turpentine to accelerate the germinative process in plants, and a still more stimulative action to be exercised by camphor. The motions of camphor and other substances upon water have been described and explained by Professor TOMLINSON, and a kindred subject, "cohesion figures," as a means of detecting adulteration, has been revived by a lady pharmacist in America.

Some valuable contributions to our knowledge of the camphors have been made during the year. The history of Ngai camphor by Mr. Hanbury led up to its chemical description by Mr. Plowman, who reported that he found it to be isomeric with Borneo camphor, and this was followed by Mr. J. Moss's suggestion that it might bear the same optical relation to Borneo camphor as feverfew camphor does to laurel camphor; this was subsequently confirmed by Professor Fluckiger. Monobromated camphor, formed by the substitution of an atom of bromine for one of the atoms of hydrogen in camphor, is coming into considerable repute as a sedative, but its limited solubility presents a great difficulty in dispensing. Its preparation has been recently described by M. Gault. The beautiful camphor which separates from Japanese oil of peppermint, and is known under the name of crystallized oil of peppermint, has also been brought under the notice of the Pharmaceutical Society, at an evening meeting, by Mr. Moss. The colouration which takes place when chloral hydrate is shaken with oil of peppermint is attributed by M. Frebault to the action of free acid contained in the chloral hydrate upon the colouring matters in the oil of peppermint. He also describes a series of similar reactions upon the addition of different acids to the oil, and points out a curious analogy between the behaviour of the green matter so produced and that of chlorophyll. M. Roucher has also called attention to a marked dichroism which occurs upon the addition of acetic acid to oil of peppermint. Mr. Horner has called attention to the fluorescence in castor oil of several bodies that are not fluorescent when dissolved in water.

The rectification of alcohol by means of lime has been the subject of an examination by Mr. Bullock, who finds that the first portions passing over are not so rich in alcohol as some later ones, which he attributes either to lime having an affinity for the stronger portion of the alcohol, or to water more freely vaporizing in an atmosphere of alcohol vapour. A curious instance of the conversion of alcohol into acetate of ethyl by the agency of cryptogamic life has been reported by Mr. Rimmington, and the presence of a fungus in a decomposed lozenge has been the subject of a paper by Mr. Greenish. M. Pasteur has described the preparation of an unalterable beer by using a pure yeast free from foreign fermentative agents, these having less power to set up changes after the beer has once been made. Mr. Horace Brown has come to the conclusion that fermentation is remarkably retarded by diminished atmospheric pressure. Further, the action of bromine upon various alcohols has been studied by M. Hardy.

The high reputation which chloral hydrate has attained as a medicinal agent shows no sign of waning. The importance of using it pure and the hurtful nature of its decomposition products were, early in the year, pointed out by Dr. Leibreich, who expressed a preference for the crystalline form as the most stable, and this is the form now made official in the B. P. Various reactions of chloral have been described; also its power of combining with albumenoid matters, and so arresting decomposition, and its singular property of liquefying when brought into contact with camphor; further, it has been recommended for external application. Its caustic action has suggested its use in that direction by the surgeon, and pencils prepared from metachloral, an isomeric modification of anhydrous chloral, have given a like satisfactory result. The solvent action of chloral hydrate upon different alkaloids has opened up another sphere of usefulness for it. A case in which a man recovered after swallowing six drachms of chloral hydrate, and remaining insensible during thirty-two hours, has been reported from Wiesbaden.

The great increase in the medicinal exhibition of phosphorus has given scope for much ingenuity in the pharmaceutical manipulation of this element. Mr. Gerrard's suggestion to dissolve it in resin was varied by Mr. Abraham's to use balsam of tolu, and the latter was adopted in the new Pilula Phosphori of the Additions, wax being added to make a suitable mass. Criticism of the latter formula induced Professor Redwood to mention soap as a suitable excipient; he has also given a formula for the administration of the Oleum Phosphoratum as an emulsion. Mr. Williams brought before the notice of the Conference a solution of phosphorus in alcohol and glycerine. Mr. Ashburton Thompson has given a formula for a "tincture" of phosphorus, and of course America has provided an "elixir." Mr. Postans has done useful service by suggesting the possibility of using phosphorus in its more convenient amorphous condition, and experiments in this direction are very desirable. The various syrups of phosphorus, existing as phosphate, lacto-phosphate, and hypophosphite, and in combination with different bases, have been the subject of many papers, amongst which may be particularly mentioned those of Dr. Polk, Mr. Broad, and Mr. Daniels.

The acknowledged difficulty of keeping a 2 per cent. solution of hydrocyanic acid, as ordered in the Pharmacopœia, without loss of strength, has been discussed in several papers, and the majority of writers have favoured the use of a 0·2 per cent. solution, as suggested by Dr. Tilden, or of the double cyanide of potassium and zinc, as suggested by Mr. Towerzey. Mr. Williams, however, has observed that the addition of glycerine materially increases the stability of solutions of hydrocyanic acid.

Glycerine has also been added to the ever increasing list of substances that promote the extinction of mercury in the preparation of mercurial ointment; it has besides been shown by M. Carles to increase the solubility of lime in water, probably by forming a soluble glycero-calcic compound. At the Vienna exhibition crystals of glycerine were exhibited by Messrs. SARG; and from Professor GODEFFROY of the same city has recently been received a rough but convenient method of testing the purity of glycerine.

A recent paper by Mr. BARNES, calling attention to the preservative influence of chloroform upon vegetable infusions has given rise to some discussion. It may be as well to note that Mr. BARNES did not recommend the addition of chloroform to infusions intended for use in dispensing, as has been rather hastily assumed; he simply placed the fact on record. The discussion has shown that there is no real difficulty in preserving vegetable infusions from decomposition during a considerable time; but we are inclined to hold with Mr. MARTINDALE that it is wiser—pharmaceutically and financially—to encourage the use of the fresh aromatic infusion and with Dr. SYMES to leave the preserved infusions for emergencies.

The discovery of the antiseptic properties of salicylic acid and an economic method of preparing it by Professor KOLBE appear to open up a new chapter in the history of preservative agents, and probably these observations will find ready application in pharmacy. A kindred subject has been discussed in the late Dr. GRACE-CALVERT'S memoir on the influence exerted by certain gases and other bodies upon the preservation of eggs.

Amongst other real contributions to pharmaceutical progress may be mentioned Professor TICHBORNE'S elaborate paper upon the substitution of oleic acid for the varying substance called soap, and Mr. GERRARD'S carefully worked out report on the Pharmacopœia plasters. Mr. GERRARD has also suggested the substitution of caoutchouc and benzol for gutta-percha and chloroform in the formula for charta sinapis. The demand for elegant pharmacy has directed increased attention to the subject of pill coating, instructions for which operation have been given on two or three occasions. With the same object, a number of methods have been suggested of masking the taste of, and rendering palatable cod liver and castor oils; jalap has been enclosed in biscuits, and arsenious acid in granules perlés; iodine has been administered in combination with albumen, phosphate of lime dissolved in aërated water, and extract of meat in an emulsion with almonds, preserved by the addition of glycerine.

The introduction of pepsine into the Pharmacopœia gave rise to considerable criticism of the mode of preparation prescribed, but there is a general agreement that it produces a good article. Mr. PHILLIP'S experiments have led him to think that pepsine may exist in the presence of alcohol, but in a latent state, and that it may become active upon the dilution of the alcohol by the juices of the stomach. Pancreatine and its preparations have been described by Mr. MATTISON. Another derivative from the animal kingdom is kouniss, which has been the subject of a paper by Dr. JAGIELSKI, who is of opinion that cow's milk is an equally good raw material with mare's milk for its preparation. This, however, is disputed by a correspondent writing from Tartary.

We have thus indicated a multitude of subjects of practical interest to pharmacists, and it speaks well for pharmaceutical activity that our space is exhausted long before our list. We must, however, refer to the numerous valuable lectures that have appeared in our columns during the year; for instance, Dr. PETTIGREW'S on the relations of plants and animals to inorganic matter; Dr. ANDREWS' and Dr. WATTS' on ozone, Mr. FIELD'S on paraffin, Dr. ODLING'S on evaporation and diffusion, Dr. HOOKER'S on carnivorous plants, Sir JOHN LUBBOCK'S on wild flowers, and last, but not least, Mr. SCHACHT'S admirable address to the Bristol Association.

Bookmaking is now so popular an occupation that the very number of scientific books issued necessarily remits many to the book-case instead of the "inward digestion" of their proprietors, and in some cases the former is the least injurious position. But the past year has been rich in valuable works. Amongst those most interesting to pharmacists may be mentioned the new editions of Parrish's Pharmacy, Garrod's Materia Medica, the Treasury of Botany, Babington, Fresenius' Quantitative Analysis, and Valentin's Inorganic Chemistry. Schorlemmer's History of the Carbon Compounds is *sui generis*. There have been admirable manuals of Chemistry from CLOWES, MUTER, and ARMSTRONG; and a manual of Botany from BROWN. SOUBEIRAN and THIERSANT have given us the Materia Medica of the Chinese, ANDOUARD the Pharmacy of France, and the BRITISH PHARMACEUTICAL CONFERENCE a Year-book of the Pharmacy of all countries. And, keeping the best wine till last, the date of the publication of HANBURY and FLÜCKIGER'S Pharmacographia should be a red-lettered day in every pharmaceutical bibliophile's calendar.

The year in which Death has robbed English pharmacy of THOMAS NEWBORN ROBERT MORSON and HENRY DEANE, and American pharmacy of WILLIAM PROCTER, must needs be a memorable one. The names of the former are indissolubly connected with the history of the Pharmaceutical Society of Great Britain as active workers in its earlier days, in the Council and Examination Rooms, and in the Presidential Chair, as that of the latter is with the Philadelphia College of Pharmacy. It would be exaggeration to say that their places cannot be worthily filled, but probably many years will pass without taking from pharmacy three men who have done so much for its welfare or honoured it so much by their lives. Other old and valued friends of the English Society have been taken in GEORGE EDWARDS, a former Vice-President, Councillor and Examiner, and THOMAS STANDRING and GEORGE MEGGESON, also former Members of the Council. Still one more bearing a name well known to pharmacists has passed away in

Charles Harley Savory. Chemistry has lost two prominent disciples in Thomas Anderson and Frederick Rochleder; whilst medicine mourns amongst many others Neil Arnott, Forbes Winslow, Edwin Lankester, James Ranald Martin, Edward Smith, Francis Edmund Anstie, and David Livingstone.

Thus we have descanted at considerable length upon a great variety of topics, but all of them, we venture to say, of interest to pharmacists. The works of the Pharmaceutical Society in education, examination, or benevolence; the point at which recent legislation has approached most nearly the pharmaceutical domain; the new articles of the materia medica, and fresh information about old ones; the improvements in pharmaceutical processes and the bearing of the year's chemical research upon pharmacy; and the names of some of the worthies who have departed, have been in succession passed in review: with what result such of our readers who have followed us thus far will perhaps be better able to judge than ourselves. Be this as it may, in the words of Herrick—

> "Of those, and such like things, for shift,
> We send, instead of New Year's Gift.
> Read then, and when your faces shine
> With buxom meat and cap'ring wine,
> Remember us in cups full crown'd,
> And let our city health go round."

On our part we anticipate our kind friends by wishing them a Happy and Prosperous New Year!

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

Fifth general meeting held at the Royal Institution, December 17th, 1874, the president Mr. A. H. Mason, F.C.S., in the chair. After the formal business Mr. Murphy said that pitch had lately been rendered very scarce, in consequence of the great demand for anthracene causing distillers to use so much heat that the residue was useless for such purposes as road-making, coating roofs, &c. He had been informed that pitch from shale oil, and petroleum oil had been tried as substitutes, but found unsuitable.

Mr. Shaw called the attention of members to the fact that 27 chemists and druggists on the register in Liverpool could not be found at the addresses given; he asked those present who were acquainted with any of those persons to inform them of the necessity of sending their correct addresses.

Mr. W. E. Bickerdike, F.C.S., then read a paper on "The Chemistry of the Tar Antiseptics," which it is proposed to print in a future number.

A short discussion took place after the lecture, in which Messrs. Murphy, Davies, and others took part, and the meeting closed with a unanimous vote of thanks to the lecturer.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The fourth scientific meeting of the session of this Society was held in Anderson's University, on Wednesday evening, 23rd December. Mr. William Whyte, Vice-President (in the absence of Mr. Currie, President), occupied the chair. There was a good attendance. After the usual preliminary business, John Dougall, Esq., M.D. (Vice-President of the Glasgow Southern Medical Society) was introduced, who delivered a lecture on "Zymotic Poison," (printed at page 524 of this journal). Dr. Dougall was frequently applauded in the course of his lecture, his illustrations being specially interesting, and at the close, on the motion of Mr. Kinnimont, seconded by Mr. Fairlie (Sec.), a hearty vote of thanks was awarded the lecturer.

A Committee was then appointed to confer with some of the leading members of the trade, who, it was reported, were not adhering as strictly as should be to the early closing arrangements.

Mr. William M'Kenzie afterwards proposed that the Council make application for a grant of money from the Pharmaceutical Society. An amendment was made to the effect that the application be delayed for a year, which on being put to the vote was carried by a majority.

Some arrangements were then made for the annual festival, which will take the form of a supper and ball, and is to be held on 3rd February.

Mr. Paul asked if ladies could be admitted as members of the Association, but, as some doubt was expressed on the point he put himself in order by giving notice that at next meeting, he would propose that "Ladies interested in the drug business be admitted as members of the Association." His object being to propose also that a lady chemist and druggist, who desired to become a member, should be admitted.

Mr. J. M. Y. Murdoch will read the next paper at the Assistants' section, on January 6th, and Dr. D. Campbell Black will lecture at the next scientific meeting, on 20th January.

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act.

Absence of Soda and Presence of Lead in Soda Water.

In the Central Police Court, Glasgow, before Bailie Torrens, Mr. Alex. Young assessor — Margaret Carmichael, lemonade and soda water manufacturer, was charged with having sold to the sanitary inspectors a bottle of lemonade adulterated with lead, and a bottle of liquid matter represented to be soda water, but which was found to contain no soda, and to be adulterated with lead. On being asked whether she was guilty, the defender replied that she did not know that the liquids contained lead, but she was aware that the bottle said to be soda water contained no soda. It was just what was sold in Glasgow as soda water, and the customers preferred it. The machine used in manufacturing the drinks had lead pipes, and the receiver was composed of lead. This was taken as a denial of the charge, and the evidence in the case was heard. Dr. Clark, one of the city analysts, deponed that the sample contained 1·2 grains of lead per gallon. It was simply an aqueous solution of carbonic acid. The quantity of lead which it contained was sufficient to prove injurious to health. Many medical men said that less than one-tenth of a grain would prove injurious, and in this sample there were twelve-tenths. Lead was a cumulative poison. It remained in the system after the other ingredients in the liquids had passed off, and if taken daily it would in a month or six weeks produce lead-poisoning. Defender: I have been in the habit of drinking it for three years. Witness continued: In the Campsie case there were only nine-tenths of a grain. Bailie Torrens: I am rather astonished to hear that lead is a cumulative poison; that is left in the system. If that were the case, my apprentices would be dead before half their apprenticeship was out. The Procurator-Fiscal (Mr. Lang): They don't swallow lead. Bailie Torrens: But they inhale it. The Procurator-Fiscal: If you have any doubt I will produce authorities. The witness further stated that the British Pharmacopœia gave as the proper constituents of soda water 30 grains of bicarbonate of soda in a pint of water. For the defence, the defender called the manager of her establishment, who stated that the liquid represented to be soda water was that usually sold under that name, and that it was preferred by customers. He believed the lead came off the pipes of the machine, and defender had given orders that it should not be used more until altered. The Court found the charge proven, and defender was fined £3 3s., with £1 7s. expenses.

James Murdoch, soda water dealer, 7½ Nicolson Street, was next charged with having sold as unadulterated a bottle labelled as containing soda water which was adulterated with lead or other substance. Defender, on being asked to plead, admitted that he sold the liquid, declaring at the same time that it was as respectable a bottle as had passed through his hands for the last 20 years. Mr. Walker, the sanitary inspector, deponed that when he purchased the bottle Murdoch told him that it contained no soda—simply carbonic acid gas and water. As he was leaving, he told him further that it passed through lead pipes and a lead reservoir, and that there was likely a little lead in it. He did not say this at first. Dr. Clark deponed that the sample contained 1·1 grain of lead per gallon. Dr. J. B. Russell was next called, and deponed that if lead was found in soda water in the proportion of 11-10ths of a grain per gallon, it would certainly prove injurious to health. Parkes said that 100th of a grain per gallon was injurious to health. If a person in robust health were taking a bottle, or two bottles per day for a week of soda water, containing 11-10th grains of lead, it would likely result in a bad case of lead poisoning. Defender wished to know whether Dr. Russell had ever been an aërated water manufacturer, and whether he knew anything of raising a float; but Dr. Russell had to confess that he did not. Defender, who had repeatedly interrupted the witnesses, was then heard in his own defence. He denied that lead was a poison, and characterised the allegation as a humbug. He had been twenty-two years a dealer in soda water, and if it would be any satisfaction to the public, he would sup porridge made of the water he sold, and take the remainder in soup for his dinner. At his request Dr. Clark was recalled, and stated that the quantity of lead in the sample would not be the size of a pin head, whereupon the defender declared his readiness to consume a piece of lead the size of his finger, either whole or in solution. The magistrate took a different view. Men who had studied the subject considered, he said, that lead was a poison; and he must, therefore, impose a penalty of £3 3s., and £1 5s. expenses.

The following journals have been received:—The 'British Medical Journal,' Dec. 26; the 'Medical Times and Gazette,' Dec. 26; the 'Lancet,' Dec. 26; the 'London Medical Record,' Dec. 26; 'Medical Press and Circular,' Dec. 26; 'Nature,' Dec. 26; 'Chemical News,' Dec. 26; 'Gardeners' Chronicle,' Dec. 26; the 'Grocer,' Dec. 26; 'Journal of the Society of Arts,' Dec. 26; 'Grocery News,' Dec. 31; 'Produce Markets Review,' Dec. 26; 'Practical Magazine,' for December; 'Educational Times,' for December; 'British Journal of Dental Science,' for December; 'Journal of Applied Science,' for January; 'Canadian Pharmaceutical Journal,' for December; 'Tennessee Pharmacal Journal,' for December; 'Moniteur Scientifique,' for December; 'Pharmaceutische Zeitung,' for Dec. 21 and 24; 'Sanitary Record,' Dec. 26; 'Journal de Pharmacie et de Chimie,' for December; 'Répertoire de Pharmacie,' for Dec. 20; 'The Garden,' for Dec. 26; 'American Journal of Pharmacy,' for December; 'The Pharmacist,' for December; 'Tennessee Pharmacal Gazette,' for December.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Preservation of Infusions.

Sir,—As the subject of preserved and concentrated infusions is still on the *tapis*, having some years ago been in the habit of using infusions preserved, as described by some of your correspondents, by heating the bottles containing them in a water-bath and tying them over with skin; and having so treated some hundreds of bottles myself, I beg to offer my opinion. Some infusions would undergo such treatment without much deterioration; others, such as cascarilla, senna, and gentian, differ as much from the fresh as fresh beef from Australian preserved, and the longer they are kept the greater the change. This plan was at length abandoned, as it was argued, that, supposing our household beverage, tea, were treated in the same manner, it would not be as palateable as when freshly prepared.

The tampering with the Pharmacopœia processes in making these useful and inexpensive preparations by pharmacists has done much to discredit their use by the medical profession, and to our regret they are much less frequently ordered than formerly. Such vapid substitutes as concentrated infusions for the grateful fresh preparations may satisfy requirements in some cases, but in my opinion they ought not to be used by a pharmaceutical chemist.

Wm. Martindale.

10, *New Cavendish Street,*
Dec. 29, 1874.

Spirit. Vini Rectif.

Sir,—It has been pointed out by a friend that absolute alcohol is not 100° but 75·25° over proof. In that case the calculation necessary would be still more complex and would be an additional argument for the simplicity of the American system. It will have been observed, I hope, that I purposely expressed, in the most general manner, the mode on which the calculation for over proof and under proof is based—having, indeed, originally written: let $x = $P.S. $a = $O.P.: $b = $U.P. assigning any given numerical value to a and b, the calculation to be worked accordingly. I am glad, however, to be able to add the above more accurate detail, and I am grateful for the kind intention which prompted the information. The same correspondent calls attention to a paper bearing on the subject by Drinkwater. *Pharm. Journal*, 1847.

Joseph Ince.

T. M. J.—(1) We do not know of a firm who would be willing to do what you require, but would recommend you to advertise in a dental journal. (2) We are not at present acquainted with a work confined to the subject you mention, but will make inquiries.

G. F.—(1) We cannot undertake to recommend the wares of any particular manufacturer. (2) Neither is correct; see the Calendar of the Pharmaceutical Society.

T. Robinson asks for a formula for a Hair Dye, but has forgotten to specify the colour.

H. G.—Before publishing your letter, or any portion of it, we shall be glad to learn if you have adequate grounds for believing the statements made in it beyond the mere representation of a customer. We have had opportunity of learning that such representations are not always to be depended upon in such cases.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

Communications, Letters, etc., have been received from Herr Rennard, Mr. Mason, Mr. Green, Mr. Siebold, Mr. Bell, Mr. Baynes, Mr. Metcalfe, Spes.

ON SYRUP OF FERROUS PHOSPHATE PREPARED FROM METALLIC IRON.

BY H. WILLIAMS JONES.

The British Pharmacopœia directs syrup of phosphate of iron to be made from precipitated phosphate, and, so far as I am aware, all published formulæ for the syrup direct precipitated ferrous phosphate to be used. Since phosphate of iron precipitated from mixed solutions of sulphate of iron and phosphate of soda is extremely difficult to wash and very liable to oxidation, as all know who have manipulated it, it occurred to me to prepare the phosphate direct from metallic iron by means of phosphoric acid. By this means a syrup is obtained which keeps remarkably well, which is quite free from the usual impurities arising from imperfect washing of the phosphate, which contains the phosphate of iron in an unoxidized condition, and which requires less free acid to keep it in solution. Further, the personal attention required in the preparation of the syrup by this means is much less than is required by any other process.

To prepare the syrup, cover the bottom of a jar or bottle, fitted with a cork, with coarse pure iron filings, and pour in phosphoric acid of about twice the strength of the diluted acid of the Pharmacopœia. Fit in the cork somewhat loosely, and let it stand for four or five hours. Action commences almost immediately, ferrous orthophosphate ($Fe_3P_2O_8$) is formed, and kept in solution by the free acid present. The hydrogen eliminated forms a hydrogen atmosphere in the jar, and prevents oxidation of the phosphate. At the end of the time named, the action will somewhat have ceased, and an acid solution of phosphate of iron will have been formed. To determine the proportion of iron in the solution, filter off 10 c.c., and titrate immediately with bichromate (B. P. solution) after the addition of hydrochloric acid and water. Each c.c. of bichromate = ·0358 gram $Fe_3P_2O_8$. If the operation has been properly conducted the iron will all be present in the ferrous state, so that the bichromate will give the total iron present. Having found out how much is contained in 10 c.c. we have only to multiply the number of grams found, by 5·4, when we have the number of grains of phosphate present in each fluid drachm of the liquor. Filter the remaining liquor, which, when poured off the iron, runs through paper quickly, and add sufficient syrup so that each fluid drachm shall contain 1 grain of phosphate of iron. If an acid of the strength named be left on the iron for five hours, more strong acid must be added to the syrup till it acquires a decidedly acid taste, when it will keep well. If it be considered a matter of importance that a definite amount of free acid should be present, note the sp. gr. of the original acid and calculate the amount of phosphoric acid removed by the iron. With an acid of known sp. gr., and, therefore, of known percentage of phosphoric acid, the bichromate solution gives with little calculation (1) the amount of phosphoric acid removed by the iron, and (2) the amount of free acid in the solution. The required quantity of acid can then be added. The Pharmacopœia syrup is much too acid, and 15 minims of acid. phosph. dil. in the drachm will be found quite enough, and the syrup will keep well with 12 minims. If the process be well conducted no phosphate of iron will be lost by precipitation. A solution seven times the strength of the syrup can be readily formed, which when mixed off with syrup forms an elegant preparation.

NOTE ON THE OCCURRENCE OF LEAD IN LEMONADE.

BY CHARLES EKIN, F.C.S.

In the number of the *Pharmaceutical Journal* for the 26th ult., there is a report of a trial at Glasgow where a manufacturer was fined for selling lemonade containing lead, and Dr. Russell, the Medical Officer of Health, is stated to have said "that he believed the lead in the lemonade arose from the character of the apparatus;" the manufacturer, however, saying, "that he had made alterations to avoid this risk, and did not know till now that there was lead in his apparatus."

I have lately been consulted in a similar case, and here, too, the manufacturer had taken every care by the use of wooden generators and vessels, together with block tin pipes and connections, to prevent the possibility of contamination, and yet his lemonade was analysed, and condemned as containing lead. He was naturally at his wits' end to know where the lead could come from, and as I have reason to believe the recent convictions have had the effect of producing something like a panic amongst many other aërated water makers, some of whom are also pharmaceutists, it may not be out of place to point out, in the pages of the *Pharmaceutical Journal*, an hitherto, so far as I know, unsuspected source of lead.

In the case I refer to, after having satisfied myself that the water used was free from lead, that there was no lead in the machinery, and that the lemonade syrup was neither made nor stored in glazed earthenware pans, the glaze of which might have contributed the adulterating metal, I examined the citric acid itself, and got such abundant evidence of lead that there could be no question in this case, at all events, what was the source of contamination.

The citric acid was purchased, I am informed, from a respectable drysalter, and I am unable to say at present how far it was an exceptional sample. That lead may, however, be frequently present in samples of commercial citric acid is rendered likely from the method of its manufacture, as detailed in Ure's Dictionary of Arts, Manufactures, and Mines, and also in Pereira's Materia Medica. It appears that the citrate of lime, formed by neutralizing lemon juice with chalk, is decomposed by diluted sulphuric acid, and the filtrate then concentrated by boiling down in *leaden* vessels. The crystals are afterwards purified by re-solution and re-crystallization; but as each re-solution and concentration is conducted in the same leaden boilers, and as triplumbic citrate is soluble, and the dibasic salt very soluble in a hot solution of citric acid, one can quite understand that in practice and commercially on the large scale complete purity cannot be obtained. Be that as it may, I purpose, when I have leisure, examining other samples, and in the meantime have thought that the recording of this special case might be of use at the present juncture.

CHEMISTRY OF THE TAR ANTISEPTICS.*

BY W. E. BICKERDIKE, F.C.S.

The subject which I propose to bring before you this evening is rather imperfectly described in the title of my paper. The tar antiseptics possess a very high degree, perhaps their highest degree, of interest and importance, in respect to those properties which render them so serviceable in a sanitary point, not only for the general puposes of disinfection for which they are extensively employed, but

* Read before the Liverpool Chemists' Association, December 17, 1874.

also for their application in the antiseptic method of treating surgical cases, which may be said to owe its origin to the employment of these bodies. An account of the tar antiseptics would be very imperfect if these characteristics were not included, and I propose briefly to refer to them, although they scarcely belong to the chemistry of the subject.

The tar antiseptics, I need hardly say, are derived from tar, and they form by no means the least interesting or useful group of compounds furnished by that prolific material. Gas tar, as is known, is a highly complex mixture; it consists of a great number of liquid and solid bodies, some of which have been very imperfectly studied.

It is probable that several of the constituents of tar possess more or less the characters of antiseptics, but this property is especially characteristic of the alcohols phenol and the isomeric cresols, commonly known as carbolic and cresylic acids. Possibly higher homologues of these compounds may exist, having similar properties; at the present time, however, these two bodies (which are really alcohols, and not acids) are by far the most important antiseptics contained in tar, and there can be no doubt that the ancient reputation of tar as an antiseptic was very largely owing to the presence therein of these so-called acids. By the term tar antiseptics, then, I refer especially to carbolic and cresylic acids, or, more correctly, phenol and cresol, these being the only bodies which are separated from coal tar, on the commercial scale, with a view to their employment as antiseptics.

In tracing the history of these products it is necessary to refer briefly to the treatment of tar by which its constituents are separated from one another. The first process consists of simple distillation by which the volatile portion is removed from the non-volatile. In this process, of course, the bodies with lowest boiling points first pass off, and as the temperature rises the higher products are driven over; when the volume is reduced to about one half, the tar has lost all its volatile constituents, and the residue is incapable of yielding further products, except by destructive distillation.

In the annexed diagram a list is given of the constituents of coal tar, together with the boiling point of each compound. The list will no doubt become greatly extended by further research.

CONSTITUENTS OF GAS TAR.

NAME.	Boiling point (Centigrade).
Hydrosulphuric Acid	
Ammonia	
Benzene	81
Water	100
Toluene	111
Pyridine	115
Pyrrol	133
Picoline	135
Xylene	139
Cumene	148
Lutidine	154
Collidine	170
Cymene	171
Anilin	182
Phenol	184
Parvoline	188
Paracresol	200
Naphthalene	212
Rubidine	230
Leucoline	235
Viridine	251
Cryptidine	256
Anthracene	350
Pyrene	
Chrysene	
Pitch	

On the first distillation of the tar, these products are, as you might expect, very much mixed together; in fact, we may compare the result to a spectrum in which the colours overlap one another, and in this second diagram, I have represented both the order in which the results present themselves, and approximatively the degree in which they are intermingled.

Light Oil.

Naphthalene.
Cumene, Phenol, Leuc line.
Pyrrol, Cymene, Rubidine, Cryptidine.
Toluene, Pyridine, Anilin, Naphthalene, Anthracene.
Benzene, Xylene, Cumene, Phenol, Cresol. Naphthalene. Chrysene.
Water, Toluene, Lutidine, Anilin, Leucoline, Pyrene.
Naphthalene, Cymene, Phenol, Viridine.
Collidine, Cresol.
Naphthalene.

The left-hand member (Benzene) represents the commencement of the distillation, and the right-hand member (Chrysene) the termination. By drawing a vertical line through the diagram at any point it will pass through the names of those substances which distil together. Naphthalene appears at almost every stage of the process, notwithstanding its boiling point is 212° C.

In the practical working of the operation this distillate is not all run into one receiving vessel, but it is collected in three or more separate portions. The first receiver is used so long as the liquid coming from the still is lighter than water. When the specific gravity reaches 1000 to 1010 the contents of the first receiver are set aside as "light oil;" the distillation is then continued in the second receptacle until the oil begins to contain Anthracene, when the vessel is again changed and the remainder of the distillate collected in the third receiver. These three portions are afterwards treated by special methods in order to separate any particular constituent that may be required. The first portion, or "light oil," contains the phenol and part of the cresol oil, and it is to this portion that we shall now confine our attention. In order to separate the phenol and cresol, the light oil is agitated for some hours with a solution of caustic soda, and after being allowed to stand for some time the soda solution is removed by decantation. This solution contains both the phenol and cresol dissolved, and on neutralizing the soda, these rise to the surface in the form of a dark oily liquid, consisting of phenol and cresol, together with some sulphur compounds, water, and a quantity of pitchy matter. The further separation of the phenol and cresol from this crude liquid is effected by repeated fractional distillation, assisted by crystallization of the phenol, from which the liquid cresol can be removed mechanically. When the process of purification has been carried as far as the present commercial methods will allow, we have the two bodies in the form of the samples before you. The solid phenol is of the quality commonly used for medical purposes: it is almost but not entirely free from cresol, but this is not important, as the latter is quite as effective an antiseptic as the former. The cresol contains a much larger proportion of phenol, amounting often to 15 or 20 per cent.; this mixture of cresol and phenol is commonly known in commerce as liquid carbolic acid; it is used almost solely for purposes of disinfection. Pure phenol is generally described in text books as crystallizing in long needles which fuse at 35° C. and boil at 186° C.; the crystals are also stated to be very deliquescent, and but sparingly soluble in water when melted. This description is not a very accurate one, being in fact a description of an impure body. Pure phenol fuses at 41° to 42° C., and boils at 184°; the crystals are not deliquescent. Water dissolves 5 per cent. of phenol at 16° C., but at 100° it will dissolve an unlimited quantity. On the other hand, the melted crystals will dissolve 20 to 25 per cent of water, and this prevents the crystallization of the phenol at ordinary temperatures. If, however, the mixture be exposed to a temperature of 0° C., a hydrate of phenol separates in the crystalline form. From the fact that phenol was separated from tar oil by means of an alkaline solution, and especially from its appearing to form a compound with potassic hydrate, it was supposed to possess an acid character; on further investigation, however, it was found to possess none of the characteristics of an acid, and it forms no definite salts with bases (Calvert, *Journal of the Chemical Society*, vol. viii., pp. 67 and 68). On the other hand, in its chemical relationships, it exhibits the character of an alcohol, and it may be regarded as the hydrate of the hypothetical radicle phenyl C_6H_5, just as ordinary alcohol is the hydrate of ethyl C_2H_5. Phenol is thus the alcohol of benzene, the first member of the aromatic series of hydrocarbons, and the analogy between ordinary alcohol and phenol is clearly shown if we write the formulæ of the different members of the series as derived from the radicle, of which the parent hydrocarbon may be considered the hydride. For instance, taking the radicles phenyl and ethyl respectively we have :—

	Phenyl Series.	Ethyl Series.
Hydride	$(C_6H_5)H$ or Benzene.	$(C_2H_5)H$ or Ethene.
Alcohol	$(C_6H_5)HO$ or Phenol.	$(C_2H_5)HO$ or Ethylic Alcohol.
Ether	$(C_6H_5)_2O$ or Phenylic Ether.	$(C_2H_5)O_2$ or Ethylic Ether.
Aldehyde	$(C_6H_5)COH$ or Phenylic Aldehyde.	$(C_2H_5)COH$ or Propylic Aldehyde.
Acid	$(C_6H_5)CO_2H$ or Benzoic Acid.	$(C_2H_5)CO_2H$ or Propionic Acid.
Ketone	$(C_6H_5)_2CO$ or Diphenyl Ketone.	$(C_2H_5)_2CO$ or Diethyl Ketone.

In the one case, the second member is the alcohol phenol, and in the other case, ordinary alcohol. There is therefore *primâ facie* evidence that phenol *may* be an alcohol merely from the fact that its composition as determined by analysis enables it to supply the place of the alcohol member in the phenyl series. But in the chemistry of carbon, where cases of isomerism and metamerism are so abundant, this fact is not sufficient, and it is necessary to seek for confirmatory evidence in the chemical behaviour of the compound. This evidence is furnished by several reactions in which phenol behaves in a manner closely analogous to ethylic alcohol under similar conditions. When, for instance, phenol is acted upon by potassium, hydrogen is given off and is replaced by the metal—

$$2\,C_6H_5OH + K_2 = 2\,C_6H_5OK + H_2.$$

In a similar manner when alcohol is acted upon by potassium the same interchange takes place—

$$2\,C_2H_5OH + K_2 = 2\,C_2H_5OK + H_2.$$

Again, when phenol is heated with sulphuric acid half the hydrogen of the acid is replaced by phenyl—

$$\left.\begin{matrix}H\\H\end{matrix}\right\}SO_4 + C_6H_5OH = \left.\begin{matrix}C_6H_5\\H\end{matrix}\right\}SO_4 + H_2O.$$

Sulphophenic acid being produced; from this the sulphophenates or sulphocarbolates are formed by replacing the remainder of the hydrogen by the metal whose salt is required. These changes are closely paralleled by the corresponding reactions of ethylic alcohol, which with sulphuric acid produces sulphethylic acid:—

$$\left.\begin{matrix}H\\H\end{matrix}\right\}SO_4 + C_2H_5OH = \left.\begin{matrix}C_2H_5\\H\end{matrix}\right\}SO_4 + H_2O.$$

In 1865 Calvert examined the white crystalline product which is formed when phenol is mixed with a strong solution of caustic potash, and which was supposed to be a salt of carbolic acid. It was found that the crystals consisted only of phenol, with a little adhering alkali. There can be no doubt therefore that phenol belongs to the alcohols, and absolutely pure phenol may be appropriately called "absolute phenol." Of this the sample before you is prepared in the form of minute granular crystals which fuse at 41° C. and boil at 184°. The crystals have a faint fragrant odour, and having no tendency to liquefy on exposure, they will probably be found a convenient pharmaceutical preparation. Phenol is produced by the dry distillation of several organic bodies besides coal, viz., salicylic acid, gum benzoin, resin of *Xanthorrhœa hastilis*, quinic acid, and chromate of pelosine. The action in the case of salicylic acid is especially interesting, as the latter may also be produced from phenol by the action of carbonic anhydride and sodium. At present salicylic acid is being manufactured from this source; its composition is the same as that of carbonic acid in which one atom of hydrogen is replaced by the radicle phenyl.

Carbonic acid.	Salicylic acid.
$\left.\begin{matrix}H\\H\end{matrix}\right\}CO_3$	$\left.\begin{matrix}C_6H_5\\H\end{matrix}\right\}CO_3$

A large number of derivatives have been furnished by phenol, some of which are of considerable commercial importance, although they were not applied to industrial uses to any great extent until nearly twenty years after the discovery of phenol; in fact, this body has a commercial history similar to that of oxalic acid, benzol, and many other organic compounds which, after their first discovery, were known for some years as chemical curiosities only, until at length they were found to possess qualities which make them useful to mankind, and which render their manufacture a profitable enterprise. It is little over twenty years since phenol was first manufactured on a large scale, and at the present time the production in this country amounts to several hundred tons annually. A large proportion of this is consumed in manufacturing two coloured derivatives of phenol which are employed as dyes. I allude to the picric and rosolic acids. When nitric acid is made to act upon phenol three different nitro-derivatives may be produced by varying the conditions under which the action takes place. In all cases the action consists in the replacement of part of the hydrogen of the phenol by the group nitryl (NO_3), and 1, 2, or 3 atoms of hydrogen may be so replaced, forming the mono-, di-, and tri-nitrophenic acids respectively, thus :—

Phenol.	Nitrophenic acids.		
C_6H_6O	$C_6H_5(NO_2)O$, (mono-)	$C_6H_4(NO_2)_2O$, (di-)	$C_6H_3(NO_2)_3O$ (tri-)

All these derivatives possess distinctly acid properties and form definite crystallizable salts, but only the last of them is of commercial importance. Trinitrophenic or picric acid is formed when nitric acid and phenol are allowed to react upon one another, and the mixture is afterwards boiled with concentrated nitric acid. Pure picric acid crystallizes in pale yellow needles, which dissolve in about eighty times their weight of cold water, forming an intensely yellow solution.

Like many organic compounds which have had 3 atoms of hydrogen replaced by 3 atoms of NO_2, such as gun cotton, or trinitronaphthalene, picric acid, and especially the picrates, are liable to undergo violent decomposition when heated, the picrates of the alkalies exploding with much violence. The most important application of picric acid is for dyeing silk or wool, to which it imparts a beautiful lemon-yellow shade; the acid merely requires to be dissolved in water with the addition of a little sulphuric acid, which is found to assist the process of dyeing. When a solution of picric acid is gently heated with cyanide of potassuim, isopurpurate of potassium is produced; from this the ammonium salt can be obtained which exactly resembles the dyeing material, murexid or purpurate of ammonium—

$$C_6H_3N_3O_7 + 3\,CNK + 3\,H_2O = C_8H_4KN_5O_6 + CO_2 + NH_3 + 2\,KHO.$$

The other coloured product derived from phenol is rosolic acid, known in commerce as aurine or coralline. This substance is produced when phenol is heated with an alkali, together with certain metallic oxides, and also when sulphophenic acid is heated with oxalic acid to a temperature of 120° C.; the last method is the one employed on the manufacturing scale. When the action is complete the excess of sulphophenic acid is washed out by repeatedly boiling with water, and the rosolic acid is finally melted in order to remove the water which it has retained; on cooling it assumes the condition of an amorphous mass with a beetle-green lustre, in which form it is know as aurine or yellow coralline of commerce. In this state rosolic acid contains a quantity of unchanged phenol; when freed from this it may be obtained in the crystalline form. Aurine is soluble in alkaline solutions and in alcohol; it is largely employed for dyeing silk and wool, to which it gives a bright orange colour often seen on sheepskin mats. When aurine is heated under pressure with ammonia solution to 150° C., a colouring matter is formed which produces a red shade instead of the orange shade imparted by aurine; this substance is called red coralline. A blue colouring matter is obtained from aurine by heating together aurine, anilin, and benzoic acid; this, at one time rather extensively used, is now supplanted by the anilin dyes.

We have now completed the list of colouring matters which are derived directly from phenol, and it will be admitted that the contributions of this body to the great magazine of tar-colours is by no means unimportant.

I now pass on to the consideration of some of the properties of cresylic acid or cresol. The remarks already made with reference to the constitution of phenol will equally apply to cresol, this body being an alcohol and not an acid. Three isomeric modifications of cresol are known which are distinguished as para,- meta-, and ortho-cresol, and these stand in the same relation to toluene as phenol does to benzene.

Toluene.	Cresol.
$(C_7H_7)H$	$(C_7H_7)OH$

Paracresol constitutes the greater portion of the crude cresol derived from coal-tar; it is very deliquescent and its presence in commercial phenol causes the latter to liquefy on exposure; its boiling point is about 200° C. Orthocresol is believed to exist in coal-tar, but it has also been obtained (as well as paracresol), by fusing potassium toluene-sulphate with potassium hydrate—

$$C_7H_7SO_3K + KOH = (C_7H_7)OH + K_2SO_3;$$

its boiling point is about 189° C.

Metacresol has not been obtained from coal-tar; it is formed by the resolution of thymol into cresol and propylene, by heating with phosphoric anhydride; its boiling point is 195° to 200°.

$$C_{10}H_{14}O = C_7H_8O + C_3H_6.$$

The derivatives of cresol have not been so perfectly studied as those of phenol, partly on account of the difficulty of obtaining the different isomers in a pure state in large quantities. None of them have yet been applied to any useful purpose in the arts or manufactures, but cresol itself is employed even to a greater extent than phenol for purposes of disinfection. The antiseptic qualities of cresol and phenol have been carefully studied during the last 10 or 15 years, and a large amount of experience has been gained by their practical employment as disinfectants. These alcohols possess some property by virtue of which they are able immediately to arrest those changes in organic bodies which owe their origin to the development of protoplasmic life. This is not effected by oxidation or other chemical change, as in the case of the permanganates, ozone, chlorine, etc., for there is reason to believe that the antiseptics themselves suffer no change. Both phenol and cresol will precipitate albumen and gelatine from their solutions, and it has been suggested that they may exert a similar power on the sarcode which forms the structure of the above-named organisms; whatever be the method by which the effect is produced, the fact itself is sufficiently established. Almost every species of decay to which organic matter is liable may be prevented by the presence of a minute quantity of the tar antiseptics, and from their volatile character they may be made to operate on the atmosphere as well as on liquid and solid bodies. This antiseptic quality was very soon recognised by medical authorities, and it was found that the usual septic condition of suppurating wounds might be entirely prevented by employing a dressing in which a small quantity of phenol or cresol was introduced; the subject was thoroughly investigated by Dr. Lister of Edinburgh, to whom we are chiefly indebted for the antiseptic method of treating wounds, and also for some of the very convenient forms in which the antiseptics are applied.

The question naturally arises, if these ntiseptics are so certain in their action upon the vital germs which accompany decay, may they not be useful agents for internal administration in those diseases in which the morbid state of the blood is supposed to be owing to the propagation therein of poisonous germs. Of course, it is impossible to administer either phenol or cresol in a pure state, and even a weak solution is found too irritating to the delicate mucous surfaces of the stomach, except in very small quantities, so that for some time the test could not be applied. Recently, however, it has been found that the salts of sulphocarbolic acid, which may be given in tolerably large doses, are decomposed in the system, the phenol being re-formed and set at liberty. By this method it is possible to administer phenol in such quantities as to produce cerebral symptoms, but I have not seen a sufficient number of reports as to its action to determine its success or otherwise. Numerous other applications of these antiseptics have been made, and are continually being made as their properties become more generally known. I will only allude to the preservation of gelatine size in hot weather, and of hides that are intended for tanning. Some years ago I had a thorough trial made of this method of preserving hides, in order to ascertain whether the antiseptic solution had any injurious effect on the after-process of tanning. The trial was made at the tan-yard of Mr. Beakbane, near Liverpool, and it was found that the hides were in no way injured by a 2 per cent. solution of the antiseptics, but after lying in a wet state during several weeks of warm weather they afterwards behaved in the tan-pit exactly like fresh hides. In conclusion, I beg to draw your attention to a few zoological specimens which were collected three years ago by my brother in India, and sent to England in a 2 per cent. solution of crude cresol. The state of preservation is complete.

MAGNESIUM SULPHITE.*

BY R. ROTHER.

On the large scale, magnesium sulphite is prepared by passing sulphurous oxide gas into water holding magnesium carbonate in suspension. The resulting product is the article found in the general market. This form is characterized by its peculiar snowy whiteness, granular appearance, and comparative lightness. By a different method, however, an article of magnesium sulphite can be produced which, in its physical character, is almost diametrically dissimilar to the one first mentioned. The course of double decomposition, as applied in the second instance, results in a form of this compound which is distinctly peculiar. The product in this case is invariably crystalline, but accordingly as the solution from which it separated was dilute or concentrated, the crystals will be transparent, or more or less white. From a moderately dilute solution the deposited crystals will be largest and best defined. Their general tendency, especially when the liquor is dilute, is to aggregate in clusters or crusts. The white crystals differ in no way from the transparent, or large, excepting in size. When the large crystals are crushed they apparently do not differ from the white. The transparent crystals are particularly noteworthy for

* From the *Tennessee Pharmacal Gazette.*

their brilliancy and glassy aspect, their extraordinary hardness and resistance to solution. Even when powdered, water attacks them but slowly, but an aqueous solution of sulphurous oxide dissolves them with rapidity.

The first process is not exactly convenient for preparing magnesium sulphite in the shop laboratory, however effective it may be in the hands of the manufacturing chemist. Besides, judging from the material which is employed, this process cannot possibly yield a perfectly pure salt.

The second process, or that of double decomposition, on the contrary, affords, with the aid of less complicated mechanical contrivances and the use of less expensive material, an absolutely pure product, appended to which are physical features significant of purity. Yet, in the course of the operation with the second method, it will be found that the crop of the expected sulphite does not accord with the theoretical amount—that is, the yield is only about two-thirds of what it should be.

By applying various modifications of this method the general result was not materially changed. Whether hot concentrated solutions of sodium sulphite and magnesium sulphate were mixed, or their dilute solutions united, and the magnesium sulphite successively gathered by consecutive evaporations, the amount of product did not appreciably vary. The important fact was incidentally ascertained that an excess of either of the two generating salts does not in the least affect the quantity of product.

Doubts were then entertained as to the composition of the thus generated sulphite, but when the salt was treated with iodine solution, the fact became apparent that it is the true sulphite of Rammelsberg, $Mg''SO_3.\ 6H_2O$, upon which the calculation had been based. The only remaining factor that could now bear upon the amount of product is the sodium sulphate resulting as a by-product. A quantity of magnesium sulphite was then added to a moderately strong solution of sodium sulphate, wherein it readily dissolved. The solution, on evaporation, failing to yield it up again, the fact became patent that about one-third of an equivalent of magnesium sulphite was permanently dissolved by one equivalent of sodium sulphate.

By letting a concentrated mother-liquor, from which all the available sulphite had crystallized, stand for some time, a portion of the sodium sulphate crystallized out, but the dense liquor poured from these crystals, on further evaporation, yielded an apparently amorphous residue.

The trial was not made whether magnesium chloride would give the whole of the magnesium as sulphite. However, in case this should be successful, then the addition of magnesium chloride to the mixed magnesium sulphite and sodium sulphate might probably evolve the magnesium sulphite by inducing a mutual disruption between itself and the sodium sulphate.

THE CHEMICAL NATURE OF DIGITALIN.*

BY C. KOSMANN.

There exists in the *Digitalis purpurea* an immediate principle which has been named successively digitalin, digitasolin, and digitaletin. This substance is soluble in water; it is very hygroscopic, and also readily altered by the action of water, acids and alkalies. When submitted to the action of dilute sulphuric or hydrochloric acid, it at first splits up into glucose and insoluble digitalin; but that being submitted to further action of the acid, breaks up again into glucose and digitaliretin, which has been also called paradigitaletin. This digitaliretin is by the prolonged action of the acid ultimately decomposed into dehydrated digitaliretin and four molecules of water.

* *Journal de Pharmacie et de Chimie* [4], vol. xx., p. 427.

Soluble digitalin is an immediate principle, so alterable by the action of energetic agents, such as acids, water, and heat, that the different substances which have been produced from the plant, under the names digitasolin, digitalin, digitaletin, paradigitaletin, and digitaliretin, are all derivatives of a single immediate principle in which reside in a high degree the medical properties of the plant. Digitalin exists in the plant in the soluble state; but, even there it is partially altered by aqueous, saline, or acid constituents, with which it comes into contact in the vegetable tissue, and is partly decomposed into glucose and insoluble digitalin. This is the reason why insoluble digitalin is always obtained from the plant, together with the soluble; the former, however, not being entirely insoluble in water, but much less soluble than the latter. Both these digitalins are glucosides; in the soluble digitalin the digitaliretin is combined with two molecules of sugar, in the insoluble with only one; the former upon losing one molecule of sugar is converted into the latter and becomes at the same time insoluble. Dissolved in dilute hydrochloric or sulphuric acid a molecule of the former is decomposed into one molecule of digitaliretin and two molecules of glucose; the latter into one molecule of digitaliretin and one of glucose. Both are very bitter and very energetic in the animal economy. The first is especially manufactured in Germany, the second in France.

The German process consists in treating the dried and powdered leaves with eight times their weight of 80° alcohol twice successively; the extremely bitter alcoholate is distilled to recover the greater part of the alcohol; the residue of the distillation is filtered, then treated with triplumbic acetate; the liquor filtered, treated with sulphuretted hydrogen to remove excess of lead, again filtered, and treated with a solution of tannin; the abundant precipitate is collected upon a filter, washed with water, and dissolved in alcohol; the alcoholic solution is treated with triplumbic acetate which precipitates the tannin as plumbic tannate; the solution is then filtered, excess of lead removed by sulphuretted hydrogen, again filtered, and evaporated slowly. The residue is treated first with ether, which dissolves the fatty and acrid matters, and then with alcohol to remove the digitalin, which is obtained by a slow evaporation of the solution. The soluble digitalin is separated from the insoluble by means of cold water, which dissolves the former and leaves the latter. The aqueous solution of soluble digitalin is treated with animal charcoal, or preferably, again with solution of tannin, the tannate of digitalin, redissolved in alcohol, is treated with triplumbic acetate, and after filtration, with sulphuretted hydrogen, again filtered, and then, being slowly evaporated, it yields soluble digitalin of a high degree of purity and extremely energetic. The yield thus obtained is:—

0·623 per cent. of soluble digitalin.
0·167 „ insoluble „

Altogether 0·790 per cent of product.

Soluble digitalin gave upon analysis—

		Required for formula $C_{54}H_{42}O_{27}$.*
C	55·26	55·69
H	7·89	7·26
O	36·85	37·05
	100·00	100·00

Soluble digitalin attracts water with avidity, and some which the author analysed in 1859 corresponded with the formula $C_{24}H_{42}O_{27} + 3\ HO$. On the other hand, insoluble digitalin, called also, in Germany, digitaletin, gives upon analysis,—

C	58·741
H	7·692
O	33·567

* C = 6; O = 8.

Its formula is—

$$\underbrace{C_{42}H_{33}O_{18}}_{\text{Insoluble digitalin.}} = \underbrace{C_{54}H_{45}O_{30}}_{\text{Hydrated soluble digitalin.}} - \underbrace{C_{12}H_{12}O_{12}}_{\text{Glucose.}}$$

Insoluble digitalin, treated with dilute sulphuric acid, gives up another molecule of glucose, and is converted into digitaliretin.

$$\underbrace{C_{42}H_{33}O_{18}}_{\text{Insoluble digitalin.}} + 4\,HO = \underbrace{C_{30}H_{25}O_{10}}_{\text{Digitaliretin.}} + C_{12}H_{12}O_{12}$$

Digitaliretin yielded upon analysis—

		Required for above formula.
C	63·225	63·50
H	8·414	8·77
O	28·361	27·73
	100·00	100·00

By the prolonged action of dilute sulphuric acid and heat, digitaliretin loses four molecules of water, and becomes dehydrated digitaliretin, which gives—

C	72·289
H	8·434
O	19·277
	100·00

This is the last stage of the decomposition of digitalin. Its formula is, $C_{30}H_{21}O_6 = C_{30}H_{25}O_{10} - 4\,HO$. It approaches closely the true resins in its large proportion of carbon. It melts at 60° C., has an acrid taste, is insoluble in water, and soluble in ammonia, ether, and alcohol; whilst digitaliretin ($C_{30}H_{25}O_{10}$) commences to melt at 169° C., is insoluble in water, ammonia, and caustic soda, slightly soluble in ether, soluble in warm alcohol, and has a slightly bitter taste. It occurs as a glistening crystalline powder, or in nacreous scales. The Germans also call it paradigitaletin.

If soluble digitalin be compared with salicin, it will be seen that there is a great resemblance between the two bodies: one molecule of soluble salicin by the loss of two molecules of glucose being converted into saligenin, much less soluble, and this by the loss of two molecules of water becomes insoluble saliretin. Moreover, salicin combines with bases, and the author has obtained a digitalinate of soda perfectly crystallized in a radiate form.

If the composition of the crystallized digitalin of MM. Homolle and Nativelle, be compared with that of digitalin, it will be seen that they have nearly the same centesimal composition.

	Homolle and Nativelle's crystallized digitalin.	C. Kosmann's digitaliretin.
C	62·08	63·225
H	8·23	8·414
O	29·69	28·361
	100·00	100·000

In fact, it is intermediate between insoluble digitalin and digitaliretin. For instance, if one molecule of insoluble digitalin and two molecules of digitaliretin be taken ($= C_{42}H_{33}O_{18} + 2C_{30}H_{25}O_{10}$), a mixture is obtained which has the centesimal composition—

C	61·261
H	8·308
O	30·431
	100·000

closely approaching that of the crystallized digitalin of MM. Homolle and Nativelle. If one molecule of the former and three of the latter be taken the mixture will contain in 100 parts—

C	61·682
H	8·411
O	29·907
	100·000

The author therefore considers it possible that the crystallized digitalin of MM. Homolle and Nativelle is a product which has already undergone partial alteration by the multiplicity of the manipulations. He further thinks it important that in medicine the soluble or insoluble digitalin, as obtained by the ordinary methods, should be adhered to, that product being very efficacious.

As to the digitalin of M. Nativelle, the author is induced to believe that it is far from being sufficiently pure for an elementary analysis. It gives for 100 parts—

C	54·72
H	9·22
O	36·06

These figures indicate no rational formula; divided by their equivalents they give $C_{18}H_{18}O_9$. If the centesimal figures were—

C	55·26
H	7·89
O	36·85

it would follow that this body was identical with the before-mentioned soluble digitalin, but the analysis of M. Nativelle gives considerably too much hydrogen.

In conclusion, the author considers himself justified in asserting that it is the soluble digitalin which is primarily elaborated by the plant, and which yields by decomposition the other above-named products.

PERCOLATION.

BY J. B. MOORE.

The following remarks upon Percolation are appended to the author's paper on Extract of Guarana, an abstract of which was given at p. 462:—

The powder, after being moistened for percolation should be passed through a sieve previously to packing, in order to break up any little lumps or aggregations that may be formed by the moisture. The sieve not only finely and uniformly divides the powder again and restores it to the *most perfect* condition for packing, but it also removes any portions that are imperfectly powdered or any accidental impurities.

Any one who has never tried this plan will be surprised at its advantages, and will sometimes be astonished at what the sieve will remove from powders that were apparently perfectly uniform and pure. Of course, the sieve employed for this purpose must not be too fine. For powders ranging from No. 40 to 80, about a No. 20 sieve will answer, and for coarser powders a coarser sieve in proportion.

Inexperienced operators are recommended in percolating powdered substances with which they are not familiar, or have not treated for some time, first to moisten only a small portion of the powder, pack it according to their best judgment, and pour upon it a small portion of the menstruum, just sufficient to see how it enters the powder. The unabsorbed portion should then be returned to the remainder of the menstruum and the moistened powder should be returned to the remainder of the powder, and thoroughly mixed with it before the addition of more menstruum. By this means a correct idea can generally be formed how the whole of the powder should be packed. It is important, however, not to take too much of the powder for these experimental trials, or the moisture absorbed by it may make the reserved portion of the powder, when mixed with it, too moist for correct packing. This simple expedient may often save the operator much vexation, and even *entire failure*, in important operations in making fluid extracts.

Many pharmacists are in the habit of using a stick or other instrument with which to stir the powder as the menstruum is added, as though contact with the substance would prove fatal. By this dainty method of manipulation, powders are often very irregularly and imperfectly moistened, and a much longer time is consumed in the operation than would otherwise be required, resulting, in hot weather, in a considerable loss of menstruum by evaporation. In this way, too, the powder is often left, full of lumps or masses, with some portions too moist, others too dry, and the whole in a bad condition for packing. The fastidious man who is afraid of soiling his hands in the legitimate operations of the laboratory or the dispensing counter, would be quite as likely to make a good blacksmith as a good pharmacist. This is rather a homely simile, but it is nevertheless a very expressive one.

It is one of the essential points in successful percolation to have the powder in just the right condition for packing, both as regards state of moisture as well as state of division. This can be most thoroughly and satisfactorily accomplished by rubbing the powder between the hands, as the moisture is added, and working it not unlike the practical housewife does her flour in the first part of the process in making bread. This thorough intermixing and rubbing uniformly and equally distributes the moisture, and also, in a measure, breaks up the lumps and little aggregations which often form in such powders when moistened. It is only by means of this kind of treatment, and the subsequent use of the sieve, as recommended above, that powders can be brought to that perfectly uniform condition so essential for correct packing for percolation.

When operating with substances which contain much colouring matter, such as the cinchonas, red saunders, etc., it will be well for the operator to wear a pair of india-rubber gloves, which will be found exceedingly useful to protect the hands in many operations of the laboratory.

In packing the powder in the percolator the author, when practicable, always uses the back of his fingers held firmly together; he can thus, by direct touch, know how much pressure he is using, and can regulate it with greater accuracy.

In packing, special attention should be given to the quantity of powder that is added to the percolator at a time, as well as to the amount of pressure used. In all ordinary operations the powder should be packed in small portions at a time, in strata of not more than from a quarter to a half inch in thickness. Many operators are in the habit of introducing the whole of the powder into the percolator at once, which is a great mistake, as then the mass receives the maximum of pressure at the very point at which it should receive the least, and that is at the top.

For several years the author has adopted the plan, especially when operating with a large quantity of any substance, to gradually diminish the pressure in packing as he nears the top, as it is the lower portions of the powder that are likely to escape thorough exhaustion. The upper portions have always the advantage of contact with the menstruum before its solvent power has become enfeebled, as it gradually does in its descent, so that when it reaches the extreme lower portions of the mass this power is almost entirely exhausted.

In cases where a preliminary maceration is considered necessary, and especially when the substance under treatment is of a tough, compact, and impenetrable nature, it is recommended that that portion of the menstruum with which the powder is moistened be previously heated, which can be easily done in a few minutes in a stone or tin vessel, or in a bottle tightly corked and placed in a water-bath. The maceration should also be conducted in a warm place.

The power of heat to expand vegetable tissue when moist, and to augment the power and energy of solvents, is well known; by its aid, when judiciously managed, the pharmacist may, in his manipulations, often greatly shorten tedious and lengthened processes.

It will generally be found necessary to moisten powders that are intended for preliminary maceration more than those intended for immediate percolation; otherwise they are apt, during the process, to become too dry for packing without afterwards being remoistened.

A NEW POULTICE.*

The time-honoured linseed-meal poultice seems to be about to be superseded by as cleanly and efficacious a substitute as the Rigollot papers which have so recently displaced its old companion-in-arms the mustard-poultice. M. Lefort, reporting to the Académie de Médecine on a new form of cataplasm invented by M. Lelièvre, speaks in the highest terms of its excellence. It is prepared by saturating two superimposed layers of wadding with a solution of *Fucus crispus*, and drying them in a stove after they have been submitted to strong pressure. In this way a sheet of the consistence of cardboard is produced, a portion of which is cut off when wanted, and soaked in hot water for fifteen or twenty minutes; this swelling it out and filling its tissue with a mucilaginous fluid. It has been tried in several of the hospitals to the great satisfaction of both patients and attendants. It can be prepared in large quantities beforehand, as when it has once been dried it will keep for a long time without undergoing any alteration.

M. Gosselin said that he had tried this cataplasm, and could speak as to its utility. When covered by an impermeable tissue, it does not dry up like other poultices, and especially it does not slide off from the part on which it is put, being sufficiently adherent to prevent its becoming displaced. M. Verneuil said that he had used it for several months in his wards, and had found it a most convenient application, for it can be cut and fashioned into any form or size desired. After being swollen out by soaking in warm water, it may remain in that state for twelve, eighteen, or even twenty hours; and after twelve hours it is as fresh as when first put on; so that it does not require renewal every five or six hours, like linseed-meal. It does not give rise to any bad smell, becoming at last only slightly acid. It neither softens nor crumbles; and as it does not soil either the parts or the linen, etc., it comes in contact with, it secures an amount of cleanliness that is of great importance. It is also economical, as it enables compresses and poultice-cloths which are so often badly washed and badly whitened, to be dispensed with. This latter point is also of importance as regards preventing the infection of wounds. M. Larrey believes that this emollient *fucus* is likewise to be of valuable service as a cataplasm in military service for hospitals and ambulances, by reason of its ready transport and facility of conservation. M. Demarquay, who has frequently employed these cataplasms, agrees with M. Larrey that they will prove very useful in ambulances, taking up so little room and keeping so well. M. Leroy de Méricourt believes that these cataplasms will be of great service in the navy. On board a ship it is usually impossible to wash poultice-cloths, while, as linseed-meal cannot be preserved, poultices have to be made of biscuit-dust, which produces very bad poultices. The inventor is of opinion that when his cataplasms are produced on a large scale they will be cheaper than linseeed-meal poultices.

THE JALAP PLANT.†

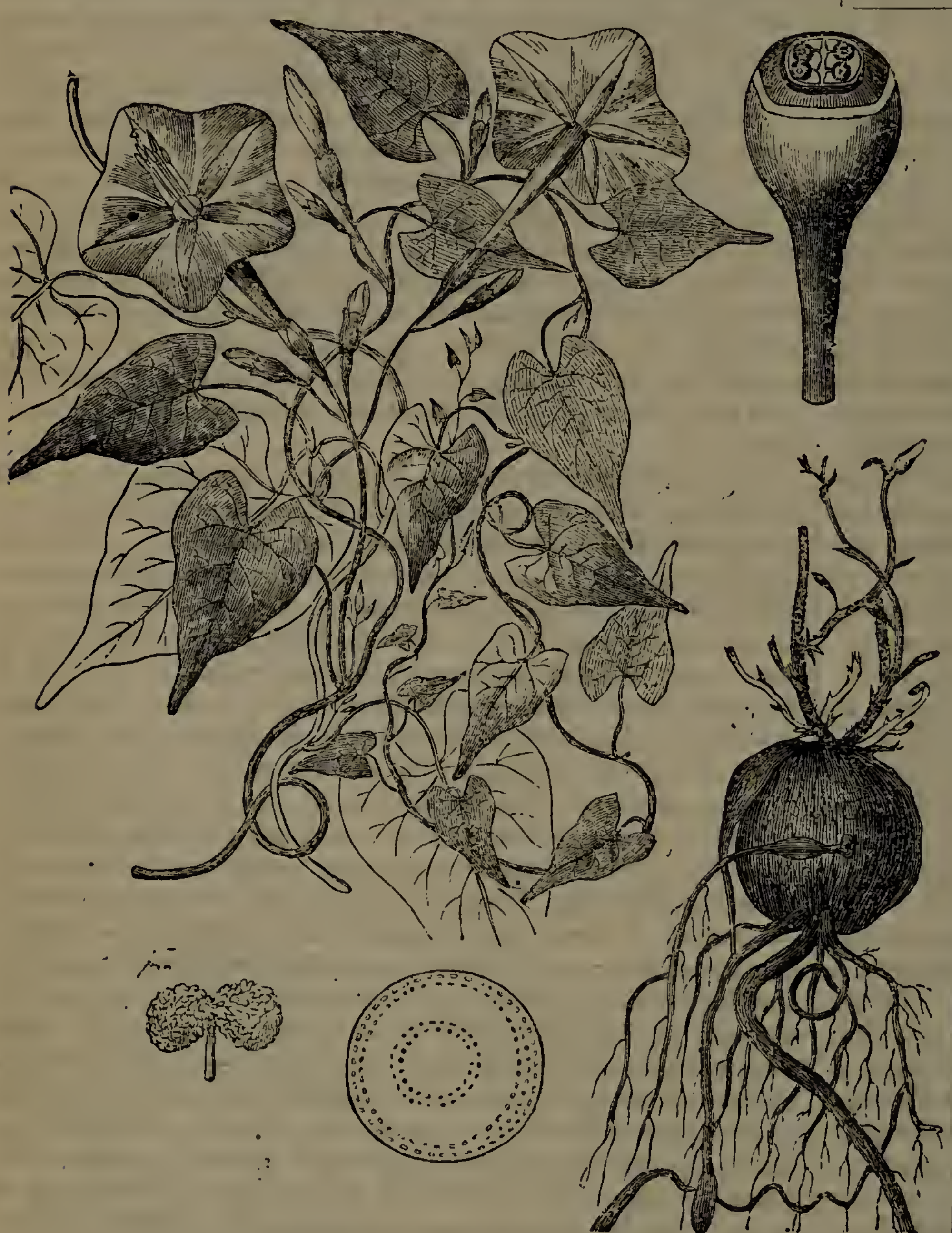
(*Exogonium purga.*)

Of all autumn-flowering hardy plants, there is, perhaps, none more beautiful than the Jalap (*Exogonium Purga*). Of its complete hardiness there can be little doubt. It has

* From *The Medical Times and Gazette*.

† Reprinted from the *Garden*, to the publisher of which journal we are indebted for the use of the woodcut.

lived at Bitton without any protection for four years, and each year it has flowered beautifully. We have also heard of its doing well at Drayton Beauchamp, Kew, and Fulham. We believe it has also lived out of doors, and flowered, in the Edinburgh Botanic Gardens. Mr. Ellacombe grows it in a sheltered corner, and gives it a tall wire cage to grow up, with a spreading top. It does not flower in the lower parts; but the entire top, and the pendent shoots, become a mass of most lovely blossoms. At Bitton, if not checked by late spring frosts, it comes into blossom early in September, and continues to flower till cut down by frost. Mr. Ellacombe states that, if he were to plant another, he should place it under a south wall near a peach or apricot tree, and let it wind its way through the branches. With a very little training, it would do no injury to the tree; and, in such a situation, it would probably flower earlier, and perfect its seeds. As regards its history, it gets its name of jalap from its native habitat, Xalapa, in Mexico. It is the true jalap of commerce; by which is not meant that it alone produces genuine jalap, but that it is *the* plant that gives the name to the medicine. The best jalap is made from the *Exogonium*; but good jalap may also be got from many other species of the *Convolvulaceæ*—even from our British species. "*Convolvulus arvensis, Soldanella, macrocarpus*, and probably many others, may likewise be used with nearly equal advantage," says Dr. Lindley. The habit of the plant is well given in the *Botanical Register*, v. 33; but the colour is not bright enough. It is also figured in the *Botanical Magazine*, v. 73. Can any one say if *Convolvulus* (*Batatas*) *Jalapa* is in cultivation, and if it has been found to be hardy? *E. purga* has, as will be seen, roundish tubers of variable size, those of mature growth being about as large as an orange, and of a dark colour. These, as we have said, are the true jalap tubers.



Leaves, flowers, fruit, root, &c., of the Jalap plant.

With reference to the foregoing question as to *Convolvulus Jalapa*, Mr. J. Tyerman, of Torquay, writes to the *Garden* as follows:—"There is a plant of it in the Botanic Gardens at Liverpool, where it has been for the last fourteen or fifteen years, growing on a bed of gravel, the roots being about the size and shape of the double Cocoa nut. I do not think it has ever been tried in the open ground; perhaps the curator (Mr. J. Richardson) will possibly act on the suggestion, and give it a trial, and report the result. *Exogonium Purga* matured seeds with me this season for the first time; these are now in the hands of Mr. Thompson, of Ipswich, and I have no doubt that it has done so, and much more freely, in the College Botanic Gardens at Dublin, where both Mr. Ellacombe's and my own plants originally came from, nine or ten years ago. Both the Jalap and the Scammony grow luxuriantly with me, and I originally intended to recommend their cultivation on a large scale in this country for medicinal purposes; but I find that although they grow freely, and produce, like the common Bindweed, abundance of fleshy root-stems, from which they may be readily increased, they produce but slowly the tuberous roots from which the active property is extracted, and those are very deficient in resin, compared with prime imported samples. Judging from my short experience, it would require from four to six years to fully mature a crop, which would render it impossible in this country."

ZYMOTIC POISON.*

BY J. DOUGALL, M.D.

(*Concluded from page* 526.)

Dr. Bastian, in his experiments in proof of spontaneous generation, used various strong infusions, chiefly of hay and turnip, these being highly suitable for the existence of bacteria, etc. A portion of the fresh infusion is put into a flask and boiled for ten minutes, so as to destroy any minute organisms present, these being killed by a temperature of 212° Fah. During ebullition the neck of the flask is heated and hermetically sealed by the blowpipe, the bending inwards of the red hot glass showing a partial vacuum within. The bulb of the flask is then immersed in a water-bath, maintained at a temperature of 80° to 95° Fah. The result is that in the great majority of cases, after the lapse of some hours or days, the fluid becomes more or less turbid, and when examined by the microscope is found to contain bacteria and other allied forms. Dr. Bastian says he has taken organisms from flasks that had a few weeks before been hermetically sealed and heated for a variable time to temperatures ranging from 260° to 302° Fah. He therefore concludes, and I think fairly, that these organisms must have arisen *de novo* from the fluid in the flasks. Now, here are two theories equally striking, and both founded on experimental evidence, and while it is difficult to arrive at any other conclusion from Dr. Bastian's experiments than that life may spring from dead matter, there is also some difficulty in rejecting those of M. Pasteur, which, he thinks, prove that all life is derived from previous life. Possibly microzymes arise *de novo*, and also propagate biogenetically. The fact, however, remains that minute organisms are present in all putrefying solutions, whatever way they get there, and while the germ theorists assert they are the cause, there are others who maintain they are the result of putrefaction; the former also consider their *rôle* as malignant, and the latter as benign. The chief points

* A lecture delivered before the Glasgow Chemists and Druggists' Association.

adduced to show that bacteria, etc., are the cause of putrefaction, and fungi the source of many plant diseases, are—1st, Their presence in all putrefying fluids. 2d, Their absence in all fluids not putrefying. 3d, It is asserted that many diseases both of animals and plants are caused by living organisms, such as animal parasites and fungi. The opponents of this theory hold that these organisms are the result of the conditions of their habitat, and their concomitants. 1st, Because whether bacteria or fungi, they are only found on the parts of animals or vegetables with lowered vitality, or in their dead tissues. 2d. By increasing the vitality, or antisepting the dead tissues, they disappear. 3d, Contagious virus is destitute of the qualities of any known vegetable or animal parasites. 4th, No specific virus can be made to yield any specific organism. 5th, When microzymes appear in infective matter it ceases to infect. The first set of these propositions imply that the functions of microzymes are hurtful, while in the second set a benign *rôle* is attributed to them, and I think rightly. Professor Owen, with that wide grasp of intellect which marks all his works, and in that ornate diction with which he clothes all his conceptions, tells, in regard to the uses of infusoria, what may well be called "a fairy tale of science." "Consider," he says, "their incredible numbers, their insatiable voracity, and that it is the particles of decaying vegetable and animal bodies they are appointed to devour and assimilate. Surely we must in some degree be indebted to those ever-active invisible scavengers for the salubrity of our atmosphere. Nor is this all. They perform a still more important office in preventing the gradual diminution of the present amount of organic matter upon the earth; for when this matter is dissolved, and suspended in water in that state of comminution and decay which immediately precedes its final decomposition into the elementary gases, and its consequent return from the organic to the inorganic world, these wakeful members of nature's invisible police are everywhere ready to arrest the fugitive organized particles, and turn them back into the ascending stream of animal life. Having converted the dead and decomposing particles into their own tissues, they themselves become the food of large infusoria and of numerous other small animals, as the rotiferæ, which in their turn are devoured by larger animals, as fishes, and thus a pabulum fit for the nourishment of the highest organized beings is brought back by a short route from the extremity of the realms of organic matter." It would take too much time to discuss this part of our subject further. The points I have noticed are among the chief ones of the germ theory, and I consider there is a large balance of evidence proving that bacteria and fungi in dead matter, also the various animal and vegetable parasites of living organisms, are absolutely non-zymotic, the result and not the cause of the morbid conditions of their habitat; a similar conclusion having also been recently arrived at, by a commission appointed by a foreign government to inquire into the cause of the grape disease.

I now come to consider the physical theory. This theory, first propounded by Liebig, regards putrefaction as "a transformation or new arrangement of the atoms of a compound yielding two or more new groups, and caused by contact with other substances, the elementary particles of which are themselves in a state of transformation or decomposition. It is a communication, or an imparting of a state of motion, which the atoms of a body in a state of motion are capable of producing in other bodies, whose elementary particles are held together only by a feeble attraction."

Now, according to this view, that which is intercepted by the cotton-wool, and the bent tubes of the flasks already noticed, are not microzoa, but portions of dead organic matter in a state of transformation or decomposition, and these exist everywhere in the atmosphere near the earth's surface. In a pencil of solar rays entering a dark room by a hole in the shutter, myriads of floating particles are seen, which have been proven organic. Professor Tyndall has imitated this phenomenon very successfully in a beautiful experiment. A powerful beam of electric light is shot across a darkened space which shews the air to be a mere stirabout of extremely minute particles. If a person breathe directly into this light, the particles are much agitated and increased for the time. But if the breath be blown upon it through a tube with one end covered by cotton-wool, or if a red-hot iron ball be held close below it, in the first instance a black band cuts the beam in two where and when the breath meets it; and, in the second place, one or more inky fluctuating zigzag blots appear and disappear transversely in the beam immediately above the ball. Professor Tyndall has satisfactorily demonstrated that optically pure air is black, and these bands and blots are considered as such. Air from the lungs and the air of a room contain particles of watery vapour, and of organic matter. When the breath is blown through cotton-wool, it arrests them, while those floating above a red-hot ball are rarefied and burnt. Hence the transient black bands and tortuosities in the electric beam. Now, I have frequently examined, microscopically, the cotton-wool used in Pasteur's experiments to filter these particles, and although a very few bodies resembling sporules and diaphanous cells were found, yet the greater quantity of the particles adhering to the fibres were polymorphous, or amorphous, opaque, or semi-opaque, with ragged edges, and of various sizes, and presenting no signs of organization, and all the aspects of organic *débris*.

Believers in the physical theory thus hold that putrefaction is not caused by, and zymotic poison does not consist of, living germs. They contend that putrefaction, as stated, is propagated by contact with minute portions of putrid matter, which also is the mode of multiplication, and the form assumed by zymotic poison, whether it be expired from the lungs, exhaled from the skin, or ejected from the bowels. They, moreover, concede that each communicable disease has its specific poison, but deny that the poison causes disease by an inherent self-reproductive power. Zymosis, they consider, is continued from person to person by the virus imparting its condition to individuals, which contain in themselves that which is capable of being changed into the poison. Perhaps the most feasible enunciation of the physical theory is that of Dr. B. W. Richardson, of which the following are among the chief points:—"Zymotic poisons are organic products derived from the secreted fluids of the body, so that a zymotic patient is poisonous precisely as a cobra di capello is poisonous; he is secreting virus, which, by contact with a healthy person, may cause disease. As each secretion of the body in its healthy state has specific properties so each in its diseased state acts as a specific poison, and, from its local position when thus acting, peculiar local symptoms are set up characteristic of the disease. There is thus a different secretion forming a pabulum for each poison, one for small-pox, one for scarlatina, and so on, the one virus not thriving on the food of its neighbour, but electing its own secretion. This is said to explain why one poison does not produce the symptoms of another. According to the germ theory each zymotic case yields an enormous number of germs, all of which retain their vitality amid extreme temperatures, so that the wonder is the world is not depopulated with them. But the physical theory places zymotic virus under the same atmospheric influences as other organic matter, whereby it is soon reduced to elementary forms. Hence the dead are not contagious, and epidemics cease." Dr. Richardson also considers that zymotic poison may, under certain mal-hygienic conditions, arise, *de novo*, in the secretions, from which effects follow precisely as though it had been introduced into the body; and attributes the immunity from, or tendency to, zymotics at various ages to a constitutional or physiological peculiarity of secretion; and the non-recurrence of the same disease in the same person to the elimination of particles in a secretion susceptible of zymosis.

It seems to me strong proof in favour of the physico-chemical theory that certain epidemic distempers—sweating, sickness, plague, and black death, have ceased to be. It may be mentioned that during one night in London the plague caused 4000 deaths, and in one week 12,000. If these depended on germs, whither have the germs gone? and, moreover, where were the germs of cholera previous to its appearance on the Ganges' Delta? I think it more likely these diseases did not arise from germs at all, but from putrid poisons generated, *de novo*, both in and out of the body, but chiefly the former, from abounding decomposing organic matter, the deplorably filthy habits of the people, and their abject ignorance, and systematic violation of the laws of health, and were propagated also in accordance with the physical theory. Further, as their extinction is unquestionably due to increased knowledge and improved sanitary conditions, may it not, therefore, be reasonably expected to exterminate scarlatina, typhoid, and their allies, by the same means, as it seems to me highly probable they arise and disseminate in a similar manner.

But still we have to consider the important question, What is the specific nature of zymotic virus? Be it living germ, putrid particle, or vitiated secretion, if it be at all tangible, what does the microscope or test-tube say about it? Briefly, it must be admitted, that all the most refined and ingenious methods of research, as to the presence or properties of the mineral and vegetable poisons, physical, physiological, toxicological, or antagonistic, afford but a tantalizing, yet withal, encouraging glimmer of light, when applied even to reveal the presence, let alone unmask the specific *zymes* of zymotic virus. But most of the great discoveries of science, now shedding their benign rays over the whole earth, appeared at first like the phosphorescent scintillæ on the abdomen of the glow-worm under the hedge. So may this feeble glimmer, probed by constant experiment, and fanned by the breath of increasing knowledge, flame into radiant, far-reaching, and enduring shafts of intellectual light.

The proximate infecting principle of one of the most virulent of the zymotica, viz., the lymph of small-pox, is easily procured, and in sufficient quantity for examination. This substance, also cow-pock lymph, is fluid, translucent, odourless, alkaline, and coagulable. Under the microscope both are found to contain numerous particles about 1-20,000th of an inch in diameter. By an ingenious application of the law of diffusion of fluids, M. Chauveau and Dr. B. Sanderson managed to separate the particles from the fluid parts, and it was found that a child may be vaccinated or innoculated successively with the fluid, but without effect, while the minutest portion of the solid parts that can be separated is sufficient to originate all the phenomena of cow-pock, or of variola. Now the specific virus of the other zymotic diseases, such as scarlatina, typhoid fever, etc., has not yet, in reality, been isolated; but it may be safely predicated that if they too contain particles, these must be smaller than a blood-corpuscle, that is less than the 1-4,000th part of an inch, because if larger, or of equal size, they could not penetrate the membrane of the lung cells when inhaled, nor the vascular tunics when swallowed, to pass into the circulation, as what keeps the blood corpuscles in, must keep particles larger, or of equal size, out. But, supposing these contagia to consist of minute entities of putrid amorphous matter, then they need not be so small as a blood corpuscle, because mere contact with the pulmonary membrane, or any moist absorbing surface of a susceptible organism, would be sufficient, in accordance with the physical theory, to initiate zymotic phenomena conformable to the nature of the primary contagium.

At present it must be confessed, as already stated, that of what the infecting principles of zymotic contagia consist, no one knows! The discovery that the particles in vaccine and variolous lymph are the essential virus of these substances, is one of the golden grains of fact that has been washed out of the worthless sands of hypothesis, but as regards their particular constitution, again the sum of our knowledge is, no one knows! Furthermore, the splendid discovery of Jenner of the protective influence of vaccination has, as you know, enshrined his memory in imperishable characters on the escutcheon of science, and excited the wonder, admiration, and gratitude of the civilized world. But why the particles of vaccinia prevent the development or generation of the particles of variola, the sum of our knowledge again is, no one knows!

I cannot avoid mentioning here that previous to Jenner's discovery, nay, for some time after he had made it known, and while he worked on crystallizing his sublime idea, imbued with the true spirit of a philosopher, nathless for the drenching shower of epigrams, and lampoons, and caricatures of men with cows' heads, directed against it, in Europe alone, 400,000 persons were dying annually from small-pox, while the same number were disfigured from its effects. At present the mortality from this disease is approximatively only about a fifteenth part of what it was before the introduction of vaccination. It has been well said that he who disputes the benefits of vaccination is as unreasonable as he who opposes in like manner any proposition in Euclid.

Regarding the origin and phenomena of zymotic disease, a recent writer observes: "The more we reflect on the life history of contagion, the more puzzled we become; the more we reach after this subtle poison, the further it seems from our grasp; the more carefully we lay hold of one fact after another, the greater number of new facts spring up, mushroom-like, before us."

In conclusion, as your profession is closely allied with medicine, it is likely some of you may become medical practitioners. To those I would say, then you will frequently find yourselves wrestling in hopeless conflict with this terribly unequal antagonist. The learned, illiterate, rich, poor, young, old, it spares none of them. Then, often amidst the entreaties of children to save a parent, or parents, their children,

"Before zymosis' fevered fingers
Hath swept the lines where beauty lingers,"

you will realize how contemptible and impotent are all your powders and potions, and numerous devices to thwart, in the smallest degree, the fatal issues of these protean maladies; and baffled and beaten, wish in your inmost heart for another Jenner—a Jenner of the nineteenth century—who by some weird alchemy will charm and chase away for ever those dismal death's-head shadows that, with leperous wings distilling poison, are constantly swooping unseen and noiselessly upon us, darkening our homes and desolating our hearths, ruthlessly lacerating the tenderest ties of human sympathy, and cruelly strangling the fondest hopes of human love.

EXTRACT OF LITMUS.*

BY J. MARTENSON.

The colouring matter of litmus, when purified as much as possible, may be kept for an indefinite period unaltered in glycerin. Litmus is treated with hot water, and the solution, after concentration, is mixed with a sufficient quantity of alcohol (of 80 p. c.) to precipitate the colouring matter. After standing for twenty hours the alcohol is poured off, and carries with it a dirty blue foreign substance which frequently occurs in litmus, and is not altered by acids. The sediment is treated with hot water, which dissolves it on account of the potassium carbonate which is present. To remove this carbonate, sulphuric acid is added till the liquid assumes a faint wine-red tint; it is then heated to boiling for a few minutes, and again rendered blue by the addition of a few drops of lime water. After the lapse of twenty-four hours the liquid is filtered and evaporated to a syrup, and left all night in a cool place, when the potassium sulphate crystallizes out in the form of a crust. It is then filtered through moist cotton, mixed with glycerin, and carefully preserved from damp.

* *Journal of the Chemical Society*, from the Chem. Centr., 1874, 460.

The Pharmaceutical Journal.

SATURDAY, JANUARY 9, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

LEAD IN LEMONADE.

SHOULD Mr. THOMS, who has devoted so much time and acumen to the task of proving centenarians to be mythical, ever fall short of evidence, he might take the ground that, according to modern discoveries, a man ought to be done to death by poison over and over again, long before he attains the age of one hundred years. In fact, the revelations of sanitary commissioners, and analytical commissioners, and public analysts, *et hoc genus omne,* are sufficient to make any man, who possesses only a moderate amount of assurance, ashamed of having lived the allotted three score years and ten. Surely, even the sons of the prophets had not more reason to call out "There is death in the pot!" than a nation of which 10,000,000 suffer annually from zymotic poisoning and 100,000 die; whose bread is made indigestible by alum; who swallow iron with their tea, cocculus indicus with their beer, copper with their pickles, and chalk with their scammony; who have their milk and babies' foods rendered useless by dilution, and their mustard poultices ineffective by flour; and who cannot even drink a bottle of lemonade or soda-water without swallowing a poisonous dose of lead.

We are far from undervaluing the work of those who during recent years have so usefully attracted the public attention to the public health; nor do we think that the sensational manner in which it has been sometimes done has been altogether without its uses. But as regards the pseudo-science which is with this object sometimes thrust upon the public, there is a danger of its influencing a wider sphere, and affecting the opinion of scientific men to the weakening of the public faith in their conclusions.

In this respect we have more than once seen with regret a tendency on the part of public analysts to allow popular beliefs so far to interfere with their judgment as to induce them to confuse facts with conjectures in their official evidence. Thus, for illustration, some time since a plausible demonstration before a magistrate led to an assumption of the presence of iron filings in tea; and the rut being once established, it was followed by analysts in their certificates until there was cause for wonder as to the possible source of all the filings. Then, in a case where analysts were more numerously represented than usual, there came the collapse, and it became pretty manifest that though iron was present, it was in another form that pointed to another continent as the source of the adulteration. It cannot be denied that damage was thus done to the reputation of public analysts which might have been avoided, while the adulteration would have been equally demonstrated had the certificates and evidence simply testified to the presence of iron in the tea.

An article in our columns this week taken in conjunction with a note published about two months since (p. 339), suggests a fear that a similar *faux pas* has been taken with respect to the origin of lead found in lemonade. A few months ago the public attention, which had been aroused by paragraphs respecting the action of water on leaden pipes, based on some communications to the French Academy, was further stimulated by certain excusable vauntings of the advantages of natural aërated waters over those artificially aërated. This was followed by the discovery that aërated waters containing injurious quantities of lead were actually being sold, and the public were informed that this lead was dissolved from the apparatus during the process of manufacture. Prosecutions under the Adulteration Act have followed, and we think it is to be regretted that the certificate of the known fact that lead had been found has been complicated by an equally strong assertion that it was derived from the apparatus. Of the three cases reported during the last fortnight, the admissions of the defendants in the two respecting soda water favour the probability of this assumption. But in the lemonade case (p. 515) there is a manifest difference. There the defendant asserted—and this was not denied—that he had caused all the lead to be removed from the apparatus, and replaced by block tin. Admitting the correctness of the analysis, he evidently disputed the correctness of the inference respecting its origin. We do not say that in this he was right; but it is curious that Mr. EKIN's communication points to the possibility of his being so. Mr. EKIN's discovery of the presence of lead in commercial citric acid confirms what had already been stated by Mr. REICHARDT, who also found it in citrate of magnesia. That the method of preparing citric acid allows of this contamination is evident. That it has not attracted more attention may be accounted for by the fact that pharmacists are supplied with an article supposed to answer the Pharmacopœia tests, which guard against the presence of lead. On the other hand, it may be that the maker of aërated waters has sought for a cheap rather than an absolutely pure article. It is obvious, however, that it behoves pharmacists not to take it for granted that the citric acid they receive is always free from lead.

Of course, whether lead in lemonade owes its origin to the leaden pipes of the apparatus, or to the citric acid used in its manufacture, it is equally an adulteration, rendering the seller or manufacturer liable to penalties under the Adulteration Act. But what we venture to suggest to public analysts is, that they should rest satisfied with this fact, and not risk injuring their position in the public esteem by unscientific speculations.

THE SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

USEFUL as a Conversation Room may be for many purposes, it is evident that the desultory talk uttered there, even if it be on educational topics, can have but a limited influence in the systematic acquirement of knowledge. It is therefore satisfactory to note, in the report of the Council Meeting on Wednesday last, evidence that the students at Bloomsbury Square are not disposed to "rest and be thankful" at this stage, and that they have confidence in the desire of the Council to assist them in every possible way in their studies. We understand that the "School of Pharmacy Students' Association," referred to on p. 554, has been formed to promote the study of chemistry, pharmacy, botany and allied branches of knowledge among the members, by the reading and discussion of papers, or verbal communications on these subjects, of an educational rather than original character, at weekly or fortnightly meetings in the Society's House during the session. A code of rules has been drawn up, in which it is provided that past and present students of the School may become members of the Association upon the payment of a small annual subscription. Provision for carrying on the Association from year to year is effected by making the President, who is also to be an officer of the School, a permanent officer; the other officers are to be elected annually. We also note that no alteration in the rules is to be made without the sanction of the Council of the Pharmaceutical Society. Professor ATTFIELD has kindly lent the weight of his name to the young Association by becoming its first President. The Secretary and Treasurer is Mr. JOHN MORRIS BROAD, Hornsey Rise, London, N., to whom communications from past and present students desirous of becoming members should be addressed.

A NEW VARIETY OF SENNA.

WE understand that there is now in London a very large quantity of a drug which is being offered as fine senna. It may be distinguished from officinal senna by the peculiar arrangement of the veins of the leaf. Instead of having one central vein, with all the others branching from it, as in senna, the leaves of this variety have two or more prominent veins starting from the centre of the base of the leaf, and these are repeatedly forked in an almost parallel manner. The leaves appear to belong to a species of *Cassia*, and may therefore possess purgative properties. We hope to be in a position to give further particulars respecting this drug in our next issue.

SPURIOUS CHIRATA.

THE admixture of other species of Chirata with the officinal plant has evidently been overlooked for some time, for in two samples in the museum of the Pharmaceutical Society, both of which have been in the collection for several years, the species detected and described by Professor BENTLEY is present to a considerable extent.

THE IDENTITY OF COLLOID ANIMAL MATTER.

IN a lecture on the Pathology of Pectous Changes, recently delivered by Dr. B. W. RICHARDSON, he expressed the opinion that all the variations of colloidal matter present in the body, and known under the different names of fibrin, gelatin, albumen, globulin, casein, and chondrin, are but modifications of one form, induced by combinations between it and water, through the medium of inorganic bases and salines having an affinity for water, which fix it in combination. The purest colloid, which by perfect dialysis is most completely freed from these intermediate substances, is the most easily converted from the soluble into the insoluble pectous form. Fibrin he considers to be, perhaps, the closest approach to the pure form of colloidal matter in the human body, the most free from any such fixing intermediate agent: hence the readiness with which it passes from the soluble into the coagulated or pectous condition.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 6, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Betty, Greenish, Hampson, Robbins, Savage, Sandford, Shaw, Stoddart, Sutton, and Williams.

The minutes of the previous meeting were read and confirmed.

A Member and an Associate of the Society before the year 1842, were restored to their former status upon payment respectively of the current year's subscription and a fine.

The following being duly registered as Pharmaceutical Chemists were respectively granted a diploma stamped with the seal of the Society:—

Cox, William Dennis ....Grantham.
Currie, Robert Kirkwood ......Glasgow.
Flint, Charles Bruce............ ..Glasgow.
Frazer, Samuel McCall............Glasgow.
Knight, Benjamin..................Great Torrington.
Newton, Thornton Albert Claughton...Clapham.
Shapley, Charles ....Torquay.
Stacey, Henry George ,...........London.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Adams, William ....Barnstaple.
Cox, William Dennis ....Grantham.
Currie, Robert Kirkwood.........Glasgow.
Dale, John ....Birmingham.

Evans, Gwilym ....Llanelly.
Flint, Charles Bruce............ ...Glasgow.
Knight, Benjamin...................Great Torrington.
Newton, Thornton Albert Claughton...Clapham.
Shapley, Charles ....Torquay.

Chemists and Druggists.

Gibson, Frederick Turner ......Birmingham.
Lacey, Samuel ....North Brixton.
Pye, John ....Dartmouth.
Smith, Anthony.....................Hull.
Standring, John.....................Manchester.

Mr. Robert Elimelech Read, an Associate of the Society before 1842, was elected a Member of the Society.

ASSOCIATES.

The following, having passed their respective examinations, were elected "Associates in Business" of the Society:—

Minor.

Ballard, Frank Perry ....Wootton Bassett.
Buckle, James ....Malton.
Farrow, Charles Henry ....Islington.
Litchfield, John ....Longton.
Robinson, Joseph...................Stanley.
Smith, Alfred Lambert..... ....Birmingham.
Squire, Thomas ....London.
Westwood, Amos ....Brierley Hill.

MODIFIED.

Carman, John ....Holywell.
McIntosh, James ....Huntly.
Prentice, Charles William ......Portland.
Sutherland, Daniel Dunbar......Totnes.
Taylor, Thomas Charles ....Aylesbury.

The following having passed their respective examinations were elected "Associates" of the Society :—

MINOR.

Baker, John Hopper ....Bristol.
Carrington, Edward Green ....Bakewell.
Crossley, Newbold ....Bury.
Dale, George Edgar ....Colchester.
Davies, John..........................London.
Evans, Evan ....Cardiff.
Evans, Richard.......................London.
Horton, James Alfred ....Aberdeen.
Johnstone, William ....Nottingham.
Kennett, John Nash ....Havant.
Makinson, Thomas ....Hampstead.
Maxwell, James Ashworth ....Altrincham.
Moore, Joshua ....Preston.
Phillips, Frank Leslie ....Birmingham.
Pitchford, William ....Newton Abbot.
Price, Robert John ....Wrexham.
Pritchard, Owen ....Bangor.
Sandwith, William Henry ....Scarborough.
Shepherd, Alexander Moir ....Aberdeen.
Smith, Richard Henry.............Leeds.
Tocher, John... ....Aberdeen.
Wells, Ernest William ....East Dereham.
Wilson, Griffith Phillips ....Merthyr.
Woolnough, Harry Arnold ....Norwich.

MODIFIED.

Bell, Charles Christopher ......Nottingham.
Fields, Cotnam ....Birmingham.
Lewis, Thomas .... London.
Mount, James ....London.
Munn, Charles Henry ....Worcester.
Simpson, John ....Glasgow.
Williams, Thomas...................Chester.

APPRENTICES.

The following having passed the Preliminary Examination were elected "Apprentices or Students" of the Society: –

Adams, Charles.......................Birmingham.
Alcock, Henry .... Coventry.
Andrews, Henry Albert ....Harrogate.
Atkinson, John Thomas ....Boston.
Baker, George Henry ....Southsea.
Bell, Henry ....Newcastle-on-Tyne.
Broadbent, John ....Manchester.
Bunning, Henry .... London.
Carr, John Allen ....Lancaster.
Cocks, Walter James ....Southsea.
Crawley, John ....Wotton-under-Edge.
Crook, Arthur Williams ....Preston.
Elliott, William Alfred ....Bristol.
Fargher, Henry Spencer ....Warrington.
Fox, Frederick William ....Lincoln.
Furness, Joseph Machin ....Liverpool.
Glass, William ....Friockheim.
Gregory, Edward Thomas ......Fulham.
Hart, Arthur...........................London.
Hawthorne, Charles Oliver ......Stafford.
Highmoor, George Samuel ......Leeds.
Holmes, Philip .... Walham Green.
Horrell, Alfred Charles Julian...Dartford.
Ison, Francis...........................Penrith.
Jeffries, Benjamin....................Brixton.
Jenkins, Evan Walter............Lampeter.
Jones, Richard Edward.........London.
Jones, Thomas Mantle............Stafford.
King, John William................Bolton.
Knott, Henry Archer............Walthamstow.
Longstaff, William Luther......Sunderland.
Middlebrook, Joseph...............Sheffield.
Morris, Walter ....Farnworth.
Murray, William Henry ....Surbiton.
Mushens, Robert Heslop ....Sunderland.
McCounal, Allan ....Dudley.
Newton, Arthur James............Dudley.
Opie, Edward Augustus.........Plymouth.
Pain, Arthur...........................Bury St. Edmunds.
Parkinson, Thomas Edmund...Leeds.
Phillips, James Patt...............Bideford.
Pollitt, Joseph Moore.............Radcliffe.
Procter, John..........................Pocklington.
Robertson, James Hay............Long Melford.
Rogers, James Isaac...............North Shields.
Rogers, Oliver ....Upper Norwood.
Rossiter, Thomas Edward ......Tiverton.
Sanderson, Robert Turnbull......Glasgow.
Smith, Joseph ....Sneinton.
Spilsbury, James ....Stafford.
Stevens, James Jesse Williams...Strood.
Taylor, Frederick Gordon ......Bristol.
Taylor, Philip Neville ....Tipton.
Tipping, William Thomas ......London.
Troughton, Henry ....Lancaster.
Villar, Arthur ....Staplegrove.
Walkley, James Byron............Bollington.
Welford, Richard ....Blackburn.
Wells, Albert Charles .. ..Leamington.
Wilkinson, William Halse ......London.
Williams, David ....Pembroke Dock.
Williams, Edwin ....London.
Williams, John Henry.............London.
Williams, John Thomas C.......Dolgelly.
Windmill, William Henry ......Barking.
Wright, Edward Goddard ......Doncaster.

The name of Alfred George Annette, of 65, Charing Cross, London, S.W., was ordered to be restored to the Register of Chemists and Druggists.

FINANCE.

The report of this committee having been read, a discussion arose with reference to the financial position of the Society, more especially with reference to the future sources of income. No resolution, however, was brought forward, and the report and recommendation of the committee were unanimously adopted.

BENEVOLENT FUND.

The report of this committee recommended the following grants :--

£15 to the widow of a late member of the Society, at Devizes, having three children, and being in delicate health;

£5 to a chemist and druggist, carrying on business in a small village in Gloucestershire, embarrassed by the expenses attending the last illness and funeral of a relative who was dependent upon him, and who had also been a chemist and druggist ;

£10 to a registered chemist and druggist, formerly in business, but who had been for some time out of employment. Since the receipt of the petition, applicant had obtained a temporary situation as dispenser, but had to support his wife and four children in separate apartments.

Another application from the widow of a chemist was deferred for further consideration.

The above recommendations were unanimously adopted.

LIBRARY, MUSEUM, AND LABORATORY.

At the recent meeting of this committee the librarian reported that he had sent a list of the duplicate books in the library to the secretary of the North British Branch, who had returned a list of those not in the Edinburgh library, and the committee now recommended that copies of such books should be forwarded to Edinburgh. A copy of Pereira's Materia Medica, edited by Professors Bentley and Redwood, was recommended to be purchased for the library. The attendance in the library during the last month had, on an average during the day, been 15·6 ; evening, 7. The number of books circulated during the month had been 126 in London, 40 in the country. A donation had been received from the East India Museum, through Dr. Forbes Watson, of a report by Dr. M. C. Cooke, on the gums, resins, oleoresins, and resinous products, in the India museum, or produced in India.

In consequence of an arrangement made by the House Committee that the room adjoining the library should be opened for the use of the students at five o'clock, the committee had ordered that the library should not be closed from 5 to 7 o'clock p.m., as hitherto. The curator reported that the first two sheets of the catalogue of the museum had been revised by Mr. Daniel Hanbury and Professor Bentley, and were now ready for the press. Estimates had also been obtained for printing the same.

Professor ATTFIELD had reported that 60 students had entered the laboratories since the commencement of the session : 48 being now at work.

The following books had been presented to the library through Professor Attfield, by their author, Dr. Beale :—

'How to Work with the Microscope.'

'Protoplasm; or, Matter and Life.'

'Bioplasm.'

The report was received and adopted.

HOUSE.

This Committee having considered the question remitted to them of appropriating a room for the use of the students, now reported their opinion that there was no room in the house which could be placed at the service of the students during the entire day ; but that they had ordered that the committee room adjoining the library be opened in the evening from 5 to 10 ; and that all persons connected with the Society, and all persons having obtained leave to use the library, should have the privilege of using that room under the supervision of the librarian. This regulation was directed to come into force on Monday, December 14th.

Mr. SANDFORD asked if any use had been made of the room.

The SECRETARY said the room had been open for fourteen evenings ; the highest attendance had been 15 ; average 3·6. On five evenings no one had used the room, namely December 23rd, 29th, 30th, 31st, and January 1st.

Mr. SANDFORD thought this result very satisfactory.

The report was received and adopted.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A memorial was read from a number of the students stating that they had formed themselves into an association for promoting general and pharmaceutical education by reading and discussing educational papers at weekly or fortnightly meetings ; and asking the sanction and approval of the Council to their holding their meetings in the Society's house. A copy of the rules, with the names of the officers, was appended, Professor Attfield being the President.

Mr. HAMPSON thought every facility should be given to the students to form such an association if they conformed to the regulations made for the use of the room ; as to which the Secretary might communicate with them.

Mr. GREENISH said one thing appeared to him rather anomalous. They had just approved of the report of the House Committee, according to which all persons connected with the Society or entitled to use the library were to be admitted to the conversation room, but according to the rules of this Association the members only and their friends were to be admitted to the meetings of the proposed Association.

Mr. SANDFORD thought the present application should be considered as being quite distinct from their recent decision as to the Conversation room. The students wished to form a society to meet once a week or fortnight under these rules, which seemed very good, and it appeared to him it would be better if they met in the lecture room.

Mr. SUTTON said the Lecture room was by far the best place if there were papers to be read or experiments to be performed.

Mr. SANDFORD said it was proposed to include those who were or had been students at Bloomsbury Square, and he hoped it would bring together many men who had been students.

Mr. ROBBINS said there had been an association formed some years ago of a somewhat similar character, of which he had been a member, and it worked very successfully for some years under the presidency of Dr. Redwood. It used to meet in the Council room.

After some further conversation it was resolved—

"That the Council approve the proposition of the students to form a School of Pharmacy Students' Association, and request the House Committee to make such arrangements as may be necessary to provide for the meetings."

LAW AND PARLIAMENTARY.

This Committee had held a meeting with reference to the prosecution of a chemist and druggist by the Excise authorities for selling under the name of a "Morning Tonic" a spirituous compound. A memorial on the subject had been sent to the Commissioners of Inland Revenue, to which no answer had been returned. After some conversation had taken place with regard to the action which it might be necessary to take, the report was received and adopted.

THE LATE MR. DEANE.

The oil portrait of the late Mr. Henry Deane, painted by Mr. Wyburd for the subscribers, was exhibited in the Council room.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING OCTOBER, NOVEMBER, AND DECEMBER, 1874.

LONDON.

	£	s.	d.
A Friend..	0	5	3
Bolton, Horatio N , 11, Quadrant Road, Islington, N.	1	1	0
Butt, Edward N., 13, Curzon Street, W.	2	2	0
Cannon, Charles, 85, Upper Street, Islington, N.	1	1	0
Cawdell, George, 12, London Street, Paddington, W.	0	10	6
Cooper, W. 5, Wycombe Terrace, Holloway, N...	0	5	0
Curtis and Co., 48, Baker Street, W.	1	1	0
D. S...	0	18	6

	£	s.	d.
Davenport, John T., 33, Great Russell Street, W.C.	2	2	0
Epps, Franklin, 112, Great Russell Street, W.C...	0	10	6
Golding, William, 172, Albany Street, N.W...	0	5	0
Marks and Sons, 61, Houndsditch, E.	0	10	6
Marston, John Thomas, 1 5, London Wall, E.C...	0	10	6
Penrose, Arthur W., 5, Amwell Street, E.C...	0	10	6
Ridding, W., 237, Tottenham Court Road, W.	0	5	0
Shirley, John George, 2, Westbourne Grove, Bayswater, W.	2	2	0
COUNTRY.			
Abergele, Hannah, John	0	5	0
Ambleside, Bell, Thomas	0	10	6
Barton-on-Humber, Smith, Richard F.	0	5	0
Birkenhead, Reece, John	0	5	0
Birmingham, Biddle, James W.	1	1	0
Bristol, Berry, William	0	7	6
Cainscross, Pearce, J. A.	0	10	6
Carlisle, Foster, James..	0	5	0
Cheltenham, Prockter and Forth	1	1	0
Chester, Mills, John	0	5	0
Crook, Wilson, James	0	10	6
Dartmouth, Rees, William Henry	0	10	6
Dewsbury, Foster, Abraham	0	10	6
Doncaster, Slack, William	0	5	0
Dover, Brown, Joseph Frederick	0	10	6
Fairford, Manning, Henry..	0	2	6
Freshwater, Isle of Wight, Wellington, H. A.	0	5	0
Glasgow, Jaap, John	0	10	6
,, Pinkerton, John S.	0	10	6
Gloucester, Mumford, F. C...	0	5	0
Goole, Briggs, G.	0	10	6
Harleston, Woods, C.	0	5	0
Hull, Hudson, John, Esq., per Mr. Baynes	2	2	0
Hyde, Brunt, Thomas H.	0	10	6
Kingsbridge, Balkwill, W. H.	0	10	6
Leamington, Smith, Samuel A.	1	1	0
Leith, Wilson, James	1	1	0
Lincoln, Clarke Francis J.	2	2	0
Liverpool, S. M.	1	3	8
,, Symes, Charles	1	1	0
Llysyfraw, Jenkins, Jabez	0	5	6
Loddon, Ellis, Thomas William	0	10	6
Manchester, Balmforth, A.	0	10	6
,, Lowe, Walter	0	10	6
Mold, Evans, William..	0	10	6
Northampton, Negus, Samuel	0	10	0
Nottingham, Parr, Samuel	0	10	6
Oldham, Berry, Thomas	0	5	0
Pau, France, Jarvis John	1	1	0
Perth, Reid, Neil	0	5	0
Portobello, Nesbit, John	0	10	6
Rhydlydam, Hughes, Robert	0	5	0
St. Andrews, Govan, Alexander..	0	10	6
Sandgate, Walton, George C.	0	10	6
Shortwood, Mason, W. W.	0	5	0
Sidmouth, Chessall, Rowland	0	10	6
Skelton, Taylor, Thomas, and Son	0	10	6
Sowerby Bridge, Stott, William	0	10	6
Stockton, South, Knights, John A.	2	2	0
Stravithy, Cleghorn, Dr.	2	0	0
Strood, Picnot, Charles	1	1	0
Trowbridge, Dyer, Henry	0	10	0
Twickenham, Shelley, Henry	0	10	0
Walsham-le-Willows, Wilson, Thomas	0	5	0
Wavertree, Hay, Thomas A.	0	10	6
Winchcombe, Howman, Philip	0	5	0
DONATIONS.			
Balance of Sandford Testimonial Fund, per Mr. M. Carteighe, Secretary	6	15	7
LEGACY.			
Sissmore, H. T., Cranbrook, the Executors of the late ..	10	0	0

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The third general meeting of the present session of the above Association was held at the museum and library, Queen's road, on Friday, the 18th December, at 8 p.m., when a lecture was delivered on :—

THE CHEMICAL REACTIONS OF IODINE, BROMINE, AND CHLORINE.

BY MR. LOUIS SIEBOLD.

Having briefly alluded to the sources and the manufacture of these elementary substances, Mr. Siebold gave a description of their chemical properties in general and their analytical reactions in particular. In reference to the solvent action of water upon iodine, he maintained that the solubility of the latter was partially, if not mainly, due to the formation of hydriodic acid which takes it up much more readily than pure water. Pure powdered iodine, when shaken with distilled water for a few minutes, yields a pale yellowish solution containing a mere trace of iodine, but also containing a minute quantity of HI, as can be shown by shaking it with successive portions of chloroform until the latter remains colourless, and then adding a little nitrous acid whereby the chloroform which settles down after shaking will appear distinctly pink. By the long-continued action of water upon iodine a brownish-coloured and much stronger solution is obtained, but there is also a proportional increase in the amount of HI. This formation of hydriodic acid is favoured by light and heat. An aqueous solution of iodine, when heated gently on a water bath for a short time, or when exposed to the action of light for several days, becomes colourless and acquires the power of dissolving more iodine.

After explaining the various tests employed for the detection and separation of iodides, bromides and chlorides, the lecturer referred to the conflicting statements occurring in chemical books as to the action of solution of ammonia on bromide of silver. He said it was well known that this compound is much less soluble in ammonia than chloride of silver ; but while some consider its solubility as so trifling as to justify them in classing it along with AgI, others deem it soluble enough to recommend ammonia for the separation of Ag Br and Ag Cl from AgI. According to Löwig (Gmelin's chemistry), bromide of silver is soluble in strong but insoluble in weak solution of ammonia ; and others, again, consider it as partially but never completely soluble. His (the lecturer's) own experiments show that Ag Br is decidedly and perfectly soluble even in weak solutions of NH_3, but that it dissolves more slowly and requires a larger quantity of the solvent than the chloride. When dried and ignited Ag Br is very much less soluble in ammonia than the moist precipitate, but the same was the case with the chloride. A solution of Ag Cl in NH_4HO takes up Ag Br with much more difficulty than pure NH_4HO, so that a mixture of Ag Cl and AgBr is only completely dissolved by a large quantity of liquor ammonia. But, using such a large quantity, the separation of these two compounds from AgI always succeeds, whilst any attempt of separating AgBr and AgI from AgCl by ammonia would necessarily fail.

Having next shown how readily iodine may be detected in the presence of bromine and chlorine, or bromine in the presence of iodine and chlorine, and also chlorine in the presence of iodine, Mr. Siebold stated that the detection of chlorine in the presence of bromine was not so easy and could hitherto be accomplished only by Rose's test with bichromate of potassium and sulphuric acid. This test involves the trouble of a distillation, and requires care and the use of perfectly anhydrous materials. In the hands of inexperienced analysts it often fails to show traces of chlorine in presence of large quantities of bromine. He had now the honour of introducing to the meeting a new test which he thought would be found exact and practically useful. This test was based upon the fact that a strong solution of permanganate of potassium liberates the bromine from moderately strong solutions of bromides containing a large excess of H_2SO_4. It may be performed in the following manner:—A strong solution of $KMnO_4$ is added to the aqueous solution of KBr or NaBr (containing not less than 1 in 40), strongly acidified by dilute H_2SO_4, until the permanganate ceases to be decolourized, and a copious precipitate of MnO_2 is formed. The mixture is boiled for about five minutes to expel the bromine, and then filtered. The colourless filtrate is now quite free from bromine, and may be tested for Cl by $AgNO_3$. If a chloride be present, a small quantity of its chlorine is lost by this process ; but the main portion always remains, provided that no undue excess of $KMnO_4$ be used. It is essential therefore that the filtrate should be colourless, for if it be coloured so as to indicate the presence of undecomposed permanganate, the loss of the greater part, if not of the whole of the chlorine must be expected. If, on the other hand, too little $KMnO_4$ be used, a trace of bromide may be left in the filtrate. Instead of removing the MnO_2 by filtration, the boiled mixture may be rendered clear by the addition of $FeSO_4$; but filtration appears preferable to this process. If the solution under examination should be very much stronger than 1 in 40, water should be added before boiling (just after the addition of the permanganate), in order to avoid a loss of HCl.

By means of this test chloride may be detected even in the purest commercial samples of bromide of potassium. A bromide which is absolutely free from chloride, when treated in the above manner, yields a filtrate which forms no precipitate whatever with $AgNO_3$. Whether KBr contains a mere trace or a larger quantity of chloride, may of course be judged from the quantity of the precipitated AgCl. Alluding to the detection of Cl in KBr by means of a standard solution of $AgNO_3$, the lecturer thought that, for the detection of such an impurity, a good qualitative test would always be more reliable than a quantitative analysis. He stated that for want of a simple test, chemists rarely examined the bromide of potassium they bought, though the great medicinal importance of this salt rendered such an examination very desirable, the more so as large quantities of chloride were occasionally met with in samples of this preparation. As commercial bromine always contains a little chlorine, traces of KCl would occur in the best KBr, and could only be completely removed by an expensive process, or by a great sacrifice of material. He did not look upon small traces of chloride as an objectionable impurity.

Mr. Siebold also mentioned another new method of separating bromine from chlorine which he had but very recently discovered, but which, he said, required further experimental research to complete.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture I.

The History of Alcohol in Relation to some of its varied Services to Mankind in the Arts and in Science.

In commencing this course of lectures, the lecturer referred to the fact that within a few weeks an Archbishop and a Minister of the Crown had spoken respecting the part played by alcohol in the national history, the one dealing with its influence on the morals, the other with its influence on finance.

The lecturer considered there was yet scope for honest utterance on another side of the Alcohol question, and that to the moral view of the question and to the legislative might well be added the physical, and to this he proposed to direct public attention in these discourses.

The strain running through all these lectures, in however diverse a manner the subject matter of them may be pursued, would be simply this. Of what physical value has alcohol been to man; of what value is it to man? We know it is of no value to any other animal, and thus we limit our inquiry at once to the highest order of the animate series of natural development, or of natural creation.

He proposed to glance first at the value of alcohol to man in a general sense; that is to say to its value as an agent useful for other purposes than as a fluid to be imbibed. From this he would be naturally led to consider its action, physically, on man, and its use as a fluid consumed with, and, according to common acceptation, as a food. Lastly, he would treat upon its secondary action on the vital functions, physical and mental, *i.e.*, on the deteriorations of structure and function, which may follows its use. Dr. Richardson then proceeded with his lecture as follows:—

The Term "Alcohol."—The first employment of the word alcohol is obscurely recorded. Bartholomew Parr, one of the most learned of our scientific classics, taking the usual derivation of the word as from the Arabic *A'l-ka-hol*, a subtle essence, says it was originally employed to designate an impalpable powder, used by the Eastern women to tinge the hair and the margins of the eyelids. As this powder, viz., an ore of lead, was impalpable, the same name was given to other subtle powders, and then to spirit of wine exalted to its highest purity and perfection.

The earliest systematic and truly scientific use of the term that I can discover is in Nicholas Lemert's "Course of Chemistry," published in 1698. There the word is used as a verb, "to alcoholize," and the definition of this is said to be "to reduce to alcohol, as when a mixture is beaten into an impalpable powder." The word, says Lemert, is also used to express a very fine spirit; "thus the spirit of wine well rectified is called the alcohol of wine."

The word employed in this sense merely tells us of a refined fluid substance obtained by a subtle process of separation from a grosser substance. But it was not applied to the special fluid now under our consideration until long after that fluid had actually been separated. Then is was used as a supplementary term to the earlier terms, *Vinum adustum*, *Vinum ardens*, *Spiritus vini*, *Spiritus ardens*, by which a spirit obtained from the grosser fluid, by the action of fire, was known and described.

Fermentation and Wine.—We must now go back to a much earlier study, viz., to the study of the primitive fluid, from which the subtle spirit was derived. In the history of the production of alcohol we gather, in fact, the use of two of the most prominent words of our modern language: fermentation and distillation. They each mark distinct progressive epochs in natural science.

The term fermentation brings us in contact with the primitive fluid. It leads us to ask how, from the vegetable world, by change or mutation of its matter, a new product was evolved? The origin of this procedure is so old we have no possible means of tracing it. Before ever the word chemistry or the science which that word implies was dreamed of, this process of obtaining the crude liquor, from which alcohol was ultimately extracted, was in active operation. By some accidental discovery it had been started by human hands, and the act of first lighting and reproducing fire was hardly a less wonderful development of the higher faculties resident in man, than was this discovery. The operation itself, orginally, was, we may presume, very simple. As there is a spontaneity in nature to produce fire, as for instance, when a metal like iron strikes a stone, so there is a spontaneity of fermentation in vegetable matter — especially in the juices of fresh ripe fruits in warm weather — which fact being observed first, from the motion induced in the fluids, and secondly from the crude products that were left, would lead naturally to the contemplation of the steps of the process, to its easy, artificial, and more perfect development, to a method of separating and purifying the products, and afterwards tasting and using them.

The products of fermenting fruits were limited to four: an active air which escapes freely; a froth or yeast which floats above as a crust; a heavy mass or lees which sinks to the bottom; and a fluid which remains apart. These portions, each readily separable, indeed, separable of themselves, were soon understood in respect of their virtues. That invisible air, which escapes so

* Cantor Lectures: delivered during December, 1874, January, 1875, from the *Journal of the Society of Arts*.

actively, is a deadly vapour or miasm; that froth, unpleasant to the taste, is an active promoter of the motion that springs from the fruit; those lees are like sediment from muddy water, excrementitious, to be cast away; but that remaining subtle fluid, to the palate so grateful, to the senses so exhilarating, to the heart so forcing, to the intellect so exciting or so deadening—let it be brought froth in the daintiest cups the handicrafts can fashion from the rude earth! It is not, to the savage, a mortal thing at all. Water flows in open streams, a common liquid, at which cattle and creeping things may drink; this must be the drink of the superior intelligences from whom the savage came! It lifts the man who takes it into a higher sphere of life, or it degrades him to the lowest. It introduces him, as it were, to a new human organisation that is not to be a passing phenomenon, but, for good or for evil, is to remain for ages.

The fluid is wine.

The discovery is an epoch surpassed by none other in the history of one portion of mankind, and the early dawning civilizations show their wonder at it in their mythology. Egypt claims the invention for her god Osiris, Greece for Bacchus, and Rome for Saturn. The Greeks, most ambitious to be connected with the origin, assert that the very name belongs to them, for the drink was first discovered in Ætolia by Orestheus, the son of Deucalion, whose grandson, Oeneus, was so called from Oinos, which was the old name of the vine. Or else the discovery was by Oeneus himself, who first pressed the rich grapes. Thus Oinos—oinon—vinum—wine. Then by these nations the praises of wine and of the wine gods, one and all, were sung into the later times. The first of the Roman poets, excited to his labour by Mæcenas, the friend of Augustus, who would that the vineyards should flourish, is thus prompted to invoke Bacchus, under the name of Pater Lenæus—

> "Hither, oh, Lenæus—Father Lenæus, come.
> By thee with heavy viny harvest crowned,
> The pasture flourishes. In the full vats
> The vintage foams.
> Hither Lenæus, Father Lenæus, come,
> And, with thy buskins off, in the new wine,
> Stain, thou, thy naked legs even with me."

And thus on until our own era, in which,—alas for the mutability of even god-like virtues!—under the title of "The Worship of Bacchus," our veteran artist, George Cruikshank, has turned the praises of his brother artist, Virgil, into scorn, and has transformed Pater Lenæus, the wine giver, into the destroyer of every civilization over which he has become enthroned.

It is worthy here of special remark that the invention of wine was local on the planet and that it came from some centre of the ancient world lying near to those points from whence our modern civilization took its rise. For when that civilization concentrated itself into bands, or armies, or navies, for the purposes of discovering new portions of the earth, where other savage nations, as they are called, dwell, it found the wine god, the wine cup, and the wine equally unknown. A good three-quarters of the old world knew no more of wine than of the people who invented it, until they were taught to know it—then they learned about it fast enough.

The practice of exciting fermentation and of obtaining the coveted fermented liquor once known, the knowledge was extended, until from varied vegetable substances wine became a product extracted by an art that was successful, however rude. The discovery of the ferment, that is to say, of the body that would produce fermentation, was sufficient to set in mutation or intestine motion a whole series of fermentable vegetable substances, and to extend the manufacture of various vinous fluids to an unlimited degree. From the expressed juice of the grape the transition was easy to other juicy fruits, such as the mulberry, the apple, the pear, the peach; from these again to those juices which exude from trees, as from the eastern palmtree; and from these again to such similar looking substances as manna and honey. From fruits, moreover, it was an easy transition to seeds, and from seeds that were soft and succulent to seeds that were hard and of the character of what we now call grain.

From all these varied sources of fermentable substances there was produced for ages the fluid containing the basis of alcohol. Its most common name was wine, though the term was modified by adjective additions signifying sometimes its colour, sometimes the place where it was made or marketed. Thus were introduced the white and red wines, the Vino Tinto and the golden unctuous Vino Greco. Even after the discovery (of which I shall soon again speak) of the existence of a distinct essence or spirit in wine, the original fluid held pre-eminence over all other strong drinks, and in the early and middle stages of civilization in Europe the number of wines that were used exceeded anything we now have in common use. Here is a list of ancient Roman wines in illustration of this fact. The wines are arranged in nine groups:—

Ancient Roman Wines.

1
Falernum
Massicum
Calenum
Cœcubum
Albanum
Setinum
Surrentinum

2
Chium
Lesbium
Leucadium
Naxium
Mamertinum
Thasium
Mœnium
Mareoticum

3
Album
Nigrum
Rubrum

4
Vetus
Novum
Recens
Hornum
Trimum
Molle
Lene
Vetustate edentulum
Asperum
Merum
Fortius

5
Coum
Rhodium
Myndian
Halicarnassum

6
Cnidum
Adrium

7
Mustum
Protropum
Mulsum
Sapa
Defrutum
Carenum

8
Passum
Passum creticum

9
Murrhina

This list by no means exhausts the names of wines of ancient date, but it is a sufficient indication of the extent of the "wine trade," if I may say so, long before our State Minister's invested capital reached its 117,000,000 of wealth. As a matter of some historical interest, it is worth a moment or two to touch on the special qualities of a few of these vinous drinks.

The wines of the first group were home wines. The Falernian was, it is believed, something like our modern Madeira, and was not commonly used until it was ten years old. After it was twenty years old it affected the body unfavourably, causing headache. This was the experience of Galen.

The wines of the second group were foreign. The Chian, also called the Ariusian, was in three varieties—austere, sweet, and intermediate; the Lesbian was considered diuretic.

The wines of the third group were named after their colour—white, dark, and red. The white were thought to be the thinnest and least heating; the dark coloured and sweet the most nourishing; the red the most heating.

Group four is named after qualities, of age, and the like: as old (Novum); new (Vetus); of the present year (Hornum); of three years (Trimum); mellow (Molle, Lene, Vetustate edentulum); rough (Asperum); pure (Merum); strong (Fortius).

The wines of the fifth group, marked Myndian, Halicarnassian, Rhodian, and Coan, were made with salt water. They were considered not to be intoxicating, but to promote digestion.

The two wines of the sixth group, viz., Cnidian and Adrian, were also medicinal wines. The first, it was believed, engendered blood, and was at the same time a laxative; the second was diaphoretic.

Of those of the seventh group, the Mustum was wine newly made, or the fresh juice of the grape. The Protropum was the juice which runs from the grapes without pressing. The Mulsum was a mixture of wine and honey. The Sapa was Mustum boiled down to a third. The Defrutum was the same reduced to half, and the Carenum was the same reduced to a third.

Of the eighth group, the Passum was a sweet wine, prepared from grapes that had been dried in the sun. The Passum creticum, also a sweet wine, is believed to have been the same as the wine which our forefathers called Malmsey; the veritable wine in which the Duke of Clarence, brother of Edward the Fourth, elected to be drowned.

The wine called Murrhina, placed in the last group, has a curious history. The Greeks had a wine of this kind, which consisted of a pure wine performed with odorous substances. The Romans had a wine similarly named, which is supposed to have been wine mingled with myrrh. It was administered to those who were about to suffer torture, in order to intoxicate them and to remove the sense of suffering.

The ancient wines retained their place probably until the end of the middle ages, but we have no reliable evidence bearing upon this point, if we except an occasional reference by some poet or physician to the subject of wine. Very slowly the names, rather than the wines, changed generally. The Roman conqueror who built his villa on our islands, and fitted it with so much taste and means of luxury, added to it his wine-cellar, in the manner he had been instructed by his forefathers, and from it took out his red and white and old wine, as we do now; boasting possibly of the vintage from which it was grown, and eloquent as to its age and perfect ripeness. If he had no old port, he had old Falernian or Passum; his rough and his sweet, his light and his heavy wines, the same as ~~our~~ connoisseur of to-day; except, perhaps, that he knew a great deal more in the way of fact about the vintages than his modern follower.

How the wines changed in name through the centuries will be gathered from the lists of the wines of Europe in use in the last century, collected by the distinguished chemist Neumann, and here subjoined:—

WINES OF ITALY.

Vesuvius.

Vino Greco
Mangiaguerra
Verracia
Vino Vergine

Tuscany.

Florence (white and red)
Monte Pulciano
Montalreo
Porte Hercole

Lombardy.

Modenese
Montserrat
Marcemino
Brescian
Veronese
Placentine
Lumelline
Pucine

Naples.

Campania or Pausilippo
Muscatel
Surentine
Salernitan
Chiarello
Carcassone
Lachryma Christi
Albano
Montefiascone
Nomentan
Monteran
Velitrin
Prænetic
Il Romanesca
D'Orvieto

Sicilian, Sardinian, and Corsican.

Catanean
Panormitan
Messinian
Syracusan

Genoa.

Vino di Monte Vernaccia
Vino Amabile, or Vino di Cinque Terre
Vino Razzese
Muscadine
Rosatz
Vino Piccante

WINES OF GERMANY.

Tyrolese Tramin
Etsch
Wine of Worms
Edinghof
Ambach
Rhenish
Maine
Moselle
Neckar
Alsace
Hock
Bohemian
Silesian
Thuringian
Misnian
Naumberg
Brandenburg

WINES OF AUSTRIA AND HUNGARY.

Klosterneuberg
Brosenberg

Edenburg
Tokay

WINES OF SPAIN AND PORTUGAL.

Aland
Alicant
Sherry (or Xeres)
Spanish Malmsey
Tarragan
Salamanca
Malaga
Cordova
Galicia
Andalusia
Vino de Tore
Spanish
Vino Tinto
Madeira

WINES OF MADEIRA AND CANARIES ISLANDS.

Madeira Sec
Canary or Palm Sec

WINES OF FRANCE AND SWITZERLAND.

Languedoc
Picardy
Champagne
Burgundy
Vin de Beaune (or Partridge eye)
Cote Roti
St. Laurence
Frontiniac
Muscat de Lion
Cahors
Hermitage
Grave
Vin d'Haye

Neufchatel
Velteline
Lacote
Reiff

Some of the wines here enumerated derive additional names from peculiarities in themselves. Sec, from which we derive the name of the wine Sack, on which Sir John Falstaff so keenly enjoyed himself, means dry; the wine being made from half-dried grapes. Malmsey was called by the Italians, "Manna alla bocca e balsamo al cervello," "Manna to the mouth and balsam to the brain."

From the same chemist of last century, who has collected for us such a long list of wines, we are supplied with a very instructive table of analyses showing the strength of spirit present in the different specimens. The wines analysed are tabulated in alphabetical order. I believe this to be the first true chemical analysis that was ever made, on an extensive and comparative scale of different wines:—

TABLE OF THE CONTENTS OF DIFFERENT WINES IN A QUART OF EACH.

	Highly Rectified Spirit.			Thick Unctuous Resinous Matter.			Gummy and Tartareous Matter.			Water.			
	oz.	dr.	gr.	oz.	dr.	gr.	oz.	dr.	gr.	lbs.	oz.	dr.	gr.
Aland	1	6	0	3	2	0	1	5	0	2	5	3	0
Alicant	3	6	0	6	0	20	0	1	40	2	2	6	0
Burgundy ...	2	2	0	0	4	0	0	1	40	2	9	0	20
Carcassone..	2	6	0	0	4	10	0	1	20	2	8	4	30
Champagne .	2	5	20	0	6	40	0	1	0	2	8	3	0
French	3	0	0	0	6	40	0	1	0	2	8	0	20
Frontignac..	3	0	0	3	4	0	0	5	20	2	4	6	30

Vin Grave...	2	0	0	0	6	0	0	2	0	2	9	0	0
Hermitage .	2	7	0	1	2	0	0	1	40	2	7	5	20
Madeira ...	2	3	0	3	2	0	2	0	0	2	4	3	0
Malmsey ...	4	0	0	4	3	0	2	3	0	2	1	2	0
Vino di Monte Pulciano	2	6	0	0	3	0	0	2	40	2	8	0	20
Moselle	2	2	0	0	4	20	0	1	30	2	9	0	10
Muscadine ..	3	0	0	2	4	0	1	0	0	2	5	4	0
Neufchatel..	3	2	0	4	0	0	1	7	0	2	2	7	0
Palm Sec	2	3	0	2	4	0	4	4	0	2	2	5	0
Pontack......	2	0	0	0	5	20	0	2	20	2	9	0	40
Old Rhenish	2	0	0	1	0	0	0	2	20	2	8	5	40
Rhenish......	2	2	0	0	3	20	0	1	34	2	9	1	6
Salamanca ..	3	0	0	3	4	0	2	0	0	2	3	4	0
Sherry........	3	0	0	6	0	0	2	2	0	2	0	6	0
Spanish	1	2	0	2	4	0	9	4	0	1	10	6	0
Vino Tinto..	3	0	0	6	4	0	1	6	0	2	0	6	0
Tokay	2	2	0	4	3	0	5	0	0	2	0	3	0
Tyrol Red Wine	1	4	0	1	2	0	0	4	0	2	8	6	0
Red Wine...	1	6	0	0	4	40	0	2	0	2	9	3	20
White	2	0	0	0	7	0	0	3	0	2	7	0	0

If these analyses include all the spirit in the wines named, it is clear that the amount of spirit in them was exceedingly small, when compared with what is present in the wines of the present day. Falstaff might readily drink a pint of sack at a draught that contained rather less than seven and a half per cent. of spirit.

The only other diluted rival of wine obtained by fermentation was the liquid derived from corn. Tradition, active again in giving celestial origin to strong drinks, has assigned the introduction of the art of making this product first to Osiris, the divinity of Egypt, and afterwards to the goddess Ceres. The fluid thus produced, became, in Saxon language, known as beer, bere, from barley, or perhaps from the Hebrew, *bar*, corn. Tacitus calls it Zythum. The Egyptians, it is said, made it first for the common folk that they too might receive the gift of Osiris. In its original state beer was what we would now call the sweet fluid or wort fresh from the vat, and untinctured with any additional substance. So it continued probably until the ninth century, when it began to be treated with the *lupulus*, or hop. The first mention of this plant is made by an Arabian, named Mesue, of about the year 850, but he does not refer to it in relation to beer. The hop not only flavoured but tended to preserve the beer, and in a few centuries it became of general use. In the reign of Henry the Sixth the use of hops was for a time forbidden, on the ground that they spoiled the beer and rendered it dangerous. An order prohibiting hops and sulphur for beer was also made in the reign of Henry the Eighth. But the hops at last won their way. It is worthy of notice that Neumann, who analysed the beers of last century, as well as the wines, found that the beers contained an amount of spirit varying from 5 per cent. in the weakest to 10·90 per cent. in the strongest kinds. The malt liquors of the last century were, it appears from this, of much the same strength as those of the present.

Thus in the history of alcohol the first step of discovery was that of its production from vegetable matter by the process of fermentation. As so produced it was a mixture of that which we now call pure spirit, or alcohol, with water, and with small quantities of other extraneous substances of minor moment.

On the nature of the fermentative change by which the juice of the fruit, or the exuded fluid of the plant or tree, or the seed or the sweet sugar, is transformed into the new product, speculation has been rife for a hundred years at least. In this day the atomic constitution of water, of alcohol, and of the substances which yield alcohol are known, and the atomic change of constitution that takes place is known; but the reason of the process is, according to my judgment, as little understood as it was when the discussion began. Probably, indeed, the latest theories that have been advanced are rather a retrogression, by a line of learned subtleties from the earlier views, than an approach to simplicity of truth. I do not, therefore, venture to trouble you with any description on this head. One word I would add in the way of a guard against misuse of terms from assumed analogies. We often hear processes described as fermentative, which in truth have no relation, by any proved physical argument, with the true process of fermentation of vegetable matter connected with the production of wine. To take one example; we speak commonly of the zymotic or fermentative diseases, applying the term to those maladies which, in the form of contagious fevers, become epidemic. Hence many are led to believe that in these diseases there is in the body an actual fermentation like that in wine or beer; a comparison no closer, according to our knowledge as it now actually exists, than might be instituted between the same process and the so-called ferment of a mob when it assembles to give vent to its turbulent rage.

(*To be continued.*)

Parliamentary and Law Proceedings.

Supposed Poisoning by Corrosive Sublimate.

On Monday, January 4, an inquest was held at St. Thomas's Hospital, before Mr. Holl, coroner, touching the death of Celine Marin, a young Frenchwoman, who came to her death under the following circumstances:

Julien Robarts, servant at an hotel and restaurant, 35, Rathbone-place, who gave his evidence in French, which was interpreted by M. Albert, stated that the deceased, who lived with him as his wife, was a servant in the same house. On Sunday, the 13th December, the deceased, who was suffering from diarrhœa, asked him to go out and fetch her some bismuth. He went to a chemist's shop opposite and rang the bell, and a lady came and he asked for some bismuth, and told her it was for his wife, who was ill of diarrhœa, and that she had been recommended by a physician to take bismuth. The lady gave him one or two spoonsful of a white powder, without directions. He went back to the hotel and gave it to his wife, who said she knew how to take it, as she had taken some before. Five or ten minutes afterwards he found her on the stairs by the closet, and she said the medicine burned her very much. Another person came up and told him to give her some milk, and he did so, and she drank a large quantity of it, and he went over to the chemist's to see what the lady had given him, as the medicine had such an effect. He rang the bell several times, but no one came, and he went for Dr. Roupell, who came immediately, and he advised him to continue giving milk constantly, whilst he would go to another chemist's to see what the powder was, and procure an antidote. The deceased had taken it all, but a little remained round the glass, and he took it to another chemist's. The next morning he went again to the chemist's in Rathbone-place, and asked the woman whether it was bismuth she had given him, and she said "Yes;" and she gave some in a paper to the assistant of Dr. Roupell, who accompanied him. On the same day the woman came to see the deceased with a doctor, and she said it was an unfortunate affair, that it was an accident, but she could do nothing more, as her husband had made many mistakes on similar occasions, and that nothing was done to him. The deceased had not been taking any medicine previously.

Dr. Francis Roupell, 27, Charlotte-street, Fitzroy-square, stated that on Sunday afternoon, the 13th December, at half-past three, he was called by the last witness to see his wife, who was ill. He went to his lodging, and found she retched very much; she complained of great pain in the stomach, and was not able to swallow. She retched a little into a glass, which he took to Mr. Schomberg, a chemist. Being suspicious, he ordered an emetic, and on the same day he examined the contents of the glass, which seemed like a salt, but it was impossible to make a complete analysis of it then. The woman remained under his treatment for some days. Her tongue and her throat were swollen, and her mouth was full of saliva, from which he inferred she had taken some mineral poison. The whole inside of her mouth and throat was full of blotches. He administered chloride of potassium gargles, and beef tea. He attended her till she was taken to the hospital, which was done on his advice. It was his opinion that she had taken corrosive sublimate. He thought so from the symptoms and from the appearance after death. He did not analyse what was contained in the glass, but he tasted it, and was certain it was corrosive sublimate. Bismuth was the same colour, but the difference could easily be discerned by the touch.

Dr. Lingard, the house physician at St. Thomas's Hospital, said the deceased was brought to the hospital on Christmas Eve, and was taken to one of the wards. He attended her to the time of her death, which took place on the 28th. When she was brought in, some powder in a paper was given to Dr. Turner in his presence, and it was stated that she had taken some of it. He had tested it, and found that it was perchloride of mercury, a corrosive sublimate. He was present when a post-mortem examination of the body was made, and from the appearances it was evident that she had taken some corrosive poison, which caused death.

By the Coroner: Is there a difference in the appearance of corrosive sublimate and bismuth?—An experienced eye would detect the difference at once, but I do not think a woman would be likely to detect it.

Winnifred Kant then presented herself, and said she wished to be examined, and, after being cautioned by the Coroner that her evidence might be used against her, she stated that she lives at 15, Rathbone-place, which is a chemist's shop. She was placed there by the executors of the late owner simply to take care of the house, and she had nothing to do with the business carried on by Mr. Kerpinns, who was never there on Sunday. On the 13th December, which was on a Sunday, she heard a ring of the bell, and going to the door saw the last witness. He asked for sixpennyworth of rhubarb powder, and twopennyworth of bismuth. She gave him the six packets of rhubarb from the rhubarb drawer, and she gave him what she verily believed to be bismuth from the same place that she used to take it from for a gentleman who is now dead. Certainly the shop was shut; but she went to the same place, and took it from the same bottle. She afterwards went out, and remained out all the afternoon. She should not have given it him on any account whatever if she had not known the man. She saw "bi" on the bottle; but she did not stop as she should have done, and in her hurry she measured him some out in a spoon quickly. It was a very small spoon, and she gave it him nearly full.

Dr. Lingard said the spoon would contain sufficient to cause death.

Mr. Lewis Prosper Henry Beglim stated that he is Dr. Roupell's assistant. On the 14th December he went to the chemist's shop, 15, Rathbone-place. He saw the last witness, and asked what she had given the man Robarts the day before. She said he asked for bismuth, and she gave him bismuth. He asked to be shown the bismuth, and she took down a bottle containing a white powder. He saw it was not bismuth, although it was labelled bismuth. She gave him some, and he gave it to Dr. Turner, at the hospital. He told her it was poison, and she said, "I do not believe it is, because I know it is the same bottle I have served it from before." She also said it was a mistake, and that her Charley had done it before.

Winnifred Kant was recalled, and said she did not take the bottle down when the last witness called upon her. It was on the counter. It had not the word "bismuth" on it, but hydrobichloride. She said it could not possibly be poison, for it was the same as she had given the late Mr. Ungurer. He was in the habit of taking it. It was a white powder. She was so sure that it was all right that she took some herself, and she felt a little sick directly she took it on her tongue. She went to a physician and told him the case, and asked him to see the woman, and she went to the house, but they insulted her.

Did you say to Robarts that your husband had made many such mistakes?—No. I have not a husband. I never knew my late master make but one mistake, and that was when he gave me poison. I never served any one in the shop before, except with linseed or anything simple.

The Coroner, in summing up, said there was no doubt this woman died through having taken corrosive sublimate. By law persons were not allowed to sell poison unless they were properly qualified under the Pharmacy Act, but the woman Kant did not come under the Pharmacy Act, because she did not keep a shop in which poisons were sold.

The jury consulted for some minutes, and then said they wished to have more evidence as to whether the witness Kant had not been in the habit of serving in the shop.

The inquest was then adjourned for that purpose until Monday next.—*Daily News.*

Obituary.

Notice has been received of the death of the following:—

On the 20th December, 1874, Mr. Charles Tye, Chemist and Druggist, of Stonehouse, Gloucestershire.

On the 26th December, 1874, Mr. George Fentiman, Chemist and Druggist, of Upper East Smithfield, London. Mr. Fentiman had been a Member of the Pharmaceutical Society since 1869.

On the 27th December, 1874, Mr. Richard Smith, Chemist and Druggist, of Bridgnorth.

On the 12th August, 1874, Mr. J. A. Bullock, Chemist and Druggist, of South Shields. Mr. Bullock had passed the Minor examination about six weeks previously.

Correspondence.

⁎ ***No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.***

ERRATA.—On p. 527, col. ii, line 21, *for* "June" *read* "July;" p. 533, col. ii, line 23, for "morning cordial," *read* "morning tonic;" p. 538, col. ii, line 43 (in a few copies) *for* "Henry Dean," *read* "Henry Deane."

D. M. S.—The directions of the London Pharmacopœia, if strictly followed, will yield a satisfactory result.

"*Plato.*"—We do not think it possible to prevent the oil in such a mixture from separating.

S. D.—Faraday's courses of Lectures before juvenile audiences on the 'Chemical History of a Candle' and the 'Various Forces of Nature' are published by Messrs. Chatto and Windus, price 4*s.* 6*d.* each.

"*Spes.*"—We cannot add to the information contained on the label. You should communicate with the manufacturer.

"*Chemicus.*"—He is not compelled by law.

P. Lafitte.—(1) By incinerating the photographs and treating the ash in the usual way. (2) We know no reason why you should have failed if the metal was really gold.

"*A Minor Associate.*"—We do not agree with the opinion expressed in your letter. Any person having sufficient chemical knowledge to be able to test solutions of the chemicals in common use would be in no way at a loss in preparing solutions of those chemicals. We regard your grievance as being entirely imaginary.

"*Phosphorus.*"—The methods of analysis to which you refer will give good results if properly carried out. Probably the failure you mention was due to want of practical experience.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. A. H. Mason, Mr. Harvie, Mr. Hraail, Mr. A. Smith, Mr. Morris, F. S.

ADDITIONAL NOTES ON JABORANDI, AND ITS PHYSIOLOGICAL ACTION.

BY WILLIAM MARTINDALE, F.C.S.

Having received, through Messrs. Hearon, Squire and Francis, a further supply of this remarkable drug, which has excited so much attention physiologically and therapeutically in Paris during the last twelve months, information respecting its previously doubtful botanical origin is now obtainable. In my former communication on Jaborandi,* I said I thought the statement of Professor Baillon that it was the leaf of *Pilocarpus pennatifolius* was erroneous, giving my reasons that having obtained some of the fresh leaves of *P. pennatifolius* from Kew Gardens, these differed so much in taste, odour, and more especially in physiological action from those of Jaborandi, that "Dr. Ringer and others, as well as myself, who watched the cases," in which both were used, "and examined the leaves and infusions of both, were satisfied this was not the same as the jaborandi we had tried before." I further stated that of course as these leaves of *P. pennatifolius* "were from a plant of hot-house growth, grown in its natural habitat its effects might be different." I notice lately that Professor Baillon still adheres to his statement.† Now that we have the whole leaf of Jaborandi to compare with herbarium specimens of *P. pennatifolius*, they undoubtedly greatly resemble each other. Still in our comparison with a specimen of *P. pennatifolius* at Kew, collected near Assumption, in Paraguay, Professor Oliver and Mr. Holmes noticed a difference in certain characters, and as jaborandi comes from Pernambuco, near to the Equator, whereas the Kew specimen was collected nearly 1000 miles further south, beyond the tropic which seems to be its general habitat, there is a great probability that they are not the same; if not the same, Jaborandi is a nearly allied, perhaps, as yet, undescribed species. This I leave for Mr. Holmes, who has taken the subject in hand, and will give a full botanical description of the parts of the plant that have been received, and other botanists, to decide.

In forwarding the supply the agents in Pernambuco wrote that "it is a medical shrub known by us, but little used, notwithstanding its excellent virtues, as the medical men here prefer using foreign medicines. It is an excellent sudorific in the dose of one octave to a cup of infusion. It is a good sialogogue. The tincture is used as a friction on paralysed members."

Of the importation lately received the leaflets form about one-fourth of its weight, the remainder being stems and leafstalks, with a few roots and fruit, but unfortunately no flowers. Compared with that which I first obtained from Paris, the leaflet of this is much more pungent in taste, and, I believe, for reasons given below, much more active physiologically. When chewed the taste is piquant, and excites a glowing heat on the tongue, like that caused by pellitory root. I also find from working with it that it irritates the skin when applied externally. On the inner surface of the bark of the root, white, shining crystals are distinctly visible; but as Dr. Attfield is about to make a chemical investigation of the different parts it is premature to offer any opinion about these. Therapeutically, Dr. Ringer is continuing his investigations at University College Hospital.

Having heard doubts expressed about the activity of the Jaborandi last received, as compared with the results obtained in the first trials I witnessed at University College Hospital, I became somewhat sceptical about its efficacy, and, therefore, expecting to get little results, tried it upon myself. To me the effect seemed simply marvellous. I made an infusion of sixty grains of the bruised leaf in five ounces of boiling water, let it stand fifteen minutes and strained it. On pouring the water upon the drug I noticed the characteristic odour almost entirely disappeared. The infusion was of a pale sherry colour, had a mawkish bitter taste, but did not excite the glowing heat upon the tongue that the leaf itself did; this I thought strange, and on tasting the dregs I found they still retained their pungent taste when chewed. It was evident to me that if its diaphoretic properties depended on the principle having this pungent taste, boiling water does not extract it. At 11·30 p.m., on retiring to rest, I swallowed as much of the dregs as I could, probably 50 out of the 60 grains used, and washed them down with the infusion. In five minutes I felt a glow, an increased circulation, an uneasiness in the head, became restless, and the secretion of saliva began to increase. At 11·45, a quarter of an hour after taking the dose, I was perspiring freely. The salivation and perspiration continued to be profuse until my sight became blurred. At a distance of four feet I could see my wife, but could not distinguish her eyes. On this occurring I became a little anxious, as I had evidently taken an overdose. I requested that Dr. Ringer might be sent for; he came about 12·15 a.m. The impaired vision still continued, but I was glad to find that it was only at a distance—near objects I could see distinctly enough. The pupils of the eyes were slightly dilated, I was informed. The pulse when first noted was 96, and got up to 104. The temperature was not taken. The depression was never very great, but a little before Dr. Ringer came I began to shiver, more clothes were put on the bed, and some spirit and water given to me. The excessive perspiration still continued from all parts of the body. A Turkish bath, which I have frequently had, and seen others have, was nothing to it; the saliva for a time required almost constant ejection; the secretion of this from the glands in the cheeks caused a kind of collapsed feeling in them. My speech was so affected that articulation was both difficult and indistinct. Eventually, about 1 a.m., I was sick, and vomited at first a quantity of saliva which I had swallowed. Putting my finger in my mouth vomiting was further excited, until a portion of the Jaborandi returned. The effects were now subsiding: more spirit and water were given to me, my night-shirt, soaked with perspiration, was changed. I was put into a warm blanket, and about 1·40 a.m. I fell asleep and slept a quiet sleep till 6 a.m. The pulse on awakening was 88—normally with me it is 80. I got up about 7·30 a.m., and although I felt squeamish all next day I was able to attend to business as usual. When the action was at its height, on uncovering my arm, I am informed the perspiration passed off in steam from my hand and night-shirt sleeve. The saliva collected, which was distinctly alkaline, measured 16 ounces, in addition to which a quantity had flowed on to the pillow while I slept, as it was quite

* *Pharmaceutical Journal*, 1874, p. 365.

† *Journal de Pharmacie et de Chimie*, Janvier, 1875, p. 23.

wet in the morning. I came to the conclusion that I should not like to pass through the ordeal again. My thanks are due to Dr. Ringer, whose presence and kindness greatly relieved my anxiety.

We have undoubtedly in Jaborandi a drug which produces a marked physiological action; how far it will prove useful therapeutically in cases of fever, diabetes, and other diseases, remains to be seen. A drachm dose of the last received is no doubt excessive, that is if the whole be swallowed. The strained infusion, from what I hear, produces but little effect.

M. Robin* gives an account of the results of his researches in M. Gubler's wards in Paris, but no mention is made of its peculiar action upon the vision, which, so far as I am aware, has not been previously noted.

10, *New Cavendish Street*,
January 12*th*, 1875.

CONTRIBUTION TO THE HISTORY OF KOSIN.†

BY F. A. FLUCKIGER AND E. BURI.

In Abyssinia, during a long period of time, the female flower-panicles of the Koso tree have been the most commonly used domestic remedy against tapeworm, for which purpose the handsome tree is cultivated in every village of that extensive mountainous country, recalling, according to Munzinger, in a measure, the lindens of German villages. The history of our acquaintance with this plant has been thoroughly set forth by Pereira,‡ though it is very questionable whether the oldest information quoted by him, of the year 1681, related to Koso. In the 'Historia Æthiopica,' of Sobi Ludolfi, otherwise called Lentholf, Frankfort, 1681, lib. i., cap. ix. (this curious folio is not paged), the passage runs thus: "Aliam arborem N. Godignus§ laudat contra ventris lumbricos valde proficuam; hos enim ex usu carnis crudi gigni: ut Habessinos singulis mesibus *fructu hujus arboris* alvum purgare, atque sic vermes illos necare memorat." Of course it is possible that by this "fruit" the seeds of the Koso tree were meant, which, acccording to Heuglin,|| are more active than the flowers.

The first exact description and representation of the tree were given in 1790, by the celebrated traveller, Bruce,¶ under the name *Banksia abyssinica*. The designation *Banksia*, however, had already, in 1781, been given by the younger Linnæus to a genus of Proteaceæ, so that *Hagenia abyssinica*, the systematic name chosen for the Kosso tree, in 1811, by Lamarck** is to be preferred.

In the Abyssinian dialects the tree bears different names; the shortly pronounced expression koso is preferred by Werner Munzinger†† as the most correct and most commonly used. Supported by the opinion of this famous writer, who is also an accomplished philologist, and is, perhaps, more intimately acquainted with the land and people of Abyssinia than any other scientific European, the substance to which these lines are devoted may be called "Kosin." Heuhlin, also (l.c.), writes "Koso."

It is much to be regretted that no experiments in the cultivation of the koso tree have yet been made in Europe.* It is highly probable that they would be successful, since the tree grows in the basins of the rivers Takazzi and Abai, at a level of from 3000 to 4000 metres above the sea, and similar habitats might easily be found in Southern Europe.

In 1840, Wittstein discovered in the Koso flowers an acrid resin, which Martin in the same year appears to have obtained in a crystalline form. In 1857, Harms attributed to it acid properties; in 1858, Paresi stated that he obtained it by means of alcohol and calcium hydrate.† The same method was employed by Dr. Bedall, of Munich, in 1862. From the aqueous residue of the alcoholic extract the koussin of Bedall, existing as a calcium compound, is precipitated by acetic acid as a more or less crystalline whitish powder, having the composition $C_{26}H_{44}O_5$.‡ Of this substance the flowers yield at the most 3 per cent. In 1867, Bedall attributed to it the anthelmintic action of the drug, and gave it a place in the materia medica.

Through the kindness of Herr E. Merck, in Darmstadt, we were put in possession of some beautifully crystallized kosin prepared by him. It was in the form of needles some millimetres in length, or of short thick prisms, which were well formed, but were not measurable, because their surfaces were too much furrowed. As the result of an optical examination, however, Professor Groth was able to determine that the crystals belonged to the rhombic system. If concentrated sulphuric acid at a temperature not exceeding 15° C. be saturated with kosin, the kosin is deposited, in the cold, in simple rhombic forms, or in stellate groups; most frequently, however, in twin crystals with interlacing angles. The specific gravity of kosin is so considerable that in sulphuric acid of sp. gr. 1·842 at 15°, it quickly sinks to the bottom. The colour of the crystalline needles agrees with that of sulphur; the larger prisms are of a somewhat darker yellow; while in the very fine ramifications,' the kosin appears to be white. It possesses neither smell nor taste, and when moistened with water or alcohol does not change litmus paper. Kosin bears being kept for a considerable time at 100° C., with as little loss of weight as over sulphuric acid or by fusing. Heated to 140° C. in narrow tubes, it begins to soften to and melt without decomposition at 142° C. After cooling, it remains perfectly transparent; but if this amorphous kosin be touched with only a single drop of alcohol there are immediately developed at numerous points tufts of radiating crystals, a process which has a very beautiful appearance, especially under the microscope, and which is repeated again and again in the smallest quantity of

---

* *Medical Record*, Dec. 16, p. 794, from the *Bulletin Général de Therapeutique*, November 30, 1874.

† From the *Archiv der Pharmacie*, for September, 1874.

‡ 'Elements of Materia Medica,' vol. ii., part 2 (1857), p. 296.

§ This book, 'De Abyssinorum Rebus,' 8vo., Lyons, 1615, I have not been able to procure.—F.

|| 'Reise nach Abessinien, den Galaländern Ost-Sudan und Chartum,' 1861-62. Jena, 1868, p. 322.

¶ 'Travels in Nubia and Abyssinia, 1768-1773.'

** 'Encyclopédie méthodique, Botanique,' Suppl. II., p. 423.

†† In a verbal conversation in 1864, for which a visit of Munzinger to his native country gave me the opportunity.—F.

* To my knowledge no botanical garden possesses the Koso tree, and my efforts to obtain seeds remain unsuccessful.—F.

† Kopp and Will's 'Jahresbericht der Chemie,' 1859, p. 586.

‡ 'Jahresbericht der Chemie,' 1862, p. 513; Gmelin, 'Organ. Chemie,' vol. vii., p. 2103.

this substance. This change of form is not produced by water.

Upon heating more strongly even a very small quantity of kosin, the odour of butyric acid becomes perceptible; at the same time, it forms a red brown tar, which in a very dilute solution of perchloride of iron gives rise to a brown colour. Heated in a current of carbonic acid gas, the kosin creeps to a considerable distance along the sides of the tube, but does not sublime.

Water boiled with kosin acquires a slight opalescence, without, however, any sensible quantity entering into solution. On the other hand it is very freely taken up by ether, benzol, carbon bisulphide, and chloroform; less freely by glacial acetic acid and alcohol. 1000 parts of the latter (sp. gr. ·818), at 12° C., is capable of dissolving 2·3 parts of kosin; but boiling alcohol dissolves it readily. By slowly cooling such a solution the kosin is obtained well crystallized, but not by evaporation. Crystals are equally well obtained from a hot saturated solution in glacial acetic acid upon cooling. The alcoholic or acetic mother liquor is subsequently rendered only slightly opalescent by water.

The solution of kosin in 20 parts of chloroform exercises no rotatory influence in a tube 25 millimetres long; while in a 50 millimetre tube the solution is not sufficiently transparent.

In two parts of concentrated sulphuric acid at 15° C. one part of kosin forms a yellowish solution wherein no change is produced by strong nitric acid. The solution quickly becomes of a clear yellow, and after longer standing in the cold a brownish and then a scarlet colour; the latter colour may be produced at once by warming gently, so that sulphurous acid is not developed. In this case especially the smell of butyric acid is developed. This is also the case when kosin is heated with nitric acid, sp. gr. 1·2. From the yellow solution kosin is precipitated as a whitish turbidity on the addition of water; but when the solution has become red by time or by heat, it deposits scarlet-coloured flocks.

Cold saturated alcoholic solution of kosin is at first scarcely altered by alcoholic solution of perchloride of iron, but after a short time it becomes a clear red. The same solution gradually acquires a similar colour in contact with reduced iron. The pure solutions also acquire a red colour on evaporation.

An alcoholic solution of neutral acetate of lead causes no precipitation from an alcoholic solution of kosin. Dissolved in chloroform kosin is not perceptibly changed by bromine.

Aqueous solutions of the caustic and carbonated alkalies—but not of borax—readily dissolve kosin, especially if gently heated; the yellow colour of these solutions also is changed to red by heating or long standing. Upon neutralizing these alkaline solutions there is formed, according to the temperature and concentration, sometimes a white amorphous, sometimes a pale yellowish microcrystalline precipitate, which, after perfect washing, is tasteless and without action upon test paper. It agglutinates when rapidly dried; but if first perfectly dried in the air at the ordinary temperature it does not lose weight at 100° C. In this respect the kosin precipitated from alkaline solutions, and that obtained from alcohol and chloroform, behave similarly. On the whole it would appear that the kosin precipitated from the alkaline solution is a return to the original form. The want of colour in the amorphous precipitate is dependent on the fineness of the particles, for their alcoholic solution yields again the former yellow crystals and white amorphous kosin, which, carefully dried, fused, and treated with alcohol, immediately yields beautiful yellow needles.

Heated in closed tubes with dilute sulphuric acid during a considerable time, kosin suffers no perceptible change.

If kosin be fused with caustic potash, and the mass dissolved in water, no precipitation takes place upon supersaturation with sulphuric acid; but the solution smells of formic and butyric acids, and contains oxalic acid.

The burning of kosin in a current of oxygen, which left scarcely a trace of ash in the platinum vessel, gave figures equal to the following percentages:—

	I.	II.	III.	IV.
C	65·06	64·92	64·25	64·23
H	6·73	6·81	6·61	6·52

From these results the formula $C_{31}H_{38}O_{10}$ is calculated, which requires:—

31 C	372	65·26
38 H	38	6·66
10 O	160	28·08

NEW CHEMICAL PROCESSES.*

BY J. PATTINSON.

For some time past, the chemical manufacturer, desirous of renewing or extending his plant has, as our cousins across the water say, "been much exercised in his mind," as to which, if any, of the new processes pressed upon his attention should be adopted. This perplexity is now gradually becoming removed by the knowledge gained of their value by actual practical working. In the manufacture of bleaching powder, for example, the rival claims of the Weldon and Deacon processes have long engaged attention. So far as can be seen at present, the conclusion arrived at appears to be one which, however unpleasant to the manufacturer anxious to economize his plant capital, ought to be very gratifying to the inventors of both these processes, namely, that it is advisable to have both methods at work. In the Deacon process in its present condition, there is a large proportion of the hydrochloric acid passed through the apparatus which escapes decomposition, but which is afterwards condensed and obtained as liquid hydrochloric acid. The best way to utilize this acid for the purpose of making bleaching powder is in the Weldon apparatus. The Weldon process, thanks to the chemical and engineering skill that has been brought to bear upon it, is a decided success; and Mr. Weldon claims that of the 100,000 tons of bleaching powder now made in this country annually, 60,000 tons are made by his process. It is in use in six of the manufactories on the Tyne at present, and others are having the plant erected. The acid from three to four tons of salt produces one ton of bleaching powder by this process. Not the least of its advantages are that it very much lessens the amount of polluting matter run into our rivers and sent into the air, and that it dispenses with one of the most disagreeable operations the workman has to perform in a chemical manufactory—the cleaning out and charging of the old chlorine stills.

The Deacon process is in operation in four of the manufactories in this district. The conditions necessary for the uniform and successful working of this process are not yet fully known. The produce of bleaching powder, for instance, from one decomposer varies as much as from 10 tons to 36 tons per week, and the cause of this variation

* From a Presidential Address delivered before the Newcastle-upon-Tyne Chemical Society.

remains to be discovered, excepting that it is known that irregularity of temperature has something to do with it. The greatest difficulty to contend with is, however, that of keeping the decomposer free from leakages and the consequent production of weak bleaching powder. The gases being drawn through the apparatus by means of a pump, any fissures in the decomposer cause carbonic acid to be drawn in from the surrounding flues and conveyed to the lime chambers. Still, in spite of these drawbacks, the usual yield of bleaching powder of good strength is about one ton for every two tons of salt decomposed, and this result is obtained when the pan acid alone is used. The cost for labour, fuel, etc., is very small. The process, therefore, even in its present state, may be said to be a very successful one, and when experience and research shall have more clearly indicated the conditions requisite for uniform working, it will probably become the chief process followed in our bleaching powder manufactories.

But little further is known of the process of making carbonate of soda directly from salt by what is called the "ammonia process." Messrs. Brunner and Mond carry it on at Northwich, but their operations, I understand, are kept so secret that nothing is known of them outside their works. Mr. Weldon, who has examined into the subject, expressed the opinion at a recent meeting of the Society of Arts that the process is so slow and the apparatus so expensive that it could not be economically worked. It may be of interest to some of our members to know that the direct ammonia process was experimented with in Gateshead about ten years ago. The trial soon came to an end, but from causes apart, I believe, from the success or non-success of the process.

The Hargreaves process of decomposing common salt is now making considerable progress. This plant is in operation in three manufactories in Lancashire, which at present are producing from 210 to 240 tons of sulphate of soda per week by its means. The Jarrow Chemical Company are also preparing to erect plant capable of making about 100 tons of sulphate of soda per week, and it is in process of erection in other works. For the information of such of our members as are unacquainted with this process, I may explain that instead of decomposing common salt by sulphuric acid as in the old process, Mr. Hargreaves uses sulphurous acid, air, and steam for this purpose. The salt, in a suitable mechanical condition, is placed in large cast-iron cylinders, ten to fifteen feet in diameter, and from ten to twelve feet high. A series of from six to ten of these are placed alongside each other and heated externally. Sulphurous acid direct from the pyrite kilns, together with air and steam, are passed through the salt in the first cylinder, then through that in the second, and so on through the whole series. A temperature of from 800 degrees to 1000 degrees Fahrenheit is found most favourable for the decomposition. It takes a fortnight or three weeks from the commencement of the operation to completely decompose the salt in the first cylinder; the salt in the other cylinders is, however, in various stages of conversion into sulphate at the same time, so that when the sulphate made in the first cylinder is drawn and the gas goes direct from the pyrites' kilns to the second cylinder, the salt in this becomes completely decomposed and ready for drawing one or two days afterwards; and so on with the other cylinders. The adoption of this process will work the most radical change in the chemical manufacturer's plant, for the old familiar large leaden chambers, and the decomposing pan and furnace, which have hitherto been indispensable, will then be superseded. As the cost of the Hargreaves plant is, I understand, much about the same as that which it will supersede for the production of a given amount of sulphate of soda, the superior economy of this process must be looked for in the saving of nitrate of soda, labour, and wear and tear.

I will now briefly call your attention to a few other new processes involving chemical operations, some of which have recently been introduced in this district, and others which are, I think, deserving of notice because they are likely to affect the interests of the manufactures which are carried on in our midst.

Of late years chemists and manufacturers have devoted much attention to the utilization of what have usually been considered waste products. The Weldon process already alluded to, in which peroxide of manganese is reproduced from the hitherto waste chloride of manganese liquors, is an instance of the success which has been achieved in this direction. This is also admirably illustrated in the treatment of the cupreous iron pyrites, now so largely imported from Spain and Portugal, by which almost every constituent of this mineral is now utilized and made a source of profit to the manufacturer. When the sulphuric acid maker has extracted the most of the sulphur, the burnt ore is handed over to the copper extractor, who not only separates the copper it contains, but, at the same time, so perfectly removes the remaining sulphur that the residue, consisting chiefly of peroxide of iron, is suitable for, and is now largely used in, various iron-making processes. It is well known that the original pyrites contain small quantities of silver—from half an ounce to one ounce per ton—and this is, also, now in many instances, separately extracted and sold. It is found that the most of the silver is obtained in solution along with the copper after the burnt pyrites has been roasted along with common salt and subsequent lixiviation with water. Mr. F. Claudet, a few years ago, patented a process for obtaining the silver from these solutions by precipitating it with an alkaline iodide, and this process is, I believe, successfully at work in some of the copper-extracting works in Lancashire. Within about the last twelve months, Mr. Thomas Gibb, of the St. Bede Metal and Chemical Works, has devised an ingenious method of extracting the silver from these solutions, which is now in successful practical operation at those works. Mr. Gibb's method of separation is based on the fact, I believe, first discovered by him, that when sulphuretted hydrogen diluted with common air is passed through a cupreous solution containing small quantities of silver, the silver is precipitated first, or, at any rate, that the most of the silver is precipitated as sulphide with a relatively small proportion of the copper. For the particulars given in the following description of this process I am indebted to Mr. Gibb. Sulphuretted hydrogen is generated by the action of dilute hydrochloric acid on soda waste, and drawn from the generating tanks, in admixture with common air, by a blowing engine which forces the mixture into the copper solutions. This is continued until about six per cent. of the copper in the liquors is precipitated, when it is found that the solutions which usually contain about 20 oz. of silver per ton of copper before the action of sulphuretted hydrogen, are reduced to 3 oz. of silver per ton of copper on the average, and the mixed sulphides of copper and silver precipitated contain about 200 oz. of silver per ton of copper. The sulphide precipitate is washed and calcined at a low temperature. The silver becomes soluble in common salt solution, the precipitate, although washed, retaining chlorides sufficient to change the sulphide of silver into chloride in the calcination. A part of the sulphide of copper is changed to sulphate, and the remainder to oxide, by the calcination. The sulphate of copper is washed out with water in wooden tubs, and the chloride of silver, with some chloride of copper, is subsequently dissolved out by strong hot brine. The sulphate of copper solution first washed out contains only about one ounce, and the oxide of copper remaining after dissolving out the chloride of silver 4 or 5 oz. of silver per ton of copper. The former is precipitated with the ordinary copper liquors in the usual manner, and the latter smelted with the ordinary copper precipitate. The solution of chlorides of silver and copper in common salt is mixed with milk of lime to decompose the metallic chlorides, and the chloride of calcium produced is washed from the precipitated oxides. These oxides are treated with dilute sulphuric acid, which dissolves the oxide of copper, leaving the silver. The residue, which contains about 10 per cent. of silver as chloride with sulphates of lime and lead, after the sulphate of copper has been washed from it, is dried and sold to silver smelters. Fully half an ounce of silver per ton of burnt ore is recovered, and although the operations just described appear somewhat numerous and troublesome, yet the total cost of recovery is not more than 1*s.* 6*d.* per oz. of silver. During this year, an amount of residue containing 16,000 oz. of silver has already been extracted at the Bede Metal Works by this process.

Another novelty introduced in our district, and which I think is deserving of the attention of our members, is the new form of condenser recently patented by Messrs. Newall and Bowman of the Washington Chemical Works, and which these gentlemen have in use and are now experimenting with for the condensation of hydrochloric acid in their works at Washington. In this condenser condensation is effected by passing the acid gas through one or more stone cisterns, about six feet square and two feet deep, into each of which water is entering through a small orifice of about 0·06 of an inch diameter, under a pressure of about 40 lbs. The fine stream of water is projected by this pressure with great force against a small disc, and is thus dashed into fine spray, which fills the whole of the vessel, and meeting with the hydrochloric acid gas, condenses it, forming liquid hydrochloric acid of the strength usually of 28 degrees of Twaddell's hydrometer. There is a considerable amount of heat developed by the condensation of the gas, and the vapour of water laden with hydrochloric acid after leaving the vessels in which the spray producers are placed is at present passed into a small condenser of the ordinary construction (much too small to do the whole work of condensation itself), where the vapour is cooled and perfectly condensed. In places where an ordinary condenser is not already in existence to be thus utilized it is proposed to place a series of cooling pipes between each spray producer vessel in order to cool the vapour.

It appears to me that these spray producers may be used with great advantage in washing and purifying the smoke and gases from copper works, outlets of sulphuric acid chambers, manure works, and in many other cases where noxious vapours are sent into the air. With such an apparatus the draught of the chimney need not be interfered with, and, what is of great importance for the effectual removal of condensable gases, every particle of the gases would be brought into contact with water. I would recommend that experiments in this direction should be made.

The spray producer may also probably be found of use in the purification of lighting gas as a substitute for the scrubber. An American engineer, Mr. B. E. Chollar, of St. Louis, patented, in 1872, an apparatus for this purpose, in which spray was produced by injecting water into a vessel through which the gas passed, by means of a jet of the gas under process of manufacture compressed to about 10 lbs. on the inch by a suitable compressor. More recently still, two French engineers, MM. Pelouze and Andouin, have patented a similar apparatus for the same purpose. Messrs. Newall and Bowman's water spray is, however, produced by much simpler means, and will probably be found to be as effective for this purpose.

A discovery has recently been made in iron metallurgy which is likely to be of very great importance to the iron manufacturers of this and all other districts where the iron produced contains considerable quantities of phosphorus. It has been considered an axiom amongst steel makers that it is impossible to produce good workable steel if the amount of phosphorus it contains exceeds somewhere about five-hundredths of a per cent. of the steel. As it is well known that neither the Bessemer process nor the Siemens-Martin process of steel making eliminate the phosphorus from the iron under treatment, it has hitherto been found necessary to use only such pig iron for these processes as were nearly quite free from this ingredient. The attention of chemists and metallurgists has therefore for long been directed to discover a method for effectually and economically removing phosphorus from its combination with pig iron, but hitherto no process better than the old puddling process has been devised, and this does not remove the phosphorus so thoroughly as to make the iron sufficiently free from it to fit it for the requirements of the steel maker. It has now been discovered that much more phosphorus may be left in the steel without injury to the product than has hitherto been thought possible, provided that the amount of carbon be at the same time reduced; in other words, the less carbon there remains the more phosphorus may be left in the steel. Thus a steel of good workable quality suitable for making rails is produced, which contains 0·30 of a per cent. of phosphorus, if only 0·15 per cent. of carbon be present at the same time. It is difficult to ascertain to whom the merit of this discovery is due. It appears that the late Mr. Matthiessen years ago held the principle upon which it is based, and Mr. Frederic J. Slade, of the New Jersey Steel Company, seems to have discovered the same principle and carried it into practice in the beginning of 1870. It has, however, recently been brought into public notice by the publication of the researches and experiments of M. Tessié du Motay and of M. Euverte of the Terre Noire Steel Works in France, and it was at these works that the steel of the composition just mentioned was produced. The chief credit of making the principle known, and showing how it can be carried into practice, may therefore be claimed by them. When the pig iron used in the Bessemer process has been decarbonized by the action of the air a certain amount of oxygen remains in the iron either as oxide or in some other condition, and it is necessary to remove this and, in this process as well as in the Siemens-Martin process, to add substances to convert the iron into steel. Spiegeleisen, a substance containing about ten per cent. of manganese and five per cent. of carbon, is at present used for this purpose. It is found, however, that when spiegeleisen of this quality is used in the necessary amount to convert the iron into steel it introduces too large a proportion of carbon to admit of a workable steel being produced from iron containing more than a few hundredths of a per cent. of phosphorus. When, therefore, "phosphorus steel," as it is called, is to be produced, it is necessary to use for the last-named process a material containing a smaller amount of carbon in relation to its manganese than spiegeleisen contains, and such a material is found in ferro-manganese, which can be obtained containing from 40 to 70 per cent. of metallic manganese and about 5 per cent. of carbon. This material is, however, very expensive, the present price being about 1s. 6d. per lb., and although only about two per cent. of it is required in the steel, yet this amount adds about £3 7s. 6d. per ton to the cost of the steel. At Terre Noire, however, they find that it answers their purpose to use this expensive material. No doubt means will soon be found to produce good ferro-manganese at much less cost. When this is the case, there is every reason to believe that Cleveland puddled bar may be largely used in the manufacture of steel. There is no difficulty in producing puddled bar from Cleveland pig iron containing only 0·2 or 0·3 per cent. of phosphorus, especially if the revolving puddling furnace is used, one form of which (Crampton's) promises now to be commercially successful.

At the present time there are several attempts being made to produce iron and steel directly from the ore without the intervention of the blast furnace. Besides the Siemens process, which was described by Mr. Siemens in a paper read before the Chemical Society in London in the beginning of last year, there are two or three being tried which are based on the principle employed many years ago by Clay, Renton, Chenot, and others, which consist in reducing the iron in the ore to the metallic state by heating it with carbonaceous matter in close retorts, and afterwards heating the reduced ore in reverberatory furnaces to melt out the slag and to weld the particles of iron together. The process of this kind which is attracting most attention at present is that of Mr. Blair, of Pittsburgh. He heats a mixture of iron ore and charcoal in vertical tubes forty feet in height and three feet in diameter. The upper part of this tube is heated externally by gas generated in gas producers, and internally by the combustion of the carbonic oxide arising from the action of the charcoal on the iron ore, whilst the lower part is cooled by encasing it in a water jacket. The iron which is reduced to the metallic state in the upper part of the tube is thus cooled down in an atmosphere of carbonic oxide in the lower part, so that when it reaches the bottom of the tube it may be removed in the air without fear of re-oxidation. The materials are fed in at the top and withdrawn at the bottom continuously. The metallic sponge thus produced is then pressed into lumps by hydraulic pressure and used for the making of steel in the Siemens-Martin process instead of wrought iron. The process has been at work for some time at the Glenwood Iron Works, Pittsburgh, and Mr. Blair claims that there is a very considerable saving in the cost of production of steel from his iron sponge as compared with the use of wrought iron. With very rich iron ores processes of this kind may probably be economical if a well-planned apparatus is used, but it is very doubtful if this would be the case with poor and siliceous ores, owing to the waste of iron which would occur in smelting out the earthy matters. Mr. Blair's process is not yet removed from the region of experiment, and the progress it makes will be watched with interest by all iron and steel makers.

RESEARCHES ON FOREIGN BITTER SUBSTANCES IN BEER.*

BY W. KUBICKI.

Professor Dragendorff, of Dorpat, has sought a method for detecting alkaloids, or other toxical and bitter substances which are introduced into beer. This method depends on the principle, determined by experiments, that, when the solution to be examined is agitated with petroleum, ether, benzine, and chloroform, the substances in question, when they have been used, are given up as well by the acid solutions as by those which are alkaline, when these solvents are evaporated so as to give a residue.

This method has been applied by Professor Dragendorff in the examination for the bitter substances usually employed, and also for substances which are not alkaloids, as picric acid, salicin, colocynthin, picrotoxin, and capsicin; also for the following alkaloids: strychnine, atropine, hyoscyamine, and the opium alkaloids sometimes used to falsify beer.

Mr. W. Kubicki has also, on his part, applied this method, and in a memoir inserted in the *Journal der Pharmacie für Russland*, August 1873, has given an account of his labours, of which, considering its length, we can only give an extract.

Mr. Kubicki's researches had for their object the detection of the following substances in beer by this method: *quassia cetraria* (quassia), *Absinthium* (absinthe), *Trifolium fibrinum* (Menyanthes trifoliata), *Ledum palustre* (marsh tea), *Cnicus benedictus* (blessed thistle), aloes, *Cetraria Islandica* (Iceland moss),† *Erythrea Centaurium* (red centaury), *Daphne Mezereum* (yarrow), *Gentiana* (gentian), and he has also extended his researches to the alkaloids of colocynth and the Levant wormseed.

First of all it was necessary to make certain of the reactions afforded by the pure extracts of malts and hops, as well as those of pure beer with and without hops. As it appears to be established that the fermentation has no effect, and that the addition of hops only affects the flavour, the experiments were all made on extracts, and preparations made expressly for the purpose.

In the examination of a hop beer, the author depended upon the works of Mr. Enders and Mr. Lermer, at least so far as they treated of the bitter principle of the hop. The latter was of but little use to him, because no reactions are given, and the crystalline form there described as characteristic, in consequence of the large quantity used by Mr. Lermer, and the vagueness of his method, could not be distinguished by the author.

The bitter principle of the hop is described by Mr. Enders as amorphous, easily soluble in alcohol, ether, chloroform, and slightly soluble in water. The aqueous solution is precipitated by plumbic subacetate, but not by tannic acid, ferric chloride, or mercuric chloride. It does not reduce an ammoniacal solution of argentic nitrate. It dissolves in concentrated sulphuric acid, turns brown, and precipitates in grey flocks when the solution is diluted.

The bitter principle obtained by Mr. Lermer has the following properties: It crystallizes in prisms, with a pure bitter flavour, hot and agreeable; it dissolves readily in alcohol, ether, chloroform, and in water to so slight an extent that it can scarcely be detected by the taste; but this flavour is strongly produced when the crystals are first dissolved in alcohol, and water is then added.

According to Mr. Leuchs, the hop bitter is decomposed by various substances, among others, by sulphurous acid and its salts, by aldehyde, and also by formic acid and its salts.

The researches of Mr. Kubicki on a pure beer as well as on a fermented and a non-fermented extract of malt, gave the following results:—

I. A. *In acid solution.*—Petroleum ether extracted but little; the residue from the evaporation of the solution, when separated, is small, amorphous, greyish-yellow; that from beer made with hops is a little more bitter than that without hops, with a taste and odour reminding one in general of amylic alcohol. Nitric and sulphuric acids give nothing characteristic.

The residue from the agitation with benzine is better characterized than the preceding; it is yellow, almost completely soluble in ether; that with hops is very bitter compared with that which contains no hops. Sulphuric acid, sulphurous, hydrochloric, sulphomolybdic (Frohde's reagent), and sulphonitric acids, bromine water, tannic acid, potash ley, potassio-mercurous iodide (Nessler's reagent), and tincture of iodine, are without very marked action upon it.

The residue from the action of chloroform is much more considerable than the preceding, dark yellow, with a slightly bitter taste, and almost the same for that made with or without hops. Concentrated sulphuric, sulphomolybdic, picric, and phosphomolybdic acids are indifferent to it. With tannic acid, the insoluble portion gives in ether a white precipitate, but none in the portion soluble in ether; the ammoniacal solution of silver is reduced, while that passing into solution in benzine does not give this effect. The author has therefore thought that two different bitter substances exist in the hop, of which the one dissolves in chloroform, and the other in benzine; the former possessing the properties remarked by Mr. Enders, while the other acts differently with the ammoniacal solution of silver and tannic acid.

B. *In alkaline solution.*—Petroleum ether extracted almost nothing; the other tests with the reagents were negative.

The residue from benzine was small, gray, a little more bitter with hops. Tincture of iodine, phosphomolybdic acid, and Nessler's reagent gave a slight turbidity, arising perhaps from the alkaloid discovered by Mr. Lermer

* *American Chemist* for November; from the *Technologiste*, No. 399, 1874.

† This substance has but little importance as a bitter, but as it gives a certain consistency to the beer, and makes it more frothy, it is often added to this beverage in the northern countries.

in beer. With regard to this alkaloid, Mr. Kubicki has found that it neither shares in nor interferes with the ordinary reactions serving to determine the identity of strychnine, atropine, daturine, or hyoscyamine.

The residue from agitation with chloroform is a little larger than that from benzine; is yellow, scarcely bitter, and afforded no reaction with picric and phosphomolybdic acids. All the residues, as well those from the acid as the alkaline solutions, were not crystalline. The substance obtained by chloroform in acid solution remained amorphous, even after treatment with ether or alcohol.

In reviewing the preceding facts, we see that, with the exception of the reduction of the ammoniacal silver solution by the acid product from agitation with chloroform, the precipitation of the portion from this product insoluble in ether by tannic acid, and the alkaloid reaction in the residue coming from the agitation with benzine in alkaline solution, the solutions from the agitation of malt or beer do not give any result which might cause error in the proximate analysis for other bitter substances than hops in beer.

II. The examination for bitter substances when mixed with beer, in pure aqueous extracts, was the object of the second portion of Mr. Kubicki's work. The quantities of these bitter substances cannot, in consequence of their flavour, be arbitrary; they must not give the beer a repulsive taste, or properties foreign to those of good ordinary beer. The examination should therefore only be carried to the detection of small quantities, and was undertaken in the following manner:—10 grammes of each substance, and 2 grammes of aloes were weighed out; some, as cassia, were boiled in two litres of spring-water, the others extracted by boiling water. The filtered liquor for each amounted to one litre.

Mr. Kubicki then proceeded to examine the reactions which characterized each of the bitter substances previously indicated, and to render the results obtained by Professor Dragendorff and himself more tangible, he has made up the following table:—

A.—Agitation in Acid Solution.

I. *Residue of Petroleum Ether.*

1. Crystalline, yellowish, slightly volatile. The solution remains yellow; potassic cyanide and caustic potash colour it red; on heating, cotton is dyed yellow. *Picric acid.*
2. Amorphous, white, sharp taste, and reddening the skin. *Capsicine.*

II. *Benzine Residue.*

1. Crystalline.
   - *a.* Not bitter, and becoming purple with caustic potassia. *Alvetine.*
   - *b.* Bitter, becoming yellow with caustic potash, and brown on heating. *Daphnine.*
2. Amorphous.
   - *a.* Sulphuric acid colours it brownish-red, tannic acid precipitates. *Quassine.*
   - *b.* Heated with dilute sulphuric acid, odour of menyanthole, with clouding of the solution, and elimination of oily drops. *Menyanthine.*
   - *c.* Sulphuric acid colours it blood-red, afterwards brown-red, hydrochloric acid greenish; after heating brown, cloudiness and elimination of oily drops. *Cnicine.*
   - *d.* Sulphuric acid colours it brown, afterwards blue-violet; same with sulphomolybdic acid. *Absinthine.*
   - *e.* Sulphuric acid colours it dark-red, sulphomolybdic acid fine cherry-red, tannic acid precipitates yellowish-white. *Colocynthine.*
   - *f.* Sulphuric acid colours it brown, hydrochloric greenish; on heating, the liquid turns brown and clouds. *Erythrocentaurine.*
   - *g.* Sulphuric acid colours it clear brown, caustic potassa yellow, brown on heating; tannic acid gives no precipitate, nitric acid of 1·42 colours red. *Gentian bitter?*

(Also sometimes a residue of *capsicine.*)

III. *Chloroform Residue.*

1. Crystalline.
   - *a.* Alkaline reaction none; sulphuric acid colours fine yellow; mixed with saltpetre ($NaNO_3$), then moistened with sulphuric acid, and finally, on adding a concentrated solution of soda, brick-red colouration. *Picrotoxine.*
   - *b.* Alkaline reaction. *Opium alkaloid.*
2. Amorphous.
   - *a.* No bitterness; caustic potash colours it purple-red. *Residue of aloetine.*
   - *b.* Bitter; caustic potash colours it yellow; obtained in crystals by dissolving in benzine and evaporating. *Residue of daphnine.*
   - *c.* Insoluble in ether.
     - *α.* Sulphuric acid colours it red-brown, tannic acid precipitates it. *Residue of quassine.*
     - *β.* Heated with dilute sulphuric acid, odour of menyanthole, liquid cloudy, and elimination of oily drops. *Major part of menyanthole.*
     - *γ.* Sulphuric acid colours it blood-red, then brown-red; hydrochloric acid greenish and brown on heating, cloudiness and elimination of oily drops. *Residue of cnicine.*
   - *d.* Soluble in ether.
     - *α.* Sulphuric acid colours it brown, afterwards blue-violet; sulphomolybdic acid same effect. *Residue of absinthine.*
     - *β.* Sulphuric acid colours it bright red, sulphomolybdic acid cherry-red, tannic acid precipitates yellowish-white. *Residue of colocynthine.*
     - *γ.* Sulphuric acid colours it brown, hydrochloric acid greenish, brown on heating, cloudiness and elimination of oily drops. *Major part of erythroecentaurine?*

B.—Agitation in Ammoniacal Solution.

I. *Benzine Residue Crystalline.*

1. Dilates the pupil.
   - *a.* Platinic chloride does not precipitate the aqueous solution; the sulphuric acid solution develops a characteristic odour on heating. *Atropine.*
   - *b.* Platinic chloride in sufficient quantity gives a precipitate. *Hyoscyamine.*
2. Does not dilate the pupil.
   Solution in sulphuric acid passes to blue with ceric oxide. *Strychnine.*

II. *Chloroform Residue.*

1. Sulphuric acid dissolves it in the cold without becoming coloured.
   - *a.* Solution colours a little on heating; after cooling is coloured violet-blue by nitric acid. Ferric chloride blues the substance, and sulphomolybdic acid colours it immediately violet. *Morphine.*
   - *b.* The solution on heating turns violet-blue. *Papaverine.*
2. Sulphuric acid colours it greyish-brown, and the solution on heating becomes blood-red. *Narceine.*

III. *Amylic Alcohol Residue.*

(This agitation is not performed unless the presence of salicine is suspected).

Sulphuric acid immediately colours it pure red. On heating with sulphuric acid and potassic bichromate, an odour of salicylic acid is developed. *Salicine.*

The characteristics designated in this table appear to be of such a nature as to afford an opportunity to discover the foreign substance which has served to give a beer the desired degree of bitterness; but they do not serve for the quantitative estimation of these substances, and even leave one in a state of uncertainty, unless the operations are repeatedly performed.

TEST PAPERS.*

BY F. MOHR.

For the preparation of litmus paper the author recommends that the litmus be washed with hot alcohol and then extracted with cold water. This extract may be brushed on writing paper on one side. The paper must be washed with water to remove free alkali or acid.

Turmeric roots contain two yellow dyes, one soluble in water and unaffected by alkalis, the other soluble in alcohol. The roots should be washed in water as long as the washings are coloured, and then exhausted with alcohol.

Paper soaked in potassium sulphocyanate or ferrocyanide may be used for the detection of iron.

Paper containing starch moistened with a solution of potassium iodate in oxalic acid, and dried, is turned blue by bodies which act as reducing agents, such as sulphurous acid, hyposulphites, sulphuretted hydrogen, potassium sulphocyanate, ferrous oxide, cupric chloride, potassium iodide, and similar bodies.

For oxidizing bodies a starch paper with potassium iodide may be used. To keep such paper unchanged, a lighted sulphur match should be held in the bottle in which the paper is preserved before closing the stopper.

The author also recommends the following test-papers:—For ammonia-gas: paper soaked in mercurous oxide solution. For sulphuretted hydrogen and alkaline sulphides: acetate of lead paper; filter-paper soaked in cobalt chloride; polished visiting cards known as "Polka papier;" paper painted with bismuth white.

For metals which give black precipitates with sulphuretted hydrogen in acid solution, washed sulphide of zinc precipitated from the acetate is smeared on writing paper and dried. Any mineral acid decomposes the sulphide of zinc, setting free sulphuretted hydrogen, which immediately precipitates the metals present.

The violet assumed by litmus in the titration of solutions which do not contain carbonates, is due to the carbonic acid contained in the litmus itself. If this be expelled by acidifying with dilute sulphuric acid and then boiling for some time, the litmus, after treatment with baryta water, changes from blue to red without any intermediate violet. In titrations with litmus, if the final colour is to be blue, blue litmus should be added first; if red, the red solution must be used. In this way all errors arising from the litmus itself may be avoided.

THE USES OF TURPENTINE AS A DISINFECTANT.

In a letter to the *Medical Times and Gazette*, from Dr. Thomas F. Wood, of Wilmington, North Carolina, occur the following remarks on the disinfecting properties of turpentine:—

"I have no experience with the use of the *odorous* essential oils as a means of disinfection, but I would like to make a remark upon the influence which the turpentine distilleries have upon the town in which I live. Wilmington, North Carolina, the town spoken of, is the great export market for oil, or "spirits of turpentine," as it is known in commerce, and also for tar, pitch, turpentine, and resin, the products of the extensive forests of *Pinus palustrio* which abound on the seaboard belt of all the Southern United States. This town is situated on the Cape Fear, a river which has a broad alluvial shore, and is subject to diurnal flooding by tide-water. The town itself is situated on a sand-ridge, and directly across the river to the west are extensive swamp rice-fields, not now under cultivation. During the late civil war, commencing in the early spring of 1861, all of the turpentine distilleries (which were located on the river-side in the town limits)—amounting to about six—were closed, and were not put in operation again until from 1866 to 1870. It had long been a popular theory that the health of the community was due to the resiniferous odours from these stills; and this opinion was shared by the medical men also. In 1862, these distilleries having ceased operations then for about eighteen months, a virulent epidemic of yellow fever broke out, having its origin, doubtless, by importation through the blockade, but owing its virulence and rapid spread to the insanitary condition of the town. True to the theory held as to the health-giving virtues of the resin and other products of the pine tree, barrels of resin were burnt day and night in the streets, covering the town with a funereal pall of dense black smoke. The only other notable epidemic was that of spotted fever (perhaps cerebro-spinal), which broke out in 1865, before the operations at the stills were recommenced. Previous to the establishment of distilleries in our midst—perhaps forty years ago—malarial fevers were very rife, but since that time they have prevailed to a less extent, and are more easily controlled by remedies.

"Another fact, bearing only an indirect relation to the above statement, is that during the civil war, when quinine was scarce, the surgeon-general of the Confederate States ordered experiments to be instituted at several of the large military posts, to prove whether or not oil of turpentine applied to the body by means of a broad band saturated with it, and worn around the abdomen, had any effect in cutting short the paroxysms of ague. Its effects were described as "marvellous," used in the cold stage of malarial fever, as endorsed by very many observers.

"It has long been the custom of the white proprietors of rice plantations in this section to move their families to the pine forests during summer and autumn, as there they enjoyed immunity from chills and fevers, so malignant upon their plantations. The theory that it is the resiniferous exudation from the *Eucalyptus globulus* which destroys malaria, seems to have abundant confirmation in the parallel of our North Carolina forests."

POTASSIUM IODIDE FROM CUPROUS IODIDE.*

BY M. LANGBEIN.

Cuprous iodide, which is imported in considerable quantity from Peru, contains from 60 to 70 per cent. of iodine, and furnishes a very suitable material for the preparation of pure potassium iodide.

In the author's process, this iodide is reduced to a fine powder, and suspended in water to which a few drops of hydrochloric acid have been added. It is then decomposed by a stream of sulphuretted hydrogen, and the excess of gas is destroyed by a solution of iodine in iodide of potassium, after the liquid has been decanted from the insoluble copper sulphide.

Potash, or potassium bicarbonate, according to the purity of the product required, is then added in sufficient quantity, and the whole evaporated till crystallization takes place. During the evaporation the suspended sulphur gathers together in balls, and sinks to the bottom.

The iron sulphate formed in the preparation of the sulphuretted hydrogen covers the expense of the acid and iron sulphide used, while the copper sulphate obtained by roasting the copper sulphide covers the other expenses. One point to be looked to is, to decant the liquid at once from the copper sulphide, as otherwise copper sulphate is formed by oxidation, and the final product rendered impure.

---

* *Journal of the Chemical Society*; from the Zeitschr. f. Anal. Chem., xii., 368—372.

* *Journal of the Chemical Society*; from the Deut. Chem. Ges. Ber., vii., 765—767.

The Pharmaceutical Journal.

SATURDAY, JANUARY 16, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE NEW DRUG, JABORANDI.

IT was hardly to be expected that the surprising statements made by Professor GUBLER, in the early part of last year, respecting a new sialogogue and sudorific drug which he had received from Brazil, would escape the attention of therapeutists or pharmacists. The supply of the drug was so limited, however, and of such a nature, as to preclude more than conjecture as to its probable botanical origin, although sufficient to justify the hope that the South American Continent, which had already contributed so richly to the materia medica, was able to furnish yet another substance valuable in the treatment of the diseases "that flesh is heir to."

When, however, demands were sent to Brazil for a fresh supply, the difficulty commenced; for the name Jaborandi, so singular to English ears, is applied in that country to a large number of vegetable substances, many of which belonged to the Pepper family, and any of which might have been fairly forwarded under that name. By comparing the imperfect materials available, with Brazilian plants in his herbarium, Professor BAILLON was induced to regard Jaborandi as a Rutaceous plant, the *Pilocarpus pennatifolius* of Lémaire. We think we are justified in saying that none of the original sample forwarded by Dr. COUTINHO to Professor GUBLER reached this country in a state that would warrant an expression of opinion as to the correctness of Professor BAILLON'S determination. The fact that the predominant drugs known by the name of "jaborandi" belonged to the Piperaceæ, coupled with the negative results of some fresh leaves of *Pilocarpus pennatifolius* obtained from a plant growing in the Royal Gardens at Kew, created a strong suspicion that Professor BAILLON was mistaken, although, on the other hand, the physiological action of some of the Piperaceous substances were not found to coincide exactly with those attributed to the drug received from Professor GUBLER. We may remark in passing, however, that the non-development of an active principle in the Rutaceous plant when grown in a different habitat would have its exact counterpart in another new remedy from South America, Boldo, a plant of which, grown in Paris, is stated to have contained only a trace of the essential oil so abundant in the plant growing in its native home.

Within the last few days, however, there has been received in this country, from Pernambuco, a parcel of a "Jaborandi," the product of a Rutaceous plant, which we are given to understand, is, if not identical with the species indicated by Professor BAILLON, at least very nearly allied to it. Further, a rather venturous, but to some extent unintended experiment upon himself, which Mr. MARTINDALE describes on another page, shows that it possesses those remarkable physiological properties attributed to the drug used by Drs. COUTINHO and GUBLER, which, as it appears at present, render it unique. Without, therefore, arrogating to this particular drug the sole title to the name, we think it may fairly be assumed that this is *the* "Jaborandi" for which therapeutists and pharmacists have been looking.

We may mention that at the earliest moment steps were taken to put our readers in possession of authentic information respecting this latest novelty, and with this object Mr. HOLMES, the Curator of the Museum of the Pharmaceutical Society, has undertaken to draw up a detailed botanical description of the plant, and this, illustrated by a drawing of the plant, fruits, etc., will appear in the next number of the journal. Meanwhile it may be useful to indicate here what he has found to be some of the principal characteristics of the leaves, which are the parts used in medicine. The leaves are about nine inches long, and consist of from three to five pair of opposite leaflets, which are entire, with an emarginate or even retuse apex, and an unequal base. The texture is leathery, and when moistened the leaflet recalls in size and thickness the leaf of the cherry laurel. The veins are prominent on both sides of the leaf, and they branch from the midrib in a pinnate manner, remaining distinct until within one quarter of an inch of the margin of the leaf, where they become lost in the network of veinlets. When held up to the light the leaflets are seen to be densely pellucidly punctate. These pellucid dots, which are receptacles of secretion, are not arranged, as in another kind of Jaborandi, in lines along the veinlets, but are irregularly scattered all over the leaf, and appear equally numerous in every part. They do not appear to contain a volatile oil, and they impart very little flavour to boiling water. The matter contained in them is granular and may possibly prove to be of the nature of stearoptene. If this be the active principle it is obvious that the best menstruum has not yet been used, and this supposition is strengthened by the result of Mr. MARTINDALE'S experiment.

Some of the leaves originally supplied by Dr. COUTINHO were subjected to a chemical investigation by M. RABUTEAU, with results which were reported in this journal in May last (p. 911). M. RABUTEAU came to the conclusion that the Jaborandi leaves have an odour due to a volatile principle which is not analogous to the essential oils contained in aromatic plants; a bitter taste, due to a principle soluble in water and in alcohol, which can be separated easily by heating the aqueous extract of the leaves with alcohol; lastly that the leaves do not appear to contain any alkaloid. The chemical properties of the drug are, however, being investigated by Professor Attfield with a more ample supply of material than M. Rabuteau possessed.

LEAD IN AËRATED WATERS.

The recent prosecutions in the North for the sale of aërated waters impregnated with lead have excited a great deal of attention, and the paper on the subject read by Dr. Stevenson Macadam last week before the North British Branch of the Pharmaceutical Society is very opportune. Although the solvent action of water charged with carbonic or other acids upon lead was previously well known, Dr. Macadam has done good service by measuring the rate of this action, and demonstrating that aërated waters should never be allowed to come in contact with lead even if the lead occur only as an ingredient in the solder or block tin used in the construction of the apparatus. But if anything were wanting to justify the remarks made last week as to the propriety of analysts limiting their evidence to facts, it would be found in the hitherto unsuspected possible source of lead found in lemonade revealed by Dr. Macadam, who states that the oil of lemons employed in making up the syrup is "often loaded with lead;" this lead being derived from the lining of the copper drums or vessels in which it is imported. It is manifest that, in the present state of the law, this and the kindred contamination indicated by Mr. Ekin last week, may be a cause of serious inconvenience no less to the seller than to the consumer, and they present fair illustrations of cases where extra discretion should be used before initiating prosecutions. It is therefore satisfactory to note Dr. Macadam's statement that in Glasgow it was only after manufacturers had refused or delayed to remove lead pipes, and make other alterations which were necessary, that the authorities commenced the prosecutions.

THE CHEMISTS' BALL.

Whilst yet engaged in the festivities and social gatherings of Christmas and the New Year many pharmacists begin to look forward to the day when, according to what has now become an annual custom, they will have an opportunity of meeting their brother pharmacists and friends at the Chemists' Ball. In informing our readers that the Ball for 1875 will be held at Willis's Rooms, King Street, St. James's, on Wednesday next, we have a suspicion that we are doing something that is almost superfluous: we are therefore glad to be able to add that there is every promise at present of its being as successful as any of its predecessors. Tickets may still be obtained from the Stewards who form the Committee, a list of whom and other details will be found in our advertising sheet.

THE YEAR BOOK OF PHARMACY, 1874.

We are requested by the General Secretaries of the British Pharmaceutical Conference to state that the Committee of Publication regrets that the protracted illness of the Editor has somewhat delayed the issue of the Year Book for 1874. It is believed, however, that it will be ready for distribution before the end of the present month.

THE STORAGE OF DRUGS, ETC.

Price Currents and Trade Lists frequently evince much ingenuity and liberality on the part of those who issue them, in providing certain features that shall impart more than a passing interest to what would otherwise be "Dry-as-dust" catalogues. Messrs. Southall, Bros., and Barclay, of Birmingham, have forwarded to us a copy of their Monthly Price Current, in which the novel feature takes the utilitarian form of some very useful hints on the Storage of Drugs.

In his quarterly report to the Town Council of Bradford, Mr. F. M. Rimmington states that as Public Analyst he has examined during the last three months 41 samples of various articles, of which about one-fourth were adulterated. In the quality of the milk supply he has noted a considerable improvement. Pepper, however, in six cases out of thirteen, he found to be adulterated with pea meal and rice starch, and he considers it clear from the evidence adduced before the magistrates that the tradesman had been fraudulently imposed upon by two wholesale dealers in a neighbouring town. Referring to the conviction for selling a "Liquid Extract of Beef," which was not what it was represented to be, Mr. Rimmington says that the notice of appeal by the defendant has been withdrawn and all expenses paid.

L'Union Pharmaceutique reports the death by poisoning of a pharmacien, who, mistaking the bottle, took a dose of tincture of digitalis instead of his accustomed dose of cinchona wine.

At a recent Meeting of the New York Academy of Medicine a Committee was appointed to confer with the New York College of Pharmacy respecting the formation of a Botanic Garden in one of the public parks.

On Friday next, a Paper on the Aquarium as a Field for Microscopical Research will be read before the Queket Microscopical Club, by T. Charters White, M.R.C.S., F.R.M.S.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH, EDINBURGH.

The second meeting of the present session was held in the Society's rooms, 119a, George Street, on Thursday evening, 7th January, at half-past eight o'clock, Mr. William Gilmour, president, in the chair. There was a full attendance. The following communication was made:—

On the Presence of Lead in Aerated Waters,

BY DR. STEVENSON MACADAM, F.R.S.E., F.C.S.,

Lecturer on Chemistry.

Lately the action of aërated waters upon lead and the presence of lead in the aërated waters have been brought prominently before the public in connection especially with the prosecutions in Glasgow and elsewhere, under the Adulteration Act, and I have thought that the subject would prove of much interest to the members of the Pharmaceutical Society. I have therefore great pleasure in giving the results of a large number of observations which I have made on the subject, partly in connection with manufactories where I have been professionally consulted as to existing apparatus and necessary improvements, and in other part in respect to a lengthened series of experiments which I have made so as to determine the extent to which and the circumstances under which the aërated waters may be found to act upon lead and become impregnated therewith. The action of aërated water upon lead is one which is not new to me, because in 1871 I made numerous experiments on the action of hard and soft waters upon lead, and then observed that aërated waters acted powerfully upon lead, and in this way explained to some extent why hard natural waters which are highly impregnated with carbonic acid are often found to have more action upon lead pipes than soft waters which are comparatively free from carbonic acid. I have lately, however, supplemented these earlier trials by various series of experiments specially applicable to the presence of lead in aërated waters generally, including simple aërated or carbonic acid water, soda water, potash water, and lemonade.

The proportion of lead in the aërated waters manufactured and sold in Edinburgh within the last month was found by me to run from a mere trace up to one grain in the gallon. It is very seldom that the aërated waters have been found perfectly free from lead. The highest proportions I have detected were as follows:—

Aërated or Carbonic Acid Water	$\frac{1}{5}$	grain of lead to gallon.
Soda Water	$\frac{1}{5}$	„ „
Potash Water	$\frac{1}{5}$	„ „
Lemonade	1	„ „

In the estimation of these or similar small quantities in a single bottle of the water, the ordinary mode of determining quantities by the aid of the chemical balance would not be suitable, and the proportion is actually obtained by a series of colour tests which are applied to standard solutions of lead. One grain of lead is taken and dissolved in a few drops of diluted nitric acid, and the solution then mixed with water till the liquid has the capacity of one gallon. Such a solution will necessarily contain one grain of lead in the gallon of water. From this standard solution it is easy to make other standard solutions containing $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{20}$ grain, or other proportions to the gallon. These standard solutions are placed in large test-tubes about an inch in diameter and seven inches in length, and the liquids may be introduced to the extent of six inches in each. On adding acetic acid and thereafter hydrosulphuric acid and agitating, a more or less dark brown-black colour is produced, according to the proportion of lead. The reaction may be best observed by holding the tube above a sheet of white paper and looking down through the whole column of the liquid.

In this way a standard series of lead test-coloured tubes may be obtained for reference, and the amount of lead in any sample of aërated water may be determined by placing the liquid in a test-tube of similar size to the standard test-tubes, and adding the acetic acid and hydrosulphuric acid, agitating and observing the depth of the colouration produced.

The apparatus at present, and still more so, recently employed in the manufacture of aërated waters over the country, is and was the chief cause of the contamination of the liquids with lead. In some instances I have noticed that lead was employed in every possible place, and not a single piece of tinpipe or other precaution was adopted.

The gas generator is generally made of lead, and the pipe leading therefrom to the gasholder is also of lead. If a washer is introduced, it is likewise made of lead. If care be taken that the entrance gaspipe to the gasholder is a little apart from the exit gaspipe, and the gas be previously passed through a washer, or the entrance pipe be turned over so as to dip into the water in the gasholder tank, then I am of opinion that no harm may be apprehended from the use of lead in the gas generator or the pipe leading therefrom to the gasholder. The exit gaspipe from the gasholder to the receiver should however be of tin, and the mouth of the pipe should rise at least three inches above the highest possible level of the water in the gasholder tank. The gasholder and the tank should not be lined with lead or be painted with lead paint. The receiver is generally of copper, brass, or bronze, and is tinned inside, but the tinning is often done with very inferior metal containing much lead, and hence is a source of contamination of the aërated water. The pipe from the receiver to the bottling machine and all the pipes connected with the water supply and pumps should be of tin, and every coupling and pipe should be soldered with pure tin.

The non-observance of one or more of the above precautions has been noticed by me in some cases to lead to the contamination of the aërated water with lead. Of course, if the pipes are of lead, then the aërated waters must contain lead, but the missing out of any one of the following points may equally cause the waters to be impure:—

1. That the pipes be of pure tin, for many tin pipes contain more or less lead, and will contaminate the waters.

2. That the solder be pure tin, for plumbers' solder and tinsmiths' solder contain much lead, and it is difficult to get workmen to use pure tin.

3. That the gasholder and tank be free from lead, and the exit gaspipe be three inches above the possible level of the liquid in the tank.

4. That the water cistern be cleansed out every week with a soft brush so as to remove any sediment which may have accumulated and which often contains lead.

5. That the receiver be properly tinned with pure tin, and not with tin containing lead; and

6. That all the vessels and measures used in the mixing of the materials be of earthenware, glass or gutta-percha, and that no lead or soldered tin or copper vessel be employed.

In order to determine the extent of the action of the aërated waters upon lead, I made some trials in lead pipes, one inch in diameter and twelve inches long. In the first trial, the aërated waters which were free from lead to begin with—having been prepared at a manufactory which had been reconstructed under my direction—were firstly brought in contact with the lead for the shortest possible time, being merely poured in, and then thrown out again; secondly, were kept in the tube for one minute; thirdly for five minutes, and, fourthly, for one hour. The results of the respective experimental trials on the contamination of aërated or carbonic acid water, soda water, potash water, and lemonade, are given in the following table:—

Aërated or Carbonic Acid Water.

Poured in and out instantly . . .	$\frac{1}{10}$th	grain of lead.
Retained in pipe for 1 minute . .	$\frac{1}{2}$	" "
" " 5 " . . .	2	" "
" " 1 hour . . .	5	" "

Soda Water.

Poured in and out instantly . . .	$\frac{1}{20}$th	grain of lead.
Retained in pipe for 1 minute . .	$\frac{1}{5}$	" "
" " 5 " . . .	1·5	" "
" " 1 hour . . .	2	" "

Potash Water.

Poured in and out instantly . . .	$\frac{1}{20}$th	grain of lead.
Retained in pipe for 1 minute . .	$\frac{1}{5}$	" "
" " 5 " . . .	1·5	" "
" " 1 hour . . .	2	" "

Lemonade.

Poured in and out instantly . . .	$\frac{1}{2}$	grain of lead.
Retained in pipe for 1 minute . .	1·5	" "
" " 5 " . . .	4·5	" "
" " 1 hour . . .	10	" "

It will thus be observed that the lemonade had the most powerful action upon the lead, followed by the simple aërated or carbonic acid water; and that the soda and potash waters had a less but similar action.

The extent of lead surface exposed to the action of the various waters in the above experiments was certainly not large when compared with the amount of lead pipe present in the fittings of some aërated water manufactories; but in order that the observations might apply to those works where a small surface of lead was exposed, or where tin pipes were employed, and soldered in the ordinary way with tinsmiths' solder, containing about two parts of tin and one of lead, I instituted a more elaborate and complete series of experiments with small portions of metal of uniform size, so that the action of the different aërated waters upon the respective metals might be relatively determined.

A strip of sheet lead was taken, exactly one inch broad, and was scraped bright, and then cut into little pieces half an inch in length. These pieces presented a square inch of surface when both sides were allowed for, and they constituted the pieces of *bright lead* which are referred to in the tables which follow. A similar set of pieces of ordinary *tarnished lead* were cut off, and the edges were left *unprotected;* whilst a third set of pieces of ordinary *tarnished* lead were taken, and the fresh edges were protected by being dipped in melted beeswax. One bit of each of these pieces of metal was placed in each of a number of aërated water bottles, and the bottles were then charged respectively with aërated or carbonic acid water, soda water, potash water, and lemonade, which were free from lead. Two bottles of each kind were opened in a day and were examined for lead; the contents of the one bottle being used at once, whilst the contents of the second bottle were first boiled to expel the excess of carbonic acid, and then filtered before the test for lead was applied. A third bottle of each kind was opened in three days, and a fourth bottle in seven days. The results of all these trials as to the amount of lead dissolved by the waters are given in the following table in proportions of a grain of lead to the gallon of the respective waters:—

	Bright lead.	Tarnished lead with cut edges, unprotected.	Tarnished lead with cut edges, protected.
	Aërated or Carbonic Acid Water.		
1 day	$\frac{1}{10}$ grain	$\frac{1}{15}$ grain	$\frac{1}{20}$ grain
" and after boiling and filtration	$\frac{1}{13}$ "	$\frac{1}{20}$ "	$\frac{1}{30}$ "
3 days	$\frac{1}{3}$ "	$\frac{1}{3}$ "	1/[illegible] "
7 "	2 grains	$1\frac{3}{4}$ "	$1\frac{1}{2}$ "
	Soda Water.		
1 day	$\frac{1}{15}$ grain	$\frac{1}{20}$ grain	$\frac{1}{30}$ grain
" and after boiling and filtration	$\frac{1}{20}$ "	$\frac{1}{25}$ "	$\frac{1}{40}$ "
3 days.	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{1}{5}$
7 "	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	1
	Potash Water.		
1 day	$\frac{1}{15}$ grain	$\frac{1}{20}$ grain	$\frac{1}{30}$ grain
" and after boiling and filtration	$\frac{1}{20}$ "	$\frac{1}{25}$ "	$\frac{1}{40}$ "
3 days	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{1}{5}$ "
7 "	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	1 "
	Lemonade.		
1 day	$\frac{1}{5}$ grain	$\frac{1}{5}$ grain	$\frac{1}{8}$ grain
" and after boiling and filtration	$\frac{1}{5}$ "	$\frac{1}{5}$ "	$\frac{1}{8}$ "
3 days	1 "	1 "	$\frac{3}{4}$ "
7 "	3 grains	3 grains	$2\frac{1}{2}$ grains

From the above table it will be observed that the lemonade had the most powerful action on the metal, which was doubtless due to the combined action of the carbonic acid, citric or tartaric acid, and sugar. Aërated or carbonic acid water ranked next to lemonade, and the soda and potash waters were less powerful in their action but gave similar results. The effect of heating and filtering the liquid before testing for lead was to lessen the quantity in all the trials with aërated or carbonic acid water, and soda and potash waters, probably due to the disengagement of the solvent carbonic acid, but did not decrease the amount in the lemonade, owing doubtless to the acid character of the syrup keeping the lead in thorough solution.

A similar set of experiments were made on pieces of ordinary tin solder (2 parts of tin and 1 part of lead); plates of tin soldered with ordinary tin solder with the edges unprotected, and plates of tin soldered with ordinary tin solder with the fresh-cut edges protected with beeswax. Each piece of metal was one inch by half an inch, and therefore, as previously expressed, yielded a square inch of surface to the action of the aërated waters. The results are given in the following table:—

	Ordinary tin solder.	Tin plates soldered and edges unprotected.	Tin plates soldered and edges protected.
	Aërated or Carbonic Acid Water.		
1 day	$\frac{1}{9}$ grain	$\frac{1}{30}$ grain	$\frac{1}{30}$ grain
" and after boiling and filtration .	$\frac{1}{12}$ "	$\frac{1}{40}$ "	$\frac{1}{40}$ "
3 days . . .	$\frac{1}{2}$ "	$\frac{1}{10}$ "	$\frac{1}{10}$ "
7 " . . .	$2\frac{1}{2}$ grains	$\frac{1}{5}$ "	$\frac{1}{5}$ "
	Soda Water.		
1 day . . .	$\frac{1}{15}$ grain	$\frac{1}{30}$ grain	$\frac{1}{30}$ grain
" and after boiling and filtration . .	$\frac{1}{20}$ "	$\frac{1}{40}$ "	$\frac{1}{40}$ "
3 days . . .	$\frac{1}{4}$ "	$\frac{1}{10}$ "	$\frac{1}{10}$ "
7 " . . .	$1\frac{3}{4}$ "	$\frac{1}{5}$ "	$\frac{1}{5}$ "
	Potash Water.		
1 day . . .	$\frac{1}{15}$ grain	$\frac{1}{30}$ grain	$\frac{1}{30}$ grain
" and after boiling and filtration. .	$\frac{1}{20}$ "	$\frac{1}{40}$ "	$\frac{1}{40}$ "
3 days . . .	$\frac{1}{4}$ "	$\frac{1}{10}$ "	$\frac{1}{10}$ "
7 " . . .	$1\frac{3}{4}$ "	$\frac{1}{5}$ "	$\frac{1}{5}$ "

	Ordinary tin solder.	Tin plates soldered and edges unprotected.	Tin plates soldered and edges protected.
	Lemonade.		
1 day . . .	$\frac{1}{3}$ grain	$\frac{1}{10}$ grain	$\frac{1}{12}$ grain
1 „ and after boiling and filtration . .	$\frac{1}{3}$ „	$\frac{1}{10}$ „	$\frac{1}{12}$ „
3 days . . .	1 „	$\frac{1}{3}$ „	$\frac{1}{4}$ „
7 „ . . .	5 grains	1 „	$\frac{3}{4}$ „

These results show a powerful action of the various waters upon the solder, and a much smaller action upon the soldered tinplates. As before, the lemonade acted most decidedly, followed by the aërated or carbonic acid water, and thereafter by the soda and potash waters.

Taking all these experimental trials into consideration, it is manifest that no lead, or solder containing lead, should ever be allowed to come in contact with any of the aërated waters, and that for the future all aërated water manufacturers should arrange their apparatus to ensure that the waters are perfectly free from lead.

The materials employed in the manufacture of aërated waters are sometimes impregnated with lead. Even the water may contain the lead derived from the pipes from which it is drawn from the well or other source, and this contamination of the water will be more likely if the water is impure from the presence of nitrates derived from sewage. The cleansing of the lead cistern every week should not be neglected, and where practicable the substitution of a slate cistern would be advisable. No charcoal filter should be employed, for such more often conveys impurity to the water than removes it. A sand and gravel filter may be advantageously employed, provided the sand and gravel are thoroughly washed before being used.

The carbonate of potash sometimes contains iron, but I have never found lead in it. The iron may lead to a fictitious appearance of the presence of lead by darkening with the hydrosulphuric acid, unless the acetic acid has been previously added in decided excess, so as to render the potash water decidedly acid.

The oil of lemons employed in making up the syrup is often loaded with lead. In some cases a few drops added to ten ounces of water, and agitated so as to mingle the oil thoroughly with the water, will communicate sufficient lead to give a dark brown with the test, and a small quantity of the same oil of lemons burned off in a porcelain basin will leave a yellow residue of oxide of lead. It is seldom that the oil of lemons is free from the lead, and I have no doubt that part of the lead which has been found in lemonade has been derived from the oil of lemons employed in making up the syrup. The oil of lemons in its turn obtains the lead from the lining of the copper vessels or drums in which it is sold, and which, in many cases, are tinned in the interior with a thick coating of inferior tin containing a large proportion of lead.

The *syphons* now used in many places for the retention of aërated waters introduce a fresh element of contamination, for the metal covers generally consist of a compound of tin and lead, resembling solder, and hence the aërated waters, when enclosed in these *syphon* bottles, continue to act upon the metal top when the liquid touches it. There should be no difficulty in making the tops of pure tin, and thus ensuring that the aërated waters be not contaminated in this way.

It is satisfactory to know that in the recent prosecutions in Glasgow, the manufacturers of aërated waters were not taken by surprise, for a warning was given to each by the inspectors, and it was only when manufacturers refused or delayed to remove lead pipes, and make such other improvements as to ensure that the aërated waters could be prepared free from lead, that the authorities then raised the prosecution. This is the proper spirit in which to carry out the Adulteration Act, especially in a field where ignorance prevailed as to the existence of the adulteration or contamination.

During the course of the paper Dr. Macadam tested many samples of aërated waters, and practically showed the mode of analysis of lead and tinpipes, solder, etc., as also the extraction of the lead from the oil of lemons, and from the lining or tinning of the drums in which the oil of lemons is brought to this country.

This paper was listened to with much interest, and at the close Mr. Baildon observed that he was sure all present must have been both interested and instructed by the exhaustive series of experiments shown that evening by Dr. Stevenson Macadam, to elucidate the fact of lead being so frequently found present in aërated waters, a subject which was at the present time undergoing a searching inquiry, which must result in benefiting and protecting the public. The discovery of a large quantity of lead in essence of lemon, acquired from the lining of the copper canisters in which the essence is always imported, was, he believed, entirely the result of Dr. Macadam's researches, and would help, although only in a slight degree, to explain the fact that it is found most difficult to manufacture lemonade that does not show a trace of lead. Every manufacturer of aërated waters was bound to take all the precautions in his power in order to obtain absolute freedom from this deleterious metal. In his own case the pipes through which the gas passed were of pure tin, and he employed pure india-rubber tubing for the water, and the solutions of soda and potash and earthenware tanks, so that neither the carbonic acid gas nor the alkaline solutions came in contact with a particle of lead.

Mr. W. Leitch, on being called upon, replied that he should speak with great diffidence, because until recently he did not think it at all possible that aërated waters could have been contaminated to such a degree with lead. Lately, however, he had instituted a series of experiments which agreed substantially in all respects with Dr. Macadam's results, with the exception of the oil of lemons, which he never suspected. With regard to working materials, he was of opinion that the acid generally used in generating the carbonic acid gas was very much too strong, producing an intense degree of heat, and probably evolving other gases than the one desiderated, besides having an undoubtedly prejudicial effect on the different parts of the apparatus, especially the gasometer. Again, he was of opinion that the condensers or receivers were in many cases (especially in Edinburgh) much too large; better results were almost invariably obtained with the smaller condensers and at a much smaller expenditure of power. At the same time he thought that for extra safety, work should never be commenced in the morning without first running off the water which might have lain overnight in the receiver or pipes—of whatever metal they might be composed—because one point which Dr. Macadam had apparently overlooked, was the fact that the couplings and valves were in many cases sources of danger. These parts of the apparatus were composed of what was popularly termed gun-metal, that is a combination of copper and tin, but which he found were frequently corroded or eaten away, showing evidence of some other metal in the composition (evidently lead or inferior tin or zinc). Mr. Leitch had also found a considerable amount of metallic refuse in dissolving bicarbonate of potash *in a mortar*. This salt was purchased as the manufacture of the most popular and well-known chemists in this country. The metal he at first surmised to be lead, but now believed it to be iron, but could not say how introduced; he was now having it tested for satisfaction. Mr. Leitch, in conclusion, said he was glad to learn from Dr. Macadam that the recent prosecutions in Glasgow had been conducted in a fair spirit, and that due notice had been previously given to each party that the apparatus was unsatisfactory, and that time had been given to make the necessary alterations. He hoped the Edinburgh authorities would show equal courtesy, as he was aware that great exertions were at present being made to secure perfect purity, by all the manufacturers in town; and at least two of these had already been *sampled*.

The chairman made a few observations on the importance of the subject, and concluded by moving a vote of thanks to Dr. Macadam for his able communication. This was seconded by Mr. H. C. Baildon, and carried with acclamation.

The following remarks were then made on

Jaborandi.

BY DR. CRAIG, F.R.S.E.

(*Lecturer on Materia Medica.*)

Dr. Craig exhibited a small quantity of the bruised leaves of Jaborandi, and also a little of an infusion which he had prepared from the leaves of this remarkable plant. He stated that Jaborandi was the name given to a remarkable medicine obtained from the leaves of a shrub from the interior of Brazil.

The medicine was said to be a powerful diaphoretic and sialogogue, and Professor Gubler, of Paris, and others had tested its virtues in the Paris hospitals, and pronounced its effects in these respects to be most wonderful. Up to the present time very little of this medicine had found its way into Europe, and what little had been received had been confined chiefly to Paris.

Dr. Craig stated that it was only on Tuesday last that he had obtained a small quantity of the drug through a friend in London. All that he could procure was one drachm of bruised leaves. This he carefully infused for two hours in a cupful of boiling water, and after it became cold he drank it, and carefully noted the effects produced. These were well marked and extremely interesting. In twenty minutes after the medicine was swallowed there came on an abundant perspiration over the forehead and trunk of the body, extending to the limbs, but most marked on the trunk. The temperature of the body remained normal throughout, showing that the perspiration was not due to increase of temperature. In all likelihood it acted by direct stimulation of the sweat-secreting glands.

Its power as a sialogogue was most wonderful. Simultaneously with the perspiration the saliva commenced to flow abundantly, and in little more than two hours he collected fully ten ounces of fluid from the mouth. He stated that he knew no medicine at all to be compared to Jaborandi as a sialogogue. Although he had only as much of the drug as enabled him to perform a single experiment, yet the results obtained were so well marked that there can be little doubt but Jaborandi is at once a powerful diaphoretic and one of the most powerful of sialogogues.

Dr. Craig remarked that the leaves being bruised he had no means of determining the species of this remarkable plant. He mentioned, however, that he had lately seen a dictionary of Brazilian medicines, published in Portuguese by a Dr. Chernoviz in 1868, and that it was there mentioned that *Jaborandi* was obtained from a plant belonging to the *Piperaceæ*, and that its root possessed sialogogue properties. He also mentions that a tincture is prepared from the roots (1 of the root to 8 of alcohol), and that this tincture is used as a sialogogue. Dr. Craig considered that it would be most interesting to determine whether or not the Jaborandi of Dr. Chernoviz was the same as the Jaborandi at present attracting so much attention in Europe.

Mr. Mackay proposed a vote of thanks to Dr. Craig for bringing the matter before the meeting, remarking that the extremely high price at which Jaborandi was now introduced would in all probability follow the example of such articles as Calabar bean, kousso, and other new drugs which at first were exceptionally dear, but soon found their level. Mr. Mackay further expressed a hope that Dr. Craig might be able, at an early meeting, to give a more extended account of the Jaborandi, and the likelihood of its being recognized as a valuable therapeutical agent.

The vote of thanks was carried very unanimously.

The Secretary then intimated the following donations to the library and museum:—

For Library:—'Thomson's Annals of Philosophy.' 16 vols. All bound. From Mr. D. R. Brown. 'Phillips's Annals of Philosophy.' 12 vols. All bound. From Mr. D. R. Brown. 'The Pharmaceutical Journal,' from Toronto, for December.

For Museum:—'Rangoon Petroleum.' Presented by Sir Robert Christison.

Seventy-six specimens of Common Metals employed in Pharmacy. From Mr. D. R. Brown. The following is a list:—

Bismuth.
Sulphate of baryta.
Black manganese.
Manganese ore.
Pyrolusite-binoxide of manganese. No. 1.
Pyrolusite-binoxide of manganese. No. 2.
Crystallized oxide of manganese.
Manganese.
Oxide of manganese.
Gold and silver stone.
Pearl spar and blende (Iceland).
Alloy of zinc and iron.
Sulphuret of zinc, (zinc blende,) Alston Moor, Cumberland.
Blende and pearl spar.

Lead Ores. Carbonates or sulphates (?) and phosphates.

Phosphate of lead, etc.
Lead ore, sulphuret of lead, Alston Moor, Cumberland.
Galena.
Plumbo-calcite, a new discovery, partly coated with oxide of manganese, also galena.
Galena and carb. of lime.
Carb. of lead, or sulphate encrusted with phosphate.
Pearl spar and galena.
Galena-sulphuret of lead.
Orange phosphate of lead.
Arseniate and phosphate of lead.
Phosphate and arseniate of lead.
Galena, or sulphuret of lead, (Silver mine, Linlithgow).

Copper.

Copper pyrites.
" " bisulphuret of copper.
Black sulphuret of copper—copper glance.
Sulphuret of copper. No. 1.
" " No. 2.
Jarrow copper process, No. i, ii, iii, iv, v, vi, vii.
Copper slag.
Silicate of copper in slag from ore furnace.
Fibrous malachite.
Native copper.
Copper, uncrystalline slag.
Carbonate of copper.
Copper ore.
Native copper with ore of copper.
Carbonate and sulphuret of copper.
Moss copper.

Peroxide of tin from Cornwall.
Oxide of tin.
Tin ore, 120 Fm., Huel Vor Breage.

Orpiment?
Ore of Arsenic.
Realgar.

Native alum.

Antimony.
Sulph. antimony. No. 1.
Sulphuret of antimony. No. 2.

Iron.

Sulphate of iron.
Slag formed when fluxing with limestone and coal.
Native carbonate of iron, (Renfrewshire.)
Iron pyrites in quartz containing trace of gold.
Carbonate of iron with lime, (Durham).
Iron ore.
Sulphuret of iron.
Sesquioxide of iron.
Specular iron ore.
Titaniferous iron?—slag.
Iron pyrites.
Carbonate of the protoxide of iron.
Peroxide of iron.
Phosph. of iron.
Pure iron.
Cleveland ironstone.
Muscle band.
Iron stone.
Clay iron stone.
Iron bolts from Bellrock lighthouse, changed by the action of sea water.
Chrome iron ore, chromate of iron.
Clay iron stone.

Special thanks were voted to the contributors, but particularly to Mr. D. R. Brown, who has so often enriched the Museum and Library by presenting specimens and books.

Proceedings of Scientific Societies.

PARIS SOCIÉTÉ DE PHARMACIE.

At the meeting of the above Society on the 2nd December, under the presidency of M. Planchon, it was announced that a communication had been received from M. Stanislas Martin upon Tayuya root, which he believed would prove of great service in the treatment of syphilitic disorders. M. Martin promised to present specimens at the next meeting.

The Society proceeded to the election of a Vice-President and a Secretary for the ensuing year; M. Coulier being elected to the former, and M. Fr. Wurtz to the latter office.

M. Vanflart presented a specimen of iron ore from Dulette (Manche), which was stated to contain 70 per cent. of the pure metal.

M. Petit described some new experiments which he had made respecting the sugar contained in vine leaves. Testings by Fehling's liquor, controlled by fermentation and polarimetric examination before and after inversion, had shown that the leaves contain a mixture of a reducing and a non-reducing sugar. The proportion of the non-reducing sugar, which presents all the properties of cane sugar, equals in certain cases three-fourths of the whole sugar present, which varies from 20 to 25 grams per kilogram of leaves. Further experiments had led him to conclude that in the melon the reducing sugar is converted at the point of maturation into non-reducing sugar, and he stated that he had observed the same change to take place in a fruit detached from the plant before it had completely ripened.

M. Buignet said that there existed a very great difference in the saccharine matter of fruits, according as it was produced under the influence of the vegetative forces or irrespective of their influence. Experiment had shown that the sugar which continued to form in bananas after they were detached from the tree was no longer cane sugar, but inverted sugar.

After the close of this discussion the Society voted a sum of 250 francs towards the fund for the erection of a monument to the memory of Scheele.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture I.

The History of Alcohol in Relation to some of its varied Services to Mankind in the Arts and in Science.

(*Continued from p.* 559.)

Distillation.—I have said that for many centuries there was nothing known to mankind beyond the formation of a vinous fluid. At length a new process was brought to bear on wine, which simple as it is to us now, was in its early days, and for many long days afterwards, a wonder and a mystery. This was the simple act of distilling wine, and of obtaining from it by distillation a fine spirit containing no water. The discovery of distillation of wine has been attributed to Albucasis, or Casa, an Arabian chemist and physician of the eleventh century. The evidence on this point is not very convincing. It is true that the refined body called spirit of wine began to be known in the alchemical and Arabian schools about or soon after the time of Casa, and from that circumstance rather than from direct evidence derived from his works, the discovery has probably been imputed to him. However, it is historically correct that from the school of Albucasis the discovery sprang. The alchemists or adepts were conversant with pure spirit, and, says Boerhaave, when they had reduced it to the utmost subtlety, they made use of it in the preparations of all their secret menstruums.

Distillation itself was probably an imitation of nature, for nature is ever distilling and condensing. In the cold, water condenses on the leaf and on the grass, as dew, and ascends as vapour in the sun. This process of raising water into a state of vapour by heat, and condensing it by cold, the simplest of immediate imitations of nature, would by easy transition pass to other liquids, and with special ease to that liquid which has rivalled water as a drink for man—wine.

The pure spirit of wine in its earlier use was applied mainly to chemical and medicinal purposes, and indeed many centuries elapsed before the process of distillation became active for the production of those stronger drinks, which, under the name of "spirits," are now in such common use in daily life. Brandy, from *brennen*, to burn; thus *brantwein*, brandy, is a comparatively late term in European literature. Gin, contracted from Geneva, is not to be found as signifying a spirituous drink in our vocabularies of two hundred years ago. The term rum is assigned to the native American peoples, who so designated the vinous spirit distilled from sugar; and whisky (Celtic *usige*) water, though it may have been known as a distilled drink as long as brantwein, has not been Anglicized, I believe, for more than a century and a half.

In the earlier mode of distillation the instruments used were simple but effective. They consisted of the furnace, the receptacle to the furnace, the receiver which stood within the receptacle, and the alembic or condenser, which was made of tin or other metal.

The ancient alembic was a very scientific instrument, and caused a perfect collection of the distilled fluid. The spirit from the crude wine ascended from the heated reservoir into the conical tube, and then downward through the returning exit tube into the receiver.

The adepts were, indeed, marvellously mechanical, and when we recall that they neither had cork nor elastic tubing, nor gas, we wonder by what clever devices they were so successful. They had many useful arts, I am sure, which we have improperly forgotten, and which might with advantage be revived. Some of their plans, for a long time thought to be fanciful and useless, are being again considered of value. There is an instrument called a cohobator, and another is called a circulator, in which they caused spirits to boil and distil, and condense and distil again, for months, in some cases. The fluids went round and round in the circulator like the wheel of fortune, and many an adept has looked upon his fortune as spinning in that wheel, from which the elixir of life and the philosopher's stone were, in his ardent imagination, to be evolved. These and several other similar instruments, for which I am indebted to Mr. Robbins, of Oxford-street, are on the table before us.

To sum up, let us remember the four stages in the general history of alcohol, from the first to the time when it came strictly under analytical chemical observation, and, in regard to common knowledge, to the present time.

(*a.*) The stage of manufacture of wine or beer by fermentation. A stage standing from the earliest history until the time of the adepts, say about the eleventh century of the Christian era.

(*b.*) A stage when there was distilled from the wine a lighter spirit called, first, spirit of wine, and afterwards alcohol.

(*c.*) A stage when this subtle or distilled spirit from

* Cantor Lectures: delivered during December, 1874, January, 1875, from the *Journal of the Society of Arts.*

wine was applied in its refined or impure state to the arts and to science.

(*d.*) A stage when this same process of distillation was applied to the production of alcoholic spirits for the use of man as spirituous drinks, under the name of brandy, gin, whiskey, rum — a stage comparatively modern.

Uses of Wine.—We will, if you please, leave now for a time the consideration of wine and alcohol as drinks, and dwell briefly on the uses to which these fluids have been applied for other purposes. The study is peculiarly interesting, and I could easily carry you on during the whole course of these lectures with the narration of it. Unfortunately, every word I have to say must be introduced into this hour, so that I can refer only to the salient points, and to a few only of these.

From the first, the preservative or antiseptic quality of wine was recognised, and the fluid was employed for the preservation of animal and vegetable substances. The Roman butchers, who, like our modern butchers, sold their fresh and their salted meats, prepared their salted flesh in the following manner :—The animals they intended to preserve were kept from drinking any fluid on the eve of the day on which the killing took place. After the killing, the parts to be preserved were boned and sprinkled lightly with pounded salt. Then, having well dried off all dampness, the operators sprinkled more salt, and placed the pieces so as not to touch each other, in vessels that had been used for oil or vinegar. Over the whole they poured sweet wine, covered the contents of the vessels with straw, and, when they could, kept down the temperature of the room in which the vessel was placed by sprinkling snow around. When the cook wished to remove the salt from the meat, he took it out of the wine and boiled it first in milk and afterwards in rain water.

Long previous to the Roman era this preservative process of wine had been recognized and applied. Palm wine was used by the Egyptians in their most costly processes of embalming the bodies of the dead. This same application of wine, or spirits of wine, for the preservation of animal and also of vegetable substances, has been maintained up to our time. In our museums the specimens therein preserved, in the moist state, are immersed in spirit, and the modern art of embalming is not perfected without the employment of the same antiseptic agent.

Early after the discovery of the properties of wine the fact must have been observed that from a change in it another substance was producible, to which, in these days, we give the name of vinegar. To prevent the formation of vinegar in wine the ancients boiled the wine, and to remove the acidity arising from vinegar they added gypsum to sour wine, and thus rendered it palatable. Vinegar itself they employed for purposes precisely the same as we in this day ; they partook of it with vegetables, they employed it for preservation of animal and vegetable substances, and they applied it for numerous medicinal purposes. After the process of distillation was discovered by the adepts, the distillation of vinegar was also carried on, and in this way was obtained that strong vinegar which enters so largely into various uses as an acid, called aromatic vinegar.

Very early in history wine was employed for another purpose, that, namely, of extracting the active principles from plants and other substances possessing, or supposed to possess, medicinal virtues. Dioscorides, one of the fathers of medicine, and particularly of that part which pertains to the use of curative substances, or medicaments proper, is full of descriptions of vinous tinctures, some of which were sufficiently potent even for our present use. On the table before us is a vinous tincture of this kind, which has a singular and, I had almost said, romantic history. This is the wine of Mandragora. In the isles of Greece there has grown for ages a plant called mandrake ; it belongs to the same family of plants as our belladonna, or deadly nightshade. From the root of this plant the Greeks extracted, by means of wine, a narcotic, and what in this day we should call an anæsthetic. Some, says our learned Dioscorides, boil the root in wine down to a third part and preserve the decoction, of which they administer a cyathus, about what would now be a common wineglassful, for want of sleep, or for severe pains of any part, and also before operations with the knife or cautery, that these may not be felt. Again, he says, a wine is prepared from the bark without boiling, and three pounds of it are put into a cadus (about eighteen gallons) of sweet wine, and three cyathi of this are given to those who are cut or cauterised, when, being thrown into a deep sleep, they do not feel any pain. Again he speaks of a preparation of mandragora, called morion, which causes infatuation, and takes away the reason. Under the influence of this agent the person sleeps, without sense in the attitude in which he took it, for three or four hours afterwards. Pliny, the Roman historian, much later, bears evidence to the same effect, and adds the singular remark that some persons have sought sleep from the smell of this medicine. And again, Lucius Apuleius, the author of the book called the 'Golden Ass,' who lived about 160 A.D., and of whose works eleven editions were republished in the fourteenth and fifteenth centuries, says that if a man has to have a limb mutilated, sawn, or burnt, he may take half an ounce of mandragora in wine, and whilst he sleeps the member may be cut off without pain or sense.

It is unquestionably to this same anæsthetic wine our own Shakespeare refers in his half-imaginary, half-legendary Middle Age history. This is the wine of that insane root, which, says Macbeth, "takes the reason prisoner." This is the wine that Juliet drinks, and the action of which the Friar Lawrence describes—

> "Through all thy veins shall run
> A cold and drowsy humour, which shall seize
> Each vital spirit ; for no pulse shall keep
> His natural progress, but surcease to beat.
> No warmth, no breath, shall testify thou liv'st,
> The roses on thy lips and cheek shall fade
> To paly ashes ; thy eyes' windows fall
> Like death when he shuts up the day of life ;
> Each part, deprived of supple government,
> Shall stiff, and stark, and cold, appear like death :
> And in this borrow'd likeness of shrunk death
> Thou shalt remain full two and forty hours,
> And then awake as from a pleasant sleep."

It follows therefore from the history of scientific discovery that our modern great advance of removing pain during surgical operations is in fact, if not as old as the hills, as old almost as wine. But is the story true, you say ? I answer yes, and the answer is from experiment. Thinking it a subject of very great interest, I instituted, a few years ago, an inquiry into the matter. Through the kindness of my friend, Mr. Daniel Hanbury, F.R.S., I obtained a fine specimen of mandragora root, and I made once again, probably after the lapse of five centuries, mandragora wine. I tested this and found that it was a narcotic, having precisely the properties that were anciently ascribed to it. I found that in animals it would produce even the sleep of Juliet, not for thirty or forty hours, a term that must be accepted as a poetical license, but easily for the four hours named by Dioscorides, and that in awakening there was an excitement which tallies with the same phenomenon that was observed by the older physicians.

Thus, one of the first uses of wine to man was amongst the most noble and beneficent that man, by his ingenuity, can confer on his kind, and if wine had ever been used in this way and in none worse, Pater Lenæus might have retained his supremacy in the good opinion of all the world.

Besides using wine for extracting the virtues of the vegetable kingdom, our ancient chemists tested it on metals, and made it here subservient to their purpose. What they called the extract of Mars was a solution of iron made with an astringent wine, and reduced into a thick consistency by fire. Eight ounces of the rust of iron, powdered very fine, were put into an iron pot, and covered with four pints of strong red wine. The iron crucible was then set on the fire, and the mixture, stirred with an iron rod, was boiled to a third; then it was strained through a cloth and evaporated into an extract. To this extract wonderful curative powers were ascribed, and indeed it was a very useful medicine. The metal antimony also was subjected to the action of wine. The so-called liver of antimony was treated with white wine, and dissolved in it: to this day we retain the remedy. It was originally called the emetic wine.

Uses of Spirit of Wine or Alcohol.—After the process of distillation of wine was discovered, the use of the new spirit rose rapidly into application in a variety of ways. The adepts, the Middle Age chemists of whom I have spoken, kept this distilled spirit long a secret. They found in it a solvent for many things that before were insoluble. Oils, resins, gum resins, balsams were now brought into a medium that acted towards them as a menstruum, and straightway they were dissolved. The East India Styrax Benzoin yielded a balsam which, dissolved in the distilled spirit was a fortune to the chemists. The Commander's balsam, or balsam for wounds, or Friar's balsam, was soon the reputed heal-all of every injury.

The useful first extracted out of the new distillate, beauty was next remembered. Alas for the female face divine, the cosmetic and the subtle wash that should veritably make young faces old and assumably make old faces young, were soon in process in the laboratory of the adept who could distil wine. Again, the artist came in for a share in the discovery. The once insoluble and useless resins and ambers were dissolved for his brush, and gave him coatings, preservatives, and washings, of which previously he had no conception.

This spirit of wine burns. It does not touch oil for the light it gives, but how strange! it burns away without a trace of smoke, and with an excellent heat. So the spirit lamp in due time is invented. A trifle, say you? Nay, it was as great an advance to the chemist who first used it as the gas in the Bunsen burner is to us.

Once more; this subtle spirit has in it the virtue of preserving all organic substance with which it is brought in contact. It masters putrefaction itself; perchance the elixir of life is therefore found. It dissolves insoluble bodies; perchance it will by careful study and experiment reveal the grand secret of transmutation. In this way reasoned its first masters.

I must not dwell longer over these details of minor things of major usefulness. I must turn to some applications of our refined spirit which are major in fact as well as in use, in theory as well as in practice, in science as well as in art. In this regard we have to consider alcohol as the basis of other essences not less potent than itself.

The process of distillation of essences from liquids and from vegetable substances once established, it was but natural that some adept should turn his hand to mineral bodies and try if they would not yield some new product that should be of effective and novel quality. Into the distillatory soon pass, therefore, all manner of things, from the horn of the stag or hart, to the skull and brain of the dead man. Among other substances, there was submitted to distillation this green stony crystal found in the earth, and called green vitriol, in Latin *vitriolum*. The result of the distillation of this *vitriolum* was to obtain as a yield, in the retort, the heavy oily corrosive fluid called, originally, spirit of vitriol, called now oil of vitriol or sulphuric acid.

Many were the fanciful things thought of by the adepts concerning this oil, and even to the letters of which the word *vitriolum* is made up they attached a mystical symbolism. In course of time they began to combine and to distil other fluids with the corrosive sulphurous oil, and amongst the first of fluids used in this manner stood spirit of wine. The experiment did not deceive them, for it gave them as a product one of the most useful and wonderful of liquids. To them this new liquid as it first was taken from the retort was an infinite marvel. They poured it on water and it floated, on spirit and it floated. They poured it into their hands, and, lo! it boiled there. It escaped from them into an invisible state or air before they could well bottle it; it burned and exploded. It caused, when it passed off from the surface of the living body, an intense cold. It dissolved wax, oil, fat, gums, resins, balsams, and yet when it was set free it let them fall again. It was so light that a measure which would hold twenty pounds weight of water would only hold seven pounds of this light intangible liquid. What name shall they apply to this substance, the lightest known? They designate it by a term indicating the lightest thing they can conceive: they compare it with the refined medium, with which the philosophers imagine the firmament to be filled, and they give it the same name. They call it *æther.*

Of what strange after use this magical fluid has been to man we all know. It was introduced early into medicine, and was well studied last century by Dr. Ward, and by Mr. Turner, of Liverpool. In our own time, it has been discovered to have the power of suspending sensation and sensibility after being inhaled by the lungs, and by its means there has been re-introduced to the world that beneficent and long-lost art of rendering the body insensible to pain during surgical operations.

More recently, by a study of the application of ether for the production of intense cold, I myself introduced that local use of it for benumbing the body, called the ether spray.

The value of this secondary alcohol to man is indeed inestimable. You know how valuable it has been in photography as the volatile solvent of collodion, and in other various departments of the fine and useful arts it has rendered equally good service.

From the distillation of *vitriolum* our adepts soon passed to other solid substances. They distilled saltpetre, and so got the spirit of nitre, which we call now nitric acid; they distilled common salt in combination with oil of vitriol, and so got spirit of salts (marine acid), which we call hydrochloric acid. Again, with these new spirits they distilled spirits of wine to obtain new ethers, nitrous, and marine. Then a chemist, the Count de Lauragnais, distilled together acetic acid and spirit of wine, by which process he obtained acetous ether. Thus by these double actions, a numerous series of useful ethers has been obtained, it were too long for me to enumerate.

From the observation of the fermentation of wine we derive, in a certain sense, our first knowledge of gases. Van Helmont gave to the gas which comes from the fermenting of vegetable matter the name of *gas sylvestre*, and from this may be dated the origin of the study of these invisible forms of matter. Priestley made some of his early observations on the gas which escaped from fermenting malt in a brewery at Warrington, and was led step by step to the liberation of gases from mineral and earthy substances, and so to the discovery of oxygen. Upon that discovery, coupled with his method of collecting gases by displacement of water, and of trying their qualities, came the process of distilling and collecting a gas from coal, and thus coal gas.

After the discovery of the element known as chlorine, and of the compounds of that element with other elements, another new era was opened in the history of alcohol. By passing chlorine through alcohol, Liebig obtained that narcotic substance which we call chloral hydrate; and by treating alcohol with chloride of lime, the same great experimentalist produced for us chloroform, an agent which has rivalled ether in its service as a soother and saver of pain. If you glance at the table of anæsthetics or sleep producers which is before you, you will see by the names in italics those substances which come from alcohol. All that have proved of most use excepting one, nitrous oxide or laughing gas, have this common origin.

List of Substances that will produce Anæsthetic Sleep.

Nitrous oxide gas	Tetra-chloride of carbon
Carbonic oxide gas	Heavy carburetted hydrogen gas
Carbonic acid gas	*Olefiant gas or ethylene*
Bisulphide of carbon	*Ethylic, or absolute ether*
Light carburetted hydrogen	*Chloride of ethyl*
Hydride of methyl or marsh gas	*Bichloride of ethylene* (Dutch liquid)
Methylic alcohol	*Bromide of ethyl, or hydrobomic ether*
Methylic ether gas	Hydride of amyl
Chloride of methyl gas	Amylene
Bichloride of methylene	Benzol
Terchloride of formyl, or chloroform	Turpentine spirit

Had the time not been expended, I could have brought before you further illustration upon illustration of these secondary uses of alcohol to man; but I must stop, content in having recalled to your minds some of the more striking facts in the history of the curious and important agent which is now the subject of our studies.

Parliamentary and Law Proceedings.

Poisoning by a Soothing Syrup.—Censure of a Chemist and Druggist.

On Wednesday, January 6, an inquest was held in Sheffield, before the deputy coroner, B. Bagshawe, Esq., upon the body of Elizabeth Connor, five days old. The evidence showed that the child being very restless, and crying almost continually, and its mother being very ill and not expected to recover, the father wished to give the child something to keep it quiet, so that it should not annoy its mother. At the recommendation of some neighbours, he went to the shop of Mr. Atkinson, Meadow street, and a bottle of anodyne was given to him. He administered about a quarter of a teaspoonful to the child, and in a short time afterwards it fell asleep. It was taken to Mr. Reckless's surgery, and that gentleman ordered them to keep the child awake. This they endeavoured to do, but were unsuccessful, and the child died on Sunday afternoon.

John Townsend, the father, said when he bought the medicine, the assistant who served him did not tell him that the mixture was poison, and he believed that he told the assistant that the medicine was for a young child. In answer to the Coroner, he said he was unaware that all soothing syrups, etc., contained poison.

Mr. G. K. Thorpe, surgeon, who had made a *post-mortem* examination, stated that the brain and lungs were much congested, which was consistent with poisoning by opium or morphia. It was exceedingly difficult to trace the action of poison, but he could readily believe that death had been caused by the child taking a dose of medicine containing opium or morphia. He could not account for death in any other manner.

George Hogg, assistant to Mr. Atkinson, said he did not remember selling the cordial produced to the man Townsend; but on a Saturday he generally sold between thirty and forty bottles of the same mixture to children of all ages. The anodyne cordial contained not quite one grain of opium to the ounce of mixture. The bottle was not labelled "poison," because he did not look upon the cordial as a poison. It contained less opium than most of the preparations of the present day.

The Coroner, in summing up, said the Jury could not but return a verdict that the deceased had died from an overdose of poison, administered by John Townsend, without any felonious intent; but they must also consider whether it was not their duty to add something by way of censure upon Mr. Atkinson, the druggist, for allowing the anodyne cordial to be sold without the label "Poison" being pasted on the outside. He read the Act of Parliament, to the effect that all opium, or preparations of opium, must be labelled "Poison" before they were sold. Mr. Atkinson had clearly offended against the provision, and if they thought proper to censure him, he would see that the case was reported to the proper authorities. The poisoning of infants was a very serious thing; in fact, it was carried on by wholesale. There were, at least, twenty fatal cases of that kind in Sheffield every year, and numerous cases occurred in which constitutions were ruined and the foundations of disease laid.

The jury concurred in the remarks of the Coroner, and returned the following verdict, "That the deceased died from an overdose of opium, administered without any felonious intent, by John Townsend; and the jurors are further of opinion that Mr. Atkinson is highly censurable for selling a preparation of opium without the same being labelled poison."—*Sheffield Evening Star.*

Poisoning by a Liniment.

On Saturday, January 2, Mr. Carter held an inquest at Kingston, Surrey, respecting the death of Mrs. Sawyer.—Mary Ann Sawyer, daughter-in-law of deceased, said she was on a visit to her mother, who was very ill, and had a draught to take, and some liniment to apply outwardly. Witness gave her the draught on Sunday night, and they all went to bed at half-past ten. About half-past twelve she was aroused by deceased moving, and saw her with the bottle containing the liniment up to her mouth, drinking from it. Witness asked her what she was doing, and she said she had a pain in her side. Witness took the bottle from her, knowing it contained poisonous liniment. Deceased had drank nearly all the liniment.

The bottles which had contained the medicine and liniment were produced; they were nearly alike in shape, but the liniment bottle bore the word poison on it in red letters. This label, however, the witness said, was not on the bottle when deceased drank the liniment; it had been put on since. She believed deceased drank it in mistake. Deceased died an hour after she had drank the liniment, before any medical assistance could be obtained.

Mr. J. Hill Turner, assistant to Mr. Shirtliff, surgeon, deposed that he was called to deceased early on the 28th ult., and found her dead. He had treated her medically for intercostal neuralgia, and supplied her with liniment, the active ingredients in which were chloroform and aconite, both deadly poisons. The bottle contained 1½oz. of liniment, and when deceased was dead, he saw that it was empty.

The Coroner: Was the bottle when you saw it in the state it is now?

Witness: No, it had not got that label on. I had supplied some liniment of the same description before, and there was a label on that. I did not put a label on this bottle.

The Coroner: How do you account for that?

Witness: I expect it was an oversight. I put the label on afterwards.

The Coroner: Why did you put it on afterwards,—it was rather foolish of you, and a great reflection might be thrown upon you for it.

Witness: I acknowledge it was so.

Mrs. Sawyer, recalled, said that deceased knew the liniment was poison, although she could not have read the label had there been one on it.

In reply to the coroner, Mr. Turner stated that he believed the chloroform in the liniment was the cause of death.

The Coroner then cautioned Mr. Turner never to send out poisonous mixtures again without a label.

Joseph Sawyer, husband of deceased, also deposed that deceased knew the bottle contained poison; but he thought she took the bottle for the one containing medicine.—A verdict was returned of Death by Misadventure.—*Surrey Comet.*

THE FATAL CASE OF POISONING BY CORROSIVE SUBLIMATE.

The inquest touching the death of Celine Marin, whose death had been caused by corrosive sublimate administered to her in mistake for bismuth, was resumed on Monday last, before Mr. Holl, coroner, at St. Thomas's Hospital. Sheppard, the coroner's officer, stated that, assisted by the police, he had made inquiries, and he could not find that the housekeeper, Mrs. Kant, had sold poisonous drugs to any other person, and he had no evidence to offer on that point; but he believed she had a number of persons present to speak on her behalf. Kilian Kupitz stated that he is a member of the Pharmaceutical Society of Great Britain. About three months ago he was engaged by the executors of Mr. Ungerer, chemist, to carry on his business, at No. 18, Rathbone-place. Mrs. Kant, the housekeeper, did not serve in the shop beyond selling soaps and scents, and simple things of that kind. She never sold poisons. Witness was never there on Sundays, and was told by his employer that on Sundays no business was done at all, unless in cases of emergency. He did not know who did it then. He was told that Mrs. Kant served this powder. If any one came Mrs. Kant would attend to the bell, and send the person to Oxford-street to another chemist there. A Juror: Did you prepare the bismuth that was in the bottle for retail sale?—No, it was old stock. Coroner: Did you see a bottle labelled bismuth in the shop?—No. Did you ever sell any bismuth there?—No, I was never asked for it. And never made up a prescription with bismuth in it?—No. Then you did not do much business?—No. Did you ever see a bottle there labelled hyd: bichl:?—Yes. Did it contain corrosive sublimate?—I did not analyse it; it contained a whitish powder. Did you ever sell any of it?—No. The coroner said the more he went into this case the more he was dissatisfied with it. He had received a letter from the registrar of the Pharmaceutical Society in reference to it. By the Pharmacy Act no person was allowed to sell poisonous drugs unless he was registered under that Act, and it was only by such cases as these coming to the Registrar's knowledge that he could carry out his duties. The coroner thought that this case should be further investigated, and should be adjourned for that purpose. The inquest was then further adjourned until Monday next.

THE SALE OF ARSENIC.

The following account of the prosecution of a chemist and druggist for an illegal sale of arsenic, has been sent by a correspondent, and has been cut from a local paper:—

At the Lanchester Petty Sessions, before M. Kearney (chairman), A. H. Talmadge, Hy. Smith, and John Clavering, Esqs., David Imrie, chemist and druggist, Front Street, Consett, was summoned for selling a quantity of arsenic, and neglecting to enter the same in a book that should have been kept by him for that purpose.—William Todd, miller, stated that in September he went to Mr. Imrie's shop and got threepenny-worth of arsenic, which was supplied by Mr. Imrie himself. Witness did not sign a book because the shop was full of people and Mr. Imrie was busy.—Mr. Imrie admitted that the book was not signed. He believed the reason Mr. Todd did not sign the book was that he (Mr. Todd) was in a hurry.—Mr. Talmadge (to Mr. Todd): Had you got arsenic at Mr. Imrie's shop before?—Mr. Todd: No. Mr. Talmadge: Had you ever bought arsenic at any other shop?—Mr. Todd: No. Mr. Clavering (to Mr. Imrie): If a stranger came to your shop and asked for arsenic would you give it to him?—Mr. Imrie replied that he would not; he knew Mr. Todd. Mr. Clavering: What did Todd want the arsenic for?—Mr. Imrie: Mr. Todd said his place was infested with rats, and as I had previously heard that this was the case, I had no scruple in letting him have the arsenic. Mr. Smith (looking at a packet containing arsenic): Are you in the habit of selling pure arsenic?—Mr. Imrie: No.—Mr. Smith: Is this mixed?—Mr. Imrie: No; that was for rats. People generally ask for it mixed with soft soap, but as Mr. Todd asked for pure arsenic I let him have it. Mr. Smith: According to the Act you are not justified in selling pure arsenic for rats.—Mr. Imrie said he usually mixed it with soft soap. Mr. Talmadge: You have no right to sell it with soft soap even. Mr. Clavering: Can you sell Battles' Vermin Killer without the book being signed?—Mr. Imrie replied in the affirmative. Mr. Clavering said he very much questioned his right to do so.—Mr. Smith thought he could not, as it was strychnine.—The Chairman said it was perfectly manifest that Mr. Imrie understood his duty. They did not intend to inflict a severe penalty, but as an example to others he would have to pay a small fine of 1*s.* and the expenses.—Mr. Smith: It is as well you should know that you are not allowed to sell arsenic unless it be mixed with soot or indigo.

POISONING BY CHLOROFORM.

An inquest was held at Woolton, on Friday, January 8, respecting the death of Samuel Healey. It appeared from the evidence that deceased had suffered from asthma and toothache, and had been in the habit of inhaling chloroform for the purpose of inducing sleep. On Friday morning he did not make his appearance as expected, and on entrance being gained to the room through the window he was found dead, with a handkerchief having chloroform on it over his mouth. The medical evidence was to the effect that death had resulted from an over-inhalation of chloroform, and the jury returned a verdict accordingly.—*Liverpool Daily Post.*

BOOK RECEIVED.

A MANUAL OF HYGIENE, PUBLIC AND PRIVATE, AND COMPENDIUM OF SANITARY LAWS, for the Information and Guidance of Public Health Authorities, Officers of Health, and Sanitarians Generally. By CHARLES A. CAMERON, Ph.D., M.D., etc. Dublin: Hodges, Foster, and Co. London: Baillière, Tindall, and Cox. 1874.

Notes and Queries.

[423]. BLACK HAIR DYE.—Would you please give me a recipe for a good black Hair Dye, that will not stain the skin, and free from the unpleasant smell of, the sulphuret of ammonium.—THOS. ROBINSON.

[*₊* In his little book on 'Diseases of the Hair,' Dr. Benjamin Godfrey says he has experimented with the following, and found it successful:—

"Dissolve ten grains of bichloride of mercury in three ounces of rose water; dip a brush in this solution, and apply it twice a day to the hair for a week. The head should previously be washed in weak soda and water, and dried. The mordant should be used in the same way, but not with the same brush, for a day or two, and a black colour will be produced. The mordant is made by dissolving an ounce of hyposulphite of soda in two ounces of water."]

Obituary.

We regret to have to announce the death, on Saturday, the 9th inst., of Mr. William Forbes, Pharmaceutical Chemist, of Reading, at the age of 77 years. Mr. Forbes was a Founder of the Pharmaceutical Society, and for many years acted as one of its Local Secretaries.

Notice has also been received of the death of the following:—

On the 30th December, 1874, Mr. William Charles O'Reilly, Pharmaceutical Chemist, of Shepherd's Bush, London. Mr. O'Reilly had been a Member of the Pharmaceutical Society since 1856.

On the 8th January, 1875, Mr. George Wood, Chemist and Druggist, of Long Row, Sheffield.

Correspondence.

** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Hours of Business in Pharmacy.

Sir,—Illness has caused my attention to be only just drawn to a second letter from "An Examined Assistant." To him, he says, "my words seem to be those of a man who has been in a trance for twenty or thirty years." My friends, on the contrary, seem to think that I have been decidedly "wide awake" during that time; but let that remain a moot point,—he may be wiser than they. It is quite possible that, as he intimates, "the apprentices" of "the good old times," as it is phrased, would be "nowhere" in "the dreaded room of Bloomsbury Square." Nevertheless it is a fact—let "An Examined Assistant" explain it if he can and choose—that many employers seeking assistants prefer *not* to have a "Square" man.

"An Examined Assistant" does not evince intelligence when he professes to see no difference between a chemist's business and that of grocers, drapers, and ironmongers, in the matter of early closing. If this evening I find that I want a lock, my wife a piece of calico, and the cook a bladder of lard, but the respective shops where these articles are sold are closed, each can and doubtless will be procured on the morrow. It is not so with physic: two sleeping draughts will not be taken the next night to make up for the one missed on this; and occasionally it would happen that if the requisite medicine could not be obtained over night the patient would in the morning be found in a condition to dispense altogether with physic for the future.

"An Examined Assistant," if intelligent, must know that in disease exacerbation generally recurs towards night. The physician must frequently pay late visits to his patients, and if the physic he prescribes is to be made up at druggists' shops, such shops cannot be closed as early as, and with the regularity of those of grocers, drapers, and ironmongers. Those who urge it prove themselves that it cannot be done. Mr. A. W. Waring, writing from Bedford, says an assistant stops in every evening after the shops are closed. The public of Bedford know well that they can obtain physic after the shops where it is sold are ostensibly shut up: it is not so with their cheese or their ribbon. By-the-bye, does Mr. Waring speak to the card when he says most of the establishments in Bedford have three or four assistants? I knew it some years since as a thriving town, but I had no idea of the extent of prosperity which this statement goes to shew it has since attained. In the city from whence I write half the establishments can boast of no assistant. Young men seeking where to commence business will assuredly have their attention directed to that evident *El Dorado*, and a rapid migration to Bedford may be looked for.

The only way to ensure everywhere such early closing as is clamoured for, would be for employers and *employés* to combine to get an Act of Parliament compelling all medical men "to do their own dirty work," by making up their own prescriptions and rendering it imperative on physicians to send theirs to apothecaries, and so relieve druggists from the infliction; and then the business might be more closely assimilated with other "trades." But I am afraid there would not be found sufficient unanimity to ensure such "a pull altogether" as might effect so excellent an object. One man elects the medical profession for his future career, his brother the legal. This is not disturbed by clients after 5 p.m., that is at the beck and call of his patients all hours of the twenty-four; and it would be just as reasonable were he to clamour to his patients to be as considerate of his time and comfort as his brother's clients are of his, as it is for druggists to clamour for the same early and regular closing, *i. e.*, cessation from work, as "drapers, etc." A pharmaceutical chemist's business has its advantages and its things agreeable; it has, also, its disadvantages and things disagreeable. These can be ascertained by youths going out into the world, and if they think the former are more than counterbalanced by the latter, let them select the hat business, or the drapery or grocery trade, as the stage for the future display of their alents and ability, if they would prefer either. It may be asked what advantages being a pharmaceutical chemist has over being a hatter, etc.? It gives a man possessed of sufficient mental ability, more interesting and intellectual occupation than fitting hats to heads, or measuring ribbon, or weighing pounds of sugar. It gives him a better social position, and as time rolls on it will give him a better one still. It is a business in which a young man with £200 or £300 to commence with, may confidently hope to retire on £500 a year by the time he is forty, or on £1000 by the time he is fifty; and he is not nearly so likely to do that either in the hat, drapery, tea, or ironmongery trade. But there is one qualification absolutely necessary to enable him to accomplish this: he must be a man of business, and it is quite possible for him to pass through the terrible ordeal of "the dreaded room with a smiling face," and write himself both "minor" and "major," and yet be as far removed from that as the poles are sundered.

In all my experience—a varied one—I never knew an instance in any establishment, when trade was so "slack," and "stock so well up," that there were no "wants" on "the want paper." The text, "no man can serve two masters," could not be better applied than to the assistant who would vainly endeavour during the day to be alternately serving his employer and himself. He would soon be found "holding more to one" than "the other," and a very slight knowledge of human nature will tell which "one" that would be.

I believe in an improved future for druggists, not in the shape of early closing; there cannot be much effected in that direction, any more than doctors can close early, especially if druggists in the future are to prepare more instead of less of their prescriptions. But the effect of stringent examinations, and the necessity for a more expensive education, will be, that druggists will not increase in an equal ratio with the population; it will follow that establishments will become larger and more profitable, and employers will get much of the work which has hitherto been done by assistants — laboratory work, etc. — performed by labour more cheaply purchased.

VERITAS.

12th January, 1875.

A. S. A.—The Assistant's Certificate of the Apothecaries' Company does not confer upon the holder a right to keep an open shop as a chemist and druggist.

"*Dispenser*" (who should have sent his name).—We think you have committed an error, and have little doubt that Acetum was meant.

R. J. M.—The green iodide should be dispensed. The dose is a small one, but that would not justify any deviation from the prescription.

J. S. R.—We know of no better method than the one mentioned.

J. Robinson.—Yes, in quantities of not less than ten pounds, and under the conditions prescribed in the Arsenic Act.

K. K.—Mucilago Acaciæ, using as small a quantity as possible.

"*Digitis.*"—We have been unable to obtain a formula for Mapson's Salve.

C. M. P.—Pereira's 'Selecta è Prescriptis,' published by Churchills.

A. Manning.—A large number of salts occur in the natural Carlsbad water, of which sodium sulphate, carbonate, and chloride are present in the largest proportions. Analyses of the water will be found in the Appendix to Squire's 'Companion to the Pharmacopœia.'

A. B. C.—(1) We believe that Bentall's botanical drying paper may be obtained from Mr. Van Voorst, Paternoster Row. (2) No.

M. R. P. S. is referred to the rule respecting anonymous communications.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Bartlett, Quaerens, Mr. Leifchild.

THE BOTANICAL SOURCE OF JABORANDI.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

Having lately had the opportunity of examining a quantity of Jaborandi from Pernambuco, through the kindness of Messrs. Hearon, Squire, and Francis, I was fortunate enough to find several ripe fruits of the plant. These fruits are distinctly Rutaceous in their character, and enable me to confirm Professor Baillon's conjecture that they belong to that natural order, and probably to a species of *Pilocarpus*, which, if not identical, certainly comes very near to the *P. pennatifolius*, Lémaire.

The specimens of the plant which I examined appear to belong to a shrub about five feet high. The root is cylindrical, hardly tapering at all, nearly three quarters of an inch in diameter for the first twelve inches, and very sparingly branched. The bark of the root is of a pale yellowish-brown colour, about one line in thickness, and has a very short fracture. The outermost layers are very thin and papery, and are frequently exfoliated. A small portion of this layer placed under a microscope forms an extremely pretty object, and is seen to consist entirely of strongly reticulated dodecahedral cells. The odour of the root is like that of a mixture of bruised peapods and orange peel. The taste is at first like that of green peas, but this soon disappears, and gives place to a tingling sensation, which is much more powerful than that produced by the leaves or bark of the stem, and endures for a considerable time. By gaslight the transversely-cut surface of the bark is seen to sparkle with minute crystals.

The stem is half an inch in diameter near the root, narrowing to a quarter of an inch in the upper branches. The bark is thin, of a greyish-brown colour, longitudinally striated, and sprinkled over in some specimens with a number of white dots which are not lenticels, but the remains of old oil receptacles. The bark of the stem is thin and fragile, and readily scales off when the stem is broken or bent; it has a short fracture, and is yellowish-white internally; its inner surface sparkles with minute crystals; it has not, to any appreciable extent, the peculiar leguminous taste of the root. The wood of the stem is yellowish-white and remarkably fibrous. The stem is alternately branched at a very acute angle (about 20°), the branches being erect and furnished with alternate leaves. The leaves, one of which is represented in fig. 1, are imparipinnate, about nine inches long, with from three to five pair of opposite leaflets, which are articulated to the rachis and have very short slightly swollen petiolules, those of the upper leaflets are about one line long, those of the lowest leaflets about three lines long, and the terminal one has a petiolule from half to one inch long. The rachis of the leaf is swollen at the base. The pairs of leaflets are usually about $1\frac{1}{4}$ inch apart, the lowest pair being about four inches from the base of the rachis.

The leaflets are very variable in size, even on the same leaf. Their general outline is oblong-lanceolate. They are entire (fig. 2), with an emarginate or even retuse apex, and an unequal base. Their texture is coriaceous, and when moistened reminds one in size and thickness of the leaf of the cherry laurel. The veins are prominent on both sides of the leaf, and branch from the midrib at an obtuse angle (about 60°) in a pinnate manner, remaining distinct until within one quarter of an inch of the margin of the leaf, where they become lost in the network of veinlets. The midrib is scarcely prominent on the upper, but forms a distinct keel on the under surface of the leaflet. When held up to the light the leaflets are seen to be densely pellucidly punctate. These pellucid dots, which are receptacles of secretion, are not arranged, as in another kind of Jaborandi, in lines along the veinlets, but are irregularly scattered all over the leaf, and appear equally numerous in every part; they are mostly rather large, but vary a little in size. The whole plant is glabrous.

I may remark here that there appear to be two varieties, if not species, of this *Pilocarpus*, the one being perfectly smooth in every part, as above described, and the other having the stems, petioles, and under surface of the leaves covered with a dense velvety pubescence composed of simple hairs. The hairs are not so numerous on the leaves and lower part of the stems, but appear to be singularly persistent, as they may be found on the bark for a considerable distance down the stem when it is examined with a lens. In shape and size the leaves resemble those above described, but are rather thinner in texture, and have a somewhat different and less pungent taste. The lowest pair of leaflets in the specimens I have examined are only two to three inches from the base of the rachis. I have not succeeded in finding entirely glabrous leaves on the stems which have hairy leaves, nor hairy leaves on the stems which have smooth leaves, and therefore consider that the plant with hairy leaves is probably a distinct variety.

The inflorescence is a raceme, six or eight inches long, judging from the peduncle figured on p. 582. The base of the peduncle there represented is entire, but the top is evidently broken off, so that it may have been one or two inches longer. The pedicels, so far as can be learned from the scars on the peduncle, are numerous and about three-eighths of an inch apart. Whether they are horizontal or not when flowering it is impossible to say. The only two specimens I have seen are in fruit and have the pedicel deflexed and about half an inch long. The fruit, fig. 3, closely resembles in external appearance that of a specimen of a Cuban plant in the British Museum,* referred by Asa Gray to *Pilocarpus heterophyllus* (Pl. Wrightianæ, p. 170; Wright, 1129). When perfect it consists of five carpels, of which not more than two or three are usually developed to maturity. When ripe the carpels dehisce into two valves, as in fig. 5, and then remind one strongly of miniature cockle shells, fig. 4, with the valves open exposing the animals.

This appearance is owing to the fact that as in two or three other closely allied genera, the endocarp separates at a very early stage, and thus forms an inner case for the seed, as represented in figs. 5 and 7. The outer portion of the carpel, consisting of the united epicarp and mesocarp, is in most of the specimens of a pale brown or buff colour, coriaceous, convex on both sides, of a somewhat circular form, but with the inner edge (*i. e.*, that nearest to the stigma) nearly straight, marked both inside (fig. 6) and outside (fig. 4) with curved ridges, which anastomose towards the outer edge and are almost absent from the inner edge. The convex surfaces only are dotted with oil

* The genus *Galipea*, to which *P. heterophyllus* has been referred, is distinguished from *Pilocarpus* by the convolute cotyledons, tubular flowers, and anthers not versatile.

JABORANDI (*Pilocarpus species*).

1. An entire leaf. 2. Leaflet: under side, showing the venation. 3. An entire fruit and peduncle—nat. size. 4. Ditto with two carpels only developed, showing the deflexed pedicel. 5. Carpel, showing the dehiscence. 6. A carpellary valve with the endocarp removed, showing the reticulated inner surface. 7. Endocarp, showing the dilated placenta and short funiculus. 8. Placenta separated. 9. Seed: *a*, hilum. 10. Endocarp without placenta. 11. Cotyledon.

receptacles. The endocarp (fig. 10) is smooth and pale yellow, with a wide sinus in the inner edge, which is occupied by a membranous expansion (fig. 7) of the shape shown in fig. 8. To the upper portion of this expansion, which appears to be a dilatation of the placenta, the seed (fig. 9) is suspended by a narrow, lancet-shaped, extremely short funiculus; this is shown in fig. 5. The seed, of which there is only one in each carpel, is black and shining, somewhat reniform, convex on both sides, enlarging towards its base, and forming a sharp ridge at the back towards the apex.

The hilum is lancet-shaped, the vessels appearing to pass through its lower end (fig. 9 *a*). The testa is thick and coriaceous, the endopleura membranous. The seed is inverted, somewhat reniform in outline, with a superior radicle, plano-convex cotyledons, and is exalbuminous, the radicle being very minute (fig. 11).

The genus *Pilocarpus*, to which our plant has been referred by Professor Baillon, was limited, as originally defined by Vahl* to plants with simple leaves, and seeds having biauriculate cotyledons. As further extended by Bentham and Hooker in their 'Genera Plantarum,' p. 299, the plants of the genus *Pilocarpus* are said to have "simple, ternate, or *pinnate* leaves," while no mention is made of the cotyledons being biauriculate. The seeds, however, are stated to be ovate, with a membranaceous testa, and exalbuminous.

The Jaborandi plant differs from the description of the genus, as defined in the 'Genera Plantarum,' only in the following particulars:—the seeds are somewhat reniform, not ovate, and the testa is coriaceous, not membranaceous. The cotyledons are not auriculate, but as that character is not given as an important one, it alone is not sufficient to exclude the plant from the genus.

Since there are several genera closely allied to *Pilocarpus* in the tribe (*Zanthoxyleæ*) to which Jaborandi evidently belongs, it will not be possible, until the flowers of the Jaborandi plant have been examined, to decide with certainty whether it belongs to the genus *Pilocarpus* or not, for the above-mentioned differences can scarcely be considered sufficient to separate it.

Whether it be identical with the *Pilocarpus pennatifolius* of Lémaire is more doubtful for the following reasons:—

The fruit of Lémaire's plant has not, that I can discover, been described.

The plant of *P. pennatifolius* at Kew, which is without doubt Lémaire's plant, has a much longer and stouter raceme (2-3 times the diameter and nearly twice as long) than that of the Jaborandi; and has quite a succulent appearance.

The leaves of Lémaire's plant are of much thinner texture than those of the Jaborandi, and the veins on the upper surface are much less prominent; the leaves also taper below much more rapidly than in the Jaborandi.

The geographical distribution is different. Lémaire's plant, so far as it is known, is extra-tropical, while the Pernambuco plant comes from near the Equator.

Hairs do not appear to be present even on the youngest leaves of the smooth variety of Jaborandi, but are stated by Lémaire to be present in the young parts of his plant.

It appears probable, therefore, that the Jaborandi of Pernambuco is a species of *Pilocarpus*, which, judging from the materials at present examined, comes very near to the species suggested by Professor Baillon, although probably distinct from it.

The hairy variety of Jaborandi seems to come much nearer in the texture of its leaves to *P. pennatifolius*, Lémaire, but from the persistence of the hairs, even upon the grey bark, I am inclined to think it also a distinct plant.

Whether these conjectures are correct or not can however only be decided by the arrival of flowering specimens of the plant, which I hope, through the kindness of Mr. W. Squire, to have the opportunity of examining during the present year. Still it is a satisfaction to have been able to describe the characters of the fruit thus early.

As there are several plants used in South America under the name of Jaborandi, which seem to possess somewhat similar properties in varying degrees, I think it will be well in future experiments to distinguish the Jaborandi here described and figured as Pernambuco Jaborandi. Another species, which is in use both in France and this country, is a kind of *Piper*. It is readily distinguished from the Pernambuco Jaborandi by the thin texture of the leaf, which is acuminate, and has pellucid dots so minute as not to be visible to the naked eye when the leaf is held up to the light.

* 'Vahl Eclog.,' 1, p. 29.

LEAD IN AËRATED WATERS.

BY C. UMNEY.

As the manufacture of aërated waters is carried on to some extent by pharmacists, any remarks having a practical bearing either upon the method of their production, or the analysis of specimens as met with in trade, must be of interest, not only to those actually engaged in their manufacture, but to druggists generally.

There can be no question that the recent prosecution in Glasgow under the Adulteration Act, for the sale of soda-water contaminated with lead, must be followed by most beneficial results, for already it would seem chemists have been consulted upon the purity of the water supply, the determination of the presence or absence of lead, and other matters which manufacturers have thought it advisable to place beyond suspicion.

The publication of the results of these investigations in our journals is unquestionably in the main a great boon, for the truth must be told even though unpalatable; but one cannot help thinking that this increase in our list of substances contaminated with lead, and more especially so when essence of lemon and such simple bodies are included, must have a tendency to produce with the trade and even the public, a lead panic.

Mr. Ekin* has recently pointed out in this Journal that citric acid, as generally met with in trade, contains traces of lead, a statement which will be believed by anyone acquainted with its manufacture.

I myself have lately examined two specimens from different sources and find both slightly contaminated, and not only citric, but tartaric acid too is liable to contain the same impurity.

Dr. Macadam's recent elaborate research into the

* *Pharm. Journ.*, Jan. 9.

solvent action of water containing carbonic acid upon lead under varying conditions, has added very much to our information upon what *may* take place under certain circumstances.*

My object is not to question the figures given in the paper alluded to as the results of examination of the waters sold in Edinburgh, or to say anything against the very excellent general suggestions for the erection of soda water plant there detailed. On the contrary, I should strongly recommend them to any one fitting a new factory; but still I do venture to put before the readers of the Journal, my views upon the cause of lead contamination, where the aërating and bottling machines used are such as are made by London engineers; for of those produced in Glasgow or other Scotch cities, I have no knowledge, although I imagine they are of the same construction and upon the continuous principle, as devised in the early part of this century by Bramah.

Of course, manufacturers, whilst desirous of perfecting their processes and attaining purity, will still be anxious to disturb their present arrangements of plant only so far as absolutely necessary. I would therefore indicate where they *should* begin, also the exact point at which they *may* cease removing leaden pipes.

London machines are generally made and adapted as follows:—

The leaden generator for carbonic acid, is in communication by a leaden pipe with the washing vat, where it is connected to a tinned copper pipe, passing upwards through the water, ending in a bend, which is several inches below the surface; the washed gas is carried away by another tinned copper pipe, which is several inches above the surface of the water; and as this leaves the vat, it is then attached to a leaden pipe, which often passes several yards along the ground, until it is beneath the machine, when it is bent in the upward direction, and connected by a gun metal union and tinned copper pipe to the aërating cylinder, which is always of copper or gun metal, in either case tinned inside.

A check valve is inserted between the leaden pipe and the cylinder, which allows the gas to pass at each stroke of the pump, but having passed and come in contact with the water, it cannot return, for the greater the pressure on the interior of the cylinder, so much greater the force on the top of the valve.

Now, as the cylinder is of copper or gun metal, tinned on its interior, and only in this cylinder is there any liquid, any lead contamination up to this point must be from the passage of the washed carbonic acid gas through the leaden pipe.

The question then naturally arises, Is it possible for gaseous carbonic acid to pass through a leaden pipe without contamination?

In order to test this, I caused one thousand litres of carbonic acid to be drawn by a pumping machine through one litre of distilled water, to which a small quantity of acetic acid had been added. Upon boiling the solution to expel carbonic acid, treating with hydric sulphide, not a trace of lead sulphide was discernible, the colour of the liquid remaining perfectly white.

It would therefore appear that aërated water does not, up to this point, receive its contamination from the aërating machine, or the pipes leading to it.

* *Pharm. Journ.*, Jan. 16.

Were all waters bottled direct from the cylinder, there would be no fear of contamination, but it is customary to transfer the liquid to the bottling machine.

In its transit it receives its contamination, for the connection is made with leaden pipe, which is acted upon (more especially when the pressure is from four to eight atmospheres), under the most favourable circumstances that could be devised.

For this reason, therefore, I would strongly recommend all manufacturers to replace the pipe leading from the machine to the bottling apparatus by one of pure tin; and in the erection of all plant for the future it would certainly be advisable, considering that the extra cost could only be an additional two or three pounds per machine, and even if only to be *beyond suspicion*, to use tin pipes throughout, as Dr. Macadam has suggested.

We are told essence of lemon "is often loaded with lead, and that no doubt part of the lead which has been found in the lemonade has been derived from the oil of the lemons in making up the syrup."

Surely this can hardly be intended in earnest, even although the essence may contain traces of lead?

In the London market, essence of lemon is met with in copper canisters, tinned internally, weighing from forty to eighty pounds, a layer of lead being added on the inside to strengthen the thin copper used. To describe the essence "as loaded with lead," is, according to my experience, an exaggeration. The solution of sufficient lead necessary "to load" the essence would with eighty pounds weight of it show a marked decrease in the weight of the copper, which in practice is not found to be the case.

That traces of lead are present I have satisfied myself, but when one considers that the amount of lemon which is used in flavouring syrup seldom exceeds 0·15 per cent., and that this syrup is only used in very limited quantity, it is difficult to believe that the indication of lead in lemonade is due to this cause, but rather to the contamination of the citric and tartaric acids in the first instance, a point which seems to have escaped Dr. Macadam in reading his paper at Edinburgh.

The discontinuance of the use of leaden pipes from the aërating to the bottling machine, will, I am confident, do all that is practically necessary to perfect the manufacture of aërated waters. It is to be hoped that public analysts will refrain from magnifying these infinitesimal contaminations into adulterations, for should they act otherwise, the public will at length become so exacting that trading in articles of high commercial purity, although not of absolute chemical purity, will be simply impossible.

Laboratory, 40, *Aldersgate Street, E.C.*

JAPANESE VEGETABLE AND BEES' WAX.

Mr. Consul Robertson in his report on the trade of Kanagawa, Japan, gives the following information respecting the vegetable and bees' wax of that country:—

"The trees from which wax is made are the urushi, or lacquer tree, the yama-urushi, the hage-urushi (the last-mentioned better known as the rô-no-ki), and the koga-no-ki. The wax is made from the rind of the fruit.

"In places where wax is manufactured to any great extent the urushi is not made use of for its lacquer. As the trees are not cut for several years, they may be seen in the wax-producing districts growing to a height of

35 to 40 feet. In districts where the trees are used for their lacquer or varnish, they are cut every seven or ten years.

"The mode of obtaining wax from the urushi or lacquer tree is as follows:—

"Late in the autumn the branches, heavy with fruit, are lopped off and taken into the house. The fruit is pounded up in a pestle and then shaken in a basket-sieve so as to separate seed from rind. From this rind the wax is made. The mode of expressing it differs here and there, but in no very important particulars. The following brief description is taken from the mode as followed out in Sendai and Aidzu. Boiling water is got ready in an iron cauldron, over which a lattice-work of sticks is placed, and on these some matting. The sifted rinds of the fruit are then laid out on the matting and steamed, after which they are placed in hempen bags and again steamed. The bag, with its contents, is then put into a wooden trough, wooden wedges or blocks are inserted in the trough, and driven home on to the bag with heavy blows from a mallet. An aperture at the bottom of the trough provides for the egress of the wax. The trough and wedges are made of kiaki wood, and the mallets and blocks of wild mulberry—a very hard wood, and well suited to the purpose. A small quantity of oil, in the proportion of about one-tenth, is added to the wax to allow of its being expressed more easily. It then goes through another steaming process, and is again pounded in the trough.

"Wax from the yama-urushi, or wild lacquer tree, is obtained thus:—The fruit is collected at the latter end of summer, and is at once steamed without being pounded in a pestle as is the case with the urushi wax. The wax is purified by melting. A large tub of cold water is taken and placed under a wooden tank, having a small aperture close to the bottom. The melted wax is then poured into this tank, and escapes through the aperture into the tub beneath. While doing so it is stirred rapidly with the hand, after which it is placed either in matting or in shallow boxes, and dried in the open air for about fifteen days.

"The hage-urushi, from which wax is largely obtained, grows in the south-western portion of the island. This tree was first brought from the Loochoo Islands to Sakurajima, an island near Sakuma. Its production has so increased that there are now no less than seven different species, known as marumi, yasutomi, inotsume, ogawa, tanaka, fukiange, and matsu-yama, the last mentioned being regarded as the best. The hage-urushi tree is raised from seed or from slips. Koga wax is made from the fruit of the koga tree, which differs from the urushi and hage-urushi trees. It is an evergreen, and is largely grown in Otsugori, in the northern part of Nagato. It flowers in the middle of summer, the fruit ripening in autumn, when it is plucked and soaked in water for four or five days, after which it is trodden out with the feet, thus separating the outer rind. This is then dried and pressed, and the same course pursued as already described. The koga wax contains a large proportion of natural oil, which, in a measure, restricts its use to cold and temperate districts. Candles made of it show a very bright light, and if some contrivance could be hit upon for extracting the oil, the consumption of this wax would be increased, as it is very cheap compared with the other kinds. Refuse wax is used for manuring purposes.

"Bees' wax is obtained in this way: After the honey has been taken from the comb the latter is put into boiling water and allowed to simmer. It soon dissolves and floats to the surface. A wire network with raised sides is then inserted in the boiler and pressed down, thus causing the wax to rise through and above the net, the refuse part of the comb remaining at the bottom. The wax is taken out and placed in cold water, where it soon hardens. It is then lumped together and again melted, after which it is placed in moulds and is now ready for the market. The amount of wax obtainable from a comb is equal to about one-third of the weight. Wax is also made from the combs of insects, which build on the ibôta tree. This wax is of the purest white, and is prepared in the same way as bees' wax."

THE PHOSPHORESCENCE OF PHOSPHORUS, SULPHUR, AND ARSENIC.*

BY M. JOUBERT.

The theory of Berzelius, that the phosphorescence of phosphorus is due to the vaporization of the metalloïd, has been confuted by the experiments of Schrötter, but it has not entirely lost credit. The author confirms Schrötter's results. The phosphorescence does not take place in a vacuum, or in the absence of oxygen. It is well known that it is not apparent in oxygen gas at the ordinary temperature and pressure, but that it is necessary to raise the temperature or diminish the pressure in order to produce the phosphorescence. The author believes that there is also an inferior limit below which diminution of pressure causes the phosphorescence to disappear. He could not fix the limit, but its existence is indicated by the fact that when phosphorus is confined in nitrogen over water containing oxygen, the phosphorescence takes place in strata, occurring at regular intervals, although, of course, the oxygen is diffused from the water in a perfectly uniform manner. Though he is unable, also, to fix the superior limit at which increase of temperature causes a disappearance of the phosphorescence, his experiments indicate that it would be about 14°. The following are the tensions of phosphorus vapour at the different temperatures given. Glycerin was the only liquid which could be used in these experiments without being acted upon:—

Temperature .	5°	10°	20°	30°	40°	100°
Millimeters .	·03	·05	·11	·25	·48	3·44

When oxygen is mixed with an inert gas, such as nitrogen, and the lower limit of pressure is noted at which phosphorus placed in the mixture ceases to give any luminosity, the pressure exerted by the oxygen alone is below that which pure oxygen would exert. This difference is greater the larger the percentage of inert gas present. The property of phosphorus of giving rise to luminosity with a very small pressure of oxygen has enabled the author to ascertain that mercuric and silver oxides are appreciably decomposed at 100°. The temperatures at which sulphur and arsenic give a phosphorescent cloud are, for the first, about 100°, at the ordinary temperature, and a little higher for the second. Oxygen is necessary for the phenomenon, and there is a superior and inferior limit, as with phosphorus.

PREPARATION OF ABSOLUTE ALCOHOL.†

BY J. LAWRENCE SMITH.

This substance, as obtained in commerce, very seldom marks more than 98 to 99 per cent. It is, however, not unfrequently made in our laboratories, and when this is done the usual method is employed of pouring strong alcohol on lime until the lumps of lime are covered. This method of proceeding gives a thick magma which, when heated over a water-bath, allows the alcohol to pass over but slowly, and much of the alcohol is lost from the impossibility of the heat penetrating the thick mass. The method I follow differs from this in no way except in the quantity of lime employed; using the smallest quantity of lime necessary to abstract all the water, it is surprising how completely the lime will perform its function in this respect. Take, for instance, one litre of alcohol of 94 per cent.; this contains about 60 grammes of water; if to this be added 120 grammes of good and fresh-burnt lime, requiring about 40 grammes of water to convert it into

* *Journal of the Chemical Society*, from the 'Compt. rend.,' lxxviii., 1853.

† From the *American Chemist*.

hydrate, actual experiment proves that when kept in contact with the alcohol a sufficient length of time it accomplishes this absorption of water, and the alcohol decanted from the precipitated lime will be fully 98 per cent.

Operating upon this fact, I have been long in the habit of supplying myself with alcohol of 98 and 100 per cent. by proceeding in the following manner :—I have in my laboratory three or four 2-litre bottles, into each of which I place 1½ litres of 94 per cent. alcohol, the strongest alcohol sold in commerce ; to this is added 180 grms. of fresh-burnt lime, of the best quality, broken up into a coarse powder. These bottles are set aside on the shelf, and agitated from time to time : the oftener this is done the more rapid will the reaction be accomplished. A week or ten days will usually suffice, when the bottles are allowed to remain at rest, and the hydrate of lime will settle in a few days, and by a syphon two-thirds of the original alcohol can be drawn off free from lime, which marks 98 per cent. alcohol, and when filtered and 50 c.c.m. evaporated to dryness there will be left only the merest trace of lime, less than ½ milligramme. But, of course, re-distillation is so simple that if we wish the alcohol at 98° it can be readily distilled over a water-bath. The magma remaining in the bottle, when distilled over a water-bath, furnishes the remainder of the alcohol about one-half per cent. higher.

When absolute alcohol is desired, take the alcohol just as it has been syphoned off or distilled from the magma, put it in a convenient flask for distillation, and to each litre add 120 grms. of lime in coarse powder, attach to a Liebig condenser inverted, so that the alcohol will run back into the flask when condensed : this is continued for an hour and-a-half or two hours. The condenser is then placed in its normal condition, and alcohol distilled over which will mark 100 per cent. Recently I have learned that there is a method adopted of making the absolute alcohol by one distillation, operating by the inverted condenser first, but in this process the amount of lime called for is the usual quantity, whereas I find that by reducing the lime to its minimum, and always having bottles ready to furnish 98 per cent. alcohol, the operation is facilitated, and the loss diminished. So that with the ordinary conveniences and appliances of the laboratory, that are always at hand to be mounted, I can, with fifteen or twenty minutes of *personal attention and manipulation*, obtain a litre or two of absolute alcohol. Of course the time for the reaction of the materials and the distillation is not referred to, as this requires little or no supervision.

NOTE ON THE PROXIMATE ANALYSIS OF CINCHONA BARK.

*Limited to the Separation of the Four Alkaloids, Quinia, Quinidia, Cinchonia, and Cinchonidia, and the Three Acids, Quinic, Quinovic, and Quinotannic.**

BY ROBERT M. COTTON.

The process given below is nothing more or less than the combination of methods reported by different authorities, and given in Watts' 'Dictionary' and Gmelin's 'Handbook,' modified, in some particulars, after trial. The writer has found all the results of this process to be satisfactory. The same material was subjected to operations by other methods without obtaining as good results.

Any desired quantity—say one-half pound—of the powdered bark is macerated with warm water for two or three days and then percolated, water being added upon the percolator to exhaustion. Hydrochloric acid is added to the percolate, to a distinct acid reaction ; then solution of caustic soda is added, with stirring, to an alkaline reaction, and the mixture is set aside for some hours for subsidence of the precipitate. The whole is then filtered, and the precipitate well washed with cold water ; this precipitate, *a*, contains the alkaloids, and the filtrate, A, contains the acids.

The washed precipitate, *a*, is exhausted with (much) ether, giving an ether solution, *b*, containing the quinia and quinidia, while cinchonia and cinchonidia are left undissolved. Precipitate *a* is again washed with water, and then treated with 90 per cent. alcohol, which dissolves the cinchonidia with a little cinchonia : solution *c*. Precipitate *a*, washed again with water, remains as nearly pure cinchonia. The residue of solution *c* is the cinchonidia, with a little cinchonia. (Cinchonia is soluble in about 120 parts of 90 per cent. alcohol ; cinchonidia in about 12 parts of the same solvent.)

The quinia and quinidia of solution *b* are separated from each other by the unlike solubilities of their oxalates, as follows :—A moderately dilute water solution of oxalic acid is added to an acid reaction ; the ether is allowed to evaporate, or is distilled off ; and the residue is treated with water. The solution *d* contains the quinidia as oxalate, together with a very little oxalate of quinia. The residue is not soluble in water, is dissolved with dilute sulphuric acid, as acid sulphate of quinia, solution *e*. By precipitation with aqueous alkali, quinia is obtained from solution *e*, and quinidia from solution *d*.

Each of the four alkaloids may be obtained in crystals from a saturated alcoholic solution.

In the work for acids the quinovic acid is precipitated with normal lead acetate, leaving quinic acid in solution. Also, if the lead acetate is added short of saturation, the quinotannic acid remains in solution. To accomplish this result two-thirds of solution *a* is treated with neutral acetate of lead solution just to complete saturation, and immediately mixed with the remaining one-third. The precipitate of quinovate of lead is filtered out, washed with water, suspended in water, and decomposed by dropping in very dilute sulphuric acid, until the precipitate turns white, carefully avoiding an excess (which would decompose the quinovic acid). The liquid is decanted from the lead sulphate upon a filter, and the filtrate concentrated and left some time to crystallize as quinovic acid.

The filtrate from the precipitate by acetate of lead is concentrated to the consistence of a thin syrup, and set aside to crystallize. It may require the insertion of a nucleus for crystallization. There should now form a crystalline mass (quinic acid), mixed with yellowish drops of oily consistence (quinotannic acid). The mass is washed with ether, the residue being quinic acid, very deliquescent.

The ether solution is evaporated, leaving in residue the quinotannic acid, uncrystallizible.

* From the *American Journal of Pharmacy* for January.

A MODE OF DECOMPOSITION OF CHLORAL HYDRATE.*

BY M. TANRET.

If a mixture of solutions of chloral hydrate and potassium permanganate be made alkaline, say with caustic potash, gas is evolved, the liquid becomes discoloured, and sesquioxide of manganese is precipitated. If several grams of chloral hydrate be acted upon, and the temperature not raised above 40° C., the reaction will last for some hours ; then on filtering the liquid, the filtrate will be found to contain chloride, carbonate, and formate of potassium. The gas evolved is carbon monoxide. The reaction occurs equally with very dilute solutions, and even if borax be substituted for potash. This decomposition leads to a theory to account for the action of chloral hydrate upon the animal system. It is suggested that when this substance is taken into the circulation, it is submitted to oxidizing agencies ; the alkalinity of the serum determines its decomposition ; the carbon monoxide displaces the oxygen from the arterial blood, and produces an effect similar to that resulting from poisoning by carbon monoxide. The lowering of the temperature of the body and the prolonged action of the chloral hydrate, owing to slow decomposition, tend to make this theory more tenable than the assumption of its conversion into chloroform.

* *Journal of the Chemical Society,* from the 'Compt. rend.,' lxxix, 662.

The Pharmaceutical Journal.

SATURDAY, JANUARY 23, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MORIBUND PHARMACIES.

SOMETHING more is due to the readers of this Journal than a bare record of the proceedings which on Monday last closed their third and final stage in a verdict of "death by misadventure." We refer to the coroner's inquiry respecting the circumstances which led to the death of CELINE MARIN, through the administration of corrosive sublimate in the stead of subnitrate of bismuth. The statements made in evidence, so far as they affect our present object, may be thus recapitulated. A young Frenchwoman who was suffering from diarrhœa requested a friend to fetch her some bismuth from a neighbouring pharmacy. The day was Sunday, and the shop was shut up; but the messenger was importunate, and gained admittance. The business, however, was one that was being carried on by trustees on behalf of the surviving representatives of a deceased chemist and druggist; the assistant placed in charge was absent, not being engaged to attend on Sundays; and the only person on the premises appears to have been a female housekeeper, who was not supposed to "serve in the shop beyond selling soaps and scents, and simple things of that kind." And there, in the gloom of a closed shop on a December day, this ignorant woman, in her wish to oblige an urgent customer, measured out a "spoonful" of bichloride of mercury instead of subnitrate of bismuth. The consequences to CELINE MARIN were a fortnight of suffering, terminated by death!

This sad accident should be pregnant with warning to all registered chemists and druggists who contemplate making provision for the carrying on of their business by trustees after their decease, under the provisions of the 16th section of the Pharmacy Act, 1868. It fully justifies also the views we have heretofore thought it right to urge upon this subject. For while on the one hand we have pointed out on several occasions the facility with which a sufficient trust may be created, and that consequently any hardship which may arise cannot fairly be attributed to the framers of the Act; we have, on the other hand, expressed a decided opinion that, except in very rare cases, it is advisable, even in the survivors' interest, that the trust should terminate at the earliest possible date, and the business be transferred to other hands whilst the prestige of the deceased proprietor is still associated with it. We are aware that this opinion has been criticized by those whose judgment we respect; but surely such a course is preferable to trusting to perfunctory services which result in the bismuth and perchloride of mercury bottles remaining undisturbed on the shelves for three months at a stretch. Moreover, if it becomes known that in such a case the trustees are responsible, to the same extent as the original proprietor would have been, for damages sustained through defective arrangements, it is probable that persons so nominated will be very chary of undertaking the duties.

But there is a broader phase of this question which demands the attention of chemists and druggists. One of the principal arguments which were urged to induce Parliament to legislate for the regulation of pharmacy in Great Britain, was the necessity for a personal qualification in persons who undertake the duties of dispensing medicines and selling poisons to the public. This principle received the endorsement of the Legislature in the Pharmacy Act, 1868; to a limited extent it is true, but still, to an unprecedented degree in the restriction of trade; and moreover, there are not wanting signs that public opinion is ripening for a further advance in the same direction. It is, therefore, not likely to be admitted by the public as consistent, that after claiming this *quasi*-professional standing, the same body of men should also claim the transmission of this personal right with no more limitation than in that of the goodwill of an ordinary business. We think there can be little doubt that the future credit with the public of the very proper restrictions which have received its sanction, is capable of being greatly damaged by an improper use of the rather elastic provisions of the 16th section of the Pharmacy Act, 1868.

This leads us to remark, that seeing the importance, in the interest of the public, of the Registrar under the Pharmacy Act receiving every assistance from public officials in enforcing its provisions, we regret that the Coroner, although aware of the fact of the name of the assistant not being on the Register of Chemists and Druggists for 1874, did not think it pertinent to the inquiry to ascertain how far the requirements of the Pharmacy Act had been complied with. Had he done so he would have found that no person bearing the name given by the assistant is a "qualified assistant" within the meaning of the Act; and the certificate produced was evidence of nothing more than that he *might* be a person who has become disqualified by being struck off the Register through neglecting to keep the Registrar informed of his proper address. Even in that case a reprimand from the Coroner would not have been wasted.

We would also respectfully protest against the view that because the woman was only allowed to sell harmless articles, her accident was one that might have happened to any of the tradesmen who formed the jury. In most shops the substitution of one article for another would only lead to temporary inconvenience; in this case the attempt to sell an innocuous substance from a stock including poisons resulted in death! On the whole, we think the occasion was one eminently fitted for emphasizing the fact that if trustees undertake to keep an "open shop for retailing, dispensing, or compounding poisons," they do it under the same responsibility as the former proprietor, and for impressing upon their consideration that they are bound to ensure that the business is throughout conducted under the qualified supervision required by the Pharmacy Act.

THE CHEMISTS' BALL.

On the evening of Wednesday last, the Annual Chemists' Ball was held at Willis's Rooms. The company numbered about three hundred. "Success to the Chemists' Ball," the only toast of the evening, was proposed at the supper table in a humorous speech by Mr. Alexander Bottle, of Dover, the Chairman of the evening.

M. Chevreul, the eminent French chemist, who is now eighty-eight years of age, has been promoted by Marshal MacMahon to the dignity of the Grand Cross of the Legion of Honour, in recognition of his services to science. The Marshal took the opportunity afforded by the reception on the *jour de l'an* to make the announcement to the *savant*.

Amongst the prizes which were awarded by the French Academy of Sciences at its sitting on the 28th December last, two fell to Assistant Professors of the Paris School of Pharmacy. These were a botanical prize of 500 francs, awarded to M. Joannes Chatin, for his monograph of the Valerianaceæ; and the Jecker prize (1872) to M. Jungfleisch, for his researches respecting the chlorinated benzols and the optical modifications of tartaric acid. M. Byasson was awarded 1,000 francs for his Memoirs on Chloral, which have appeared in this Journal. M. Lefranc, a pharmacien militaire, receives an award of 1,000 francs for his chemical and toxicological investigation of the *Atractylis gummifera*. M. Jules Lefort receives the Montyon prize of 2,000 francs for his 'Traité de Chimie hydrologique.'

We learn from the *Répertoire de Pharmacie* that in the scheme for the re-organization of the French army, it is provided that the corps of *pharmaciens militaires* shall consist of 1 inspector; 8 principals of the first class and 16 of the second; 40 majors of the first class and 55 of the second; 50 aides-majors of the first class and 15 of the second: in all 185 men.

Mr. F. M. Rimmington, F.C.S., Pharmaceutical Chemist, has been appointed Public Analyst for the borough of Dewsbury. Mr. Henry Meadows, of the University of Edinburgh, has been appointed Public Analyst for the borough of Leicester.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

January 20th, 1875.

Present: Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Hills, Linford, Martindale, Moss, Schweitzer, Taylor, and Umney.

Dr. Greenhow was also present, on behalf of the Privy Council.

MAJOR EXAMINATION.

Three candidates were examined. *All* failed.

MINOR EXAMINATION.

Sixteen candidates were examined. *Eight* failed. The following *Eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

	Moon, Murray James	Godalming.
	Blackwell, Josiah	St. Austell.
	Wiseman, Ebenezer Henry	Cambridge.
	Dixon, Henry Benjamin	Nottingham.
	Reade, Joseph George Edward	London.
Equal.	Davidson, Alexander	Insch.
Equal.	Mackaness, Charles	St. Neots.
	Pell, John	Market Harborough.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The following Certificates were received in lieu of the Society's Examination:—

Certificate of the College of Preceptors.

Buck, Anthony S. .... Liverpool.

Certificate of the Law Society of the United Kingdom.

Taylor, John .... Bolton.

Certificate of the Society of Apothecaries.

Dawson, Edward ....

Certificates of the University of Cambridge.

Bacon, Charles Henry .... Norwich.

Fry, Edwin Sargood .... Buckhurst Hill.

Certificate of the University of Oxford.

Adams, Benjamin .... Grantham.

PRELIMINARY EXAMINATION.

The following is the result of the Preliminary Examination held on the 4th inst.:—

ENGLAND AND WALES.

One hundred and fifty Candidates presented themselves for Examination, of whom *eighty-six* failed. The following *sixty-four* passed, and have been duly registered as Apprentices or Students:—

	*Anderson, Edward	Limber.
	*Holroyde, John	Halifax.
	*Thomas, Frederick William	Dowlais.
	*Wright, Robert	Buxton.
	*Woollons, Charles Henry	Ryde.
Equal.	*Rimmington, Harry	Epworth.
Equal.	*Senier, Alfred	London.
	James, Joseph	Plymouth.
Equal.	Holmes, James William	Norton.
Equal.	Senier, Harold	London.
Equal.	Williams, James	St. Clears.
	Hudson, Osborne Henderson	Sheffield.
	Pollington, Edward A. A.	Boston.
Equal.	Angior, Thomas Mathews	Bootle.
Equal.	Foot, Ernest George	Plymouth.

* Passed in the First Division.

Equal. { Sanders, John William Shanks ... Gorleston.
Southgate, Wilfred Burnham ... Hull.
Waites, Richard Foulstone ... Rotherham.
Whitwell, Alfred ... York.
Wildgoose, John Gratton ... Boston. }
Rogers, Stephen ... Manningtree.
Equal. { Gain, Alfred ... Shirley.
Grundy, George William ... Bolton.
Wilson, Alexander William ... Eastbourne. }
Goldstraw, Charles ... Bilston.
Equal. { Briggs, William ... Lancaster.
Dawson, Athol Stancliffe ... Sleaford.
Doe, James Emile ... Atherstone.
Marshall, Philip James ... Chesterfield.
Parker, Thomas Herbert ... Bedford. }
Equal. { Attfield, Walter ... Ashby Magna.
Benson, Henry Thomas ... Aberystwith.
Cock, Horace ... Attleborough.
Cox, Frederick E. W. ... Dudley.
Johnson, Richard ... Highfields.
Parry, Robert Henry ... Rhyl.
Sims, George Samuel ... Derby.
Walker, Robert ... Royston. }
Wilkinson, John ... London.
Brayne, John W. W. ... Newmills.
Equal. { Blenkiron, Jeremy ... Shildon.
Clare, John ... Reading.
Riddle, James Pearson ... South Shields.
Shrubshall, William Wyatt ... Tunbridge Wells. }
Lonnon, Alfred Imrie ... Stoke.
Millen, Herbert Alfred ... Peckham.
Equal. { Ball, Henry Simpson ... Nottingham.
Brook, Joe ... Lofthouse.
Codling, Arthur John ... Norwich.
Elton, Thomas Francis ... Cirencester.
Green, Thomas ... Hemel Hempstead.
Hadfield, Henry May ... Sheffield.
Jones, John ... Aberdare.
Lee, William Frederick ... Clifton.
Manduell, Thomas ... Hindpool.
Mansell, Charles ... Tewkesbury.
Nichols, Frederic Bulstrode ... Chelsea.
Perkin, Robert James ... Milford Haven.
Rickard, William Rees ... Holloway.
Rowland, John Llewellyn ... Carnarvon.
Shepperson, Wilson ... March.
Stretch, Joseph Harling ... Snaith.
Waddell, Andrew Morrison ... London.
Warren, Richard W. ... Leicester. }

SCOTLAND.

Twenty-two Candidates presented themselves for Examination, of these *nine* failed. The following *thirteen* passed and have been duly registered:—

*Clark, William ... Aberdeen.
*Michie, Robert ... Rhynie.
*Brown, John Jarvey ... Glasgow.
*Russell, James Lawson ... Edinburgh.
*Will, James ... Aberdeen.
*Alexander, Henry ... Aberdeen.
Equal. { Donaghey, John Joseph ... Dundee.
Thomson, John ... Edinburgh. }
Cochrane, William ... Dundee.
Maclean, James ... Jedburgh.
McDougall, Rea Ireland ... Edinburgh.
Ogilvie, William ... Balgaveny.
Morrison, William Norman ... Inverness.

The questions for examination were as follows:—

Time allowed: Three hours.

LATIN.

1. Translate into English:—Solis occasu suas copias Ariovistus, multis et illatis et acceptis vulneribus, in castra reduxit. Quum ex captivis quaereret Caesar, quam ob rem Ariovistus proelio non decertaret, hanc reperiebat causam; quod apud Germanos ea consuetudo esset, ut matres familiae eorum sortibus et vaticinationibus declararent, utrum proelium committi ex usu esset, necne; eas ita dicere, non esse fas Germanos superare, si ante novam lunam proelio contendissent.

2. Decline *rem*, *sortibus*.

3. Give the perfects and supines (active) of *quaereret*, *reperiebat*, *committi*, *contendissent*.

4. In what cases are *time when* and time *how long* put? Give examples.

5. Pater mihi et mater *mortui* sunt. Parse *mortui*.

ARITHMETIC.

6. Multiply £13. 12*s*. $11\frac{1}{4}$*d*. by $2\frac{7}{9}$.

7. Goods are bought at $6\frac{1}{2}$*d*. per pound, and the cost of carriage is $1\frac{1}{4}$*d*. per lb.; they are sold at £4. 10*s*. per cwt.; what is the gain or loss per cwt.?

8. Simplify $\dfrac{\frac{3}{4}}{\frac{5}{4}} + \dfrac{2\frac{1}{4} - \frac{3}{7}}{5\frac{1}{4} + \frac{1}{14}} - \dfrac{\cdot 2}{3\frac{4}{7}}$

9. Multiply 5·81 by ·4583, and divide 1·13 by ·000132.

10. Explain the *metrical* system of weights and measures. What is the weight in grammes of 10 litres of water?

ENGLISH.

11. In what different ways is the plural formed in English nouns? Mention any nouns that have no plural.

12. Into what classes may pronouns be divided? Give three examples of each class.

13. Write down the present and past tenses of the following perfect participles:—*bereft*, *borne*, *brought*, *caught*, *shorn*, *shrunk*, *sodden*, *swung*, *swollen*, *torn*.

14. Parse the following:—

O Solitude! where are the charms
That sages have seen in thy face?

15. Write a short account of the town that you know best.

The following is a list of the Centres at which the examinations were held, showing the number of Candidates examined at each Centre, and the result:—

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberystwith	1	1	0	Leicester	4	3	1
Birmingham	14	5	9	Liverpool	5	1	4
Boston	6	4	2	London	23	8	15
Brighton	3	2	1	Manchester	8	2	6
Bristol	6	1	5	Newcastle-on-Tyne	5	1	4
Cambridge	4	1	3	Northampton	4	1	3
Canterbury	2	0	2	Norwich	3	3	0
Cardiff	2	2	0	Nottingham	6	2	4
Carlisle	2	1	1	Oxford	1	0	1
Carmarthen	3	2	1	Plymouth	4	3	1
Carnarvon	2	1	1	Portsmouth	2	1	1
Cheltenham	1	1	0	Preston	2	0	2
Chester	3	1	2	Reading	1	1	0
Colchester	1	1	0	Scarborough	1	0	1
Darlington	4	1	3	Sheffield	6	4	2
Doncaster	1	1	0	Southampton	1	1	0
Exeter	1	0	1	Taunton	1	0	1
Guernsey	1	0	1	Truro	1	0	1
Hull	3	2	1	York	3	3	0
Leamington	2	0	2				
Leeds	7	3	4				

SCOTLAND.

	Examined	Passed	Failed		Examined	Passed	Failed
Aberdeen	9	6	3	Glasgow	1	1	0
Dundee	2	2	0	Inverness	1	0	1
Edinburgh	9	4	5				

* Passed in the First Division.

Provincial Transactions.

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

The fourth meeting of the session was held in the West Hall, Anderson's University, on Wednesday, the 6th inst. The President, Mr. John C. Hunter, in the chair. The Chairman introduced Mr. John M'Gill Murdoch, A.P.S., who read a very interesting paper "on the Pharmacy Act of 1868, its relation to Scotland, more especially Glasgow," in which he reviewed former Acts, as being the basis of the Act of 1868. Mr. Murdoch dwelt to some extent on the manner in which so many persons seemed to evade the principal section of the Act., viz., that of opening shop without being registered. Mr. Murdoch spoke of the necessity of something being done in this respect at once, as he thought if such a practice were allowed to continue the Act would be virtually a failure. A few remarks having been made by the chairman, and Messrs. Weir and Nance, Mr. Murdoch was awarded a hearty vote of thanks for his interesting paper. The Secretary intimated that owing to the annual festival taking place on the 3rd of February, the next meeting would be held on Wednesday, 27th January, when Mr. J. J. Weir would read a paper on the "Laughing Animal."

The third meeting of the session was held on Wednesday, the 9th December, 1874, when Mr. Robert Taylor read an excellent paper on "Water."

MANCHESTER CHEMISTS' AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

At an ordinary meeting of the above Association, held at their rooms on Wednesday evening, January 13th, Mr. E. G. Hughes in the chair, Mr. Louis Siebold, F.C.S., delivered the third of his series of lectures on the analysis of common articles of food and drink. There was a good attendance. The lecturer stated that milk commonly gave an acid reaction with litmus, due to the presence of carbonic acid. If boiled it became neutral. Sometimes it was possible to obtain indication of both acid and alkaline reactions with the same sample, the latter being produced by the action of the alkaline phosphates present. Samples of urine were occasionally met with possessing both acid and alkaline properties; such specimens contained traces of acid urates and carbonate of ammonia. It was a remarkable fact that it is possible to have an exceedingly dilute solution of an acid and alkali which shall for a time give *both* reactions with litmus. In such cases it seemed that the molecules of acid and alkali could exist in solution in a state of mutual indifference to each other. Starch and farinaceous matter might very easily be overlooked in milk if only a small quantity of tincture of iodine be used as a test. Sufficient iodine must be added to produce a decided yellow colour, as a considerable quantity enters into combination with the mineral constituents of the milk, and the sample remains colourless until the excess of iodine produces the blue colouration with starch. Chalk and other mineral powders might be detected by mixing a sample of the milk with an equal volume of water, twice its volume of ether, and a little solution of potash, and well shaking in a test-tube. The ether dissolves out the fat, and separates in a clear stratum; the aqueous solution of casein, etc., beneath should be only slightly opaque.

The sp. gr. of milk should be from 1·029 to 1·034. Every 10 per cent. of water added reduces the third decimal by 3, but specific gravity must not be regarded as a very reliable indication of the purity of milk; for as the density is increased by the casein, sugar of milk, and soluble salts, and diminished by the cream, it follows that when some of the latter is removed and water added the normal specific gravity is maintained. If applied at all, it should be after the milk has stood long enough to throw up its cream. Its density, after removing the cream, should not fall below 1·029, or it is probably adulterated with water.

Different samples of milk yield very varying proportions of cream, and some throw it to the surface much more rapidly than others. When mixed with water milk gives up its cream quicker than when pure.

Nothing less than a quantitative analysis of milk is satisfactory, but this does not present much difficulty. Professor Wanklyn's little book on milk analysis may be taken as a guide.

Average milk contains $12\frac{1}{2}$ per cent. of solids and $87\frac{1}{2}$ per cent. of water; no milk should contain less than 11·8 per cent. of solids, that is of fat, sugar of milk, casein, and mineral salts; of this about 3 to $4\frac{1}{2}$ per cent. is fat, 4 to 5 per cent. casein, 4 to 5 per cent. sugar of milk, and ·7 to ·8 per cent. mineral salts. Human milk contains about one-sixth the amount of mineral salts found in cows' milk. Professor Wanklyn says that the amount of solids not fat is constant in pure milk, and on this fact his mode of testing is based. Five cubic centimetres of milk are heated in a platinum dish or a water bath for three or four hours, or till the residue ceases to lose weight; this gives the *total solids* present. Formerly it was considered necessary to heat to 110° C. If this is done a further loss of weight occurs, probably from the evaporation of a little water entangled amongst the fat; but Professor Wanklyn considers the temperature of boiling water sufficient, and states that his results will always bear comparison with each other.

The total solids are then treated with boiling ether and repeatedly washed on a filter with the same liquid, until 50 c.c. has passed through. This evaporated in a water bath yields the fat, and the residue on the filter the *total solids not fat*, of which not less than 9·6 grammes should be obtained from 100 c.c. of pure milk. The proportion of water used as an adulterant is easily calculated when the amount of solids not fat is known. Treat the residue with alcohol and boiling water to dissolve out the sugar of milk and soluble salts; casein and insoluble salts remain on the filter; dry on a water-bath; weigh and burn off the casein; the remainder consists of the insoluble salts. Evaporate the liquid which has passed through the filter and we obtain the sugar of milk and soluble salts. Weigh, burn off the sugar of milk in a crucible, and the soluble salts remain.

Some chemists add a weighed quantity of powdered glass or sulphate of barium to the milk before evaporation in the platinum dish. This addition greatly facilitates the evaporation of the water; the residue thus obtained is very easily exhausted with hot ether if packed in the barrel of a small male syringe plugged with cotton wool. He (the lecturer) did not know why Mr. Wanklyn objected to this addition.

Mr. Siebold then described and illustrated Horsley's method of estimating volumetrically the value of milk, which, though less accurate than Wanklyn's, was exceedingly handy.*

Mr. Benger inquired whether there would be any objection to contracting the tube used by Horsley at the point where the percentage of fat was read off, so that greater accuracy might be obtained. Should this interfere with the necessary shaking of the mixture it might be transferred to a second narrow graduated tube after agitation in the wider one.

Mr. Siebold said a similar modification of the apparatus had suggested itself to him, and he had indeed used a narrow Mohr's burette for the purpose.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 14th January, 1875, Professor Odling, F.R.S., President, in the chair. After the usual business of the Society, a paper "On the Action of Organic Acids and their Anhydrides on the Natural Alkaloids," part III., by

* See *Pharm. Journ.*, 3rd series, vol. 5, p. 188.

Mr. G. H. Beckett and Dr. C. R. A. Wright, was read by the latter. It is a continuation of their researches on the opium alkaloids, morphine and codeine. The next communication was a "Note on the Effect of Passing the Mixed Vapours of Carbon Bisulphide and Alcohol over Red Hot Copper," by Mr. T. Carnelley. Dr. Armstrong then read a paper "On the Iodonitrophenols." The meeting was finally adjourned until Thursday, 4 February.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture II.

The Alcohol Group of Organic Bodies—Actions of different Alcohols.

If before a chemist of a hundred years ago you could have placed a specimen of spirit of wine or alcohol, and could have asked him of what it was composed, he would have told you that it was the element of water combined with elementary fire, to which elementary fire he would give the name of phlogiston, a name derived from a Greek word, signifying to burn or inflame. He would tell you that all bodies that burned were phlogisticated, and that bodies that would not burn were dephlogisticated. The substance that was left behind was, he would probably add, the element with which the elementary fire had previously been combined. Were you to ask him whence he derived this knowledge, he would say, "from the greatest chemist who had ever lived before his time, George Ernest Stahl, Professor of Medicine, Anatomy, and Chemistry in the University of Halle, who had died in Berlin, whither he had gone to be physician to the King of Prussia—forty years ago."

As proof that alcohol was elementary water combined with phlogiston, our ancient chemist would probably show you this experiment:—He would place a portion of the spirit in a cup, would set fire to the spirit, and would invert over the fire a glass vessel, shaped almost like a common globe, which he would call a cucurbit, into which he would allow the flame to ascend. He would indicate that within the glass vessel a vapour, derived from the burning fluid, formed and condensed, as you see it forming and condensing now. Collecting this fluid, he would prove to you that it was water, which water he could prove to be nothing else but one indivisible thing, therefore an element. Thus his demonstration would be complete. The element, while it existed as spirit, yielded fire on burning; it was fire water. The fire was condensed with the water; nothing could be plainer, according to his light of science.

If you had inquired of the chemist whether he had any symbol by which to denote elementary water or spirit he would give you, as a symbol for water, a sign something like the letter **V**, with two wavy lines following the letters; and for spirit of wine, a sign like the letter **V** with the letter **S** in the centre, as I put it on the black board; and if once more you questioned him as to whether his laboratory contained any similar chemical substance he would answer—none. Spirit of wine stood by itself, a pure substance, possessing single and special virtues.

If, passing over the intervening hundred years, you asked the chemist of to-day, "What is alcohol?" he would tell you that it was an organic radical called ethyl, combined with the elements of water. He would explain that water was no longer considered to be an element, but to be composed of two elements, called hydrogen and oxygen, two equivalents of hydrogen being combined in it with one equivalent of oxygen. He would inform you that the radical he had called ethyl was a compound of carbon and hydrogen, and he would add that this radical in alcohol took the place of one of the equivalents of hydrogen of water. He thereupon would give you a symbol for water and alcohol, but symbols of a very different kind to those presented by his learned predecessor. He would express the names of the elements composing the water and spirit by the first letters of their names, and add their equivalents, or parts, by figures attached to the letters. Thus his symbol for water would be H_2O; for the radical ethyl, C_2H_5; and for alcohol (C_2H_5) HO, or C_2H_6O.

Were you interested about the theory of phlogiston, invented by the illustrious George Ernest Stahl, your modern guide would instruct you that the theory had long since been discarded, and that towards the latter part of the last century the very books of its discoverer had been burned in derision by a priestess of science in one of the temples of science in Paris. Then through what a wonderful history of discovery during the hundred years he would, if he liked, lead you. Into this cucurbit in which I burned the alcohol, and which you will observe I closed by placing it with its mouth downwards upon the table, he would pour clear lime water as I do now; he would shake the water round the sides of the cucurbit and see, as he did it, the water would become milky white. This phenomenon he would indicate was due to the presence of a gas which the old chemist had actually collected but had overlooked. That gas is carbonic acid. It, as well as the water, was the product of the combustion of the spirit, and it now, in combination with the lime water, has united with the lime, forming carbonate of lime or chalk. Following the history of this gas, called once fixed air, because it could thus be fixed by lime and other substances, he would show how it had been proved to consist of carbon and oxygen; how it is given off from the burning of bodies containing carbon; and how a French chemist of the last century, named Lavoisier, traced out by analysis how, in fermentation, the juice of grapes is changed from being sweet and full of sugar into a vinous liquor, which no longer contained any sugar, the inflammable liquor known as spirit of wine. Thence it would be shown that the same illustrious chemist, making an analysis of sugar and studying the effects of yeast in causing fermentation of sugar, collected and weighed the elements produced, determined the elementary composition of spirit as consisting of carbon, hydrogen, and oxygen, and from his research announced the new principle in chemistry, that in all the operations in art and nature nothing is created; that an equal quantity of matter exists both before and after the experiment; that the quality and quantity of the elements remain precisely the same; that nothing takes place beyond changes and modifications in the combinations of the elements; and that in every chemical experiment an exact equality must be supposed between the elements of the body examined and those of the products of its analysis. Finally, on this head, he would state the theory of Lavoisier, that *must* consists of alcohol combined with carbonic acid, and that the effects of vinous fermentation upon sugar are reduced to the mere separation of the elements of sugar into two portions; one portion oxygenated at the expense of the other, so as to form carbonic acid; the other disoxygenated to form alcohol. So that were it possible to reunite alcohol and carbonic acid the product would be sugar. Bringing you down to a later period, the modern chemist would describe a theory current about between thirty and forty years ago, that alcohol is a compound of olefiant gas and water, and that in a state of vapour it consists of equal volumes of these. Or, again, that it was a hydrate of ether; or, again, according to a still later view, that it was a hydrated oxyde of ethyl. Thus he would bring you to the latest theory as to composition which I have already supplied.

Lastly, if for the sake of further comparison you asked the chemist of to-day whether alcohol had any ally or

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts*.

congener, he would reply, many. He would give you, for instance, this spirit, which he would call methylic alcohol, and which he would tell you was got also by distillation, only that the distillation was dry, and that the substance distilled was wood; or he would give you this specimen, which he would call amylic alcohol, and which he would tell you was got by distillation, not of wood, but of potato. Again he would show you other specimens, to which he would give different names, as indicated in the following table:—

TABLE I.—ALCOHOLS.

	Elementary composition.		
Methylic, Protylic (wood spirit) . . .	C	H_3	HO
Ethylic, Deutylic (common alcohol) . .	C_2	H_5	HO
Propylic, Tritylic	C_3	H_7	HO
Butylic, Tetrylic	C_4	H_9	HO
Amylic, Pentylic (potato spirit, fusil oil)	C_5	H_{11}	HO
Hexylic	C_6	H_{13}	HO
Hextylic, Œnanthic	C_7	H_{15}	HO
Octylic	C_8	H_{17}	HO
Decatylic	C_{10}	H_{21}	HO
Cetylic	C_{16}	H_{33}	HO
Melylic	C_{30}	H_{61}	HO

Directing your attention to the composition of these alcohols, the chemist would beg you to observe that their chemical construction is throughout the same, that is to say, in all cases, a radical composed of carbon and hydrogen has replaced one of the equivalents of hydrogen of water. The radicals, however, vary in respect to the equivalents of the elements of which they are composed, and to distinguish them they have different names. Essentially each radical, though it is composed of more than one element, acts as if it were one, and is called a base, because it is a root or origin upon which other structures rest. Thus, in the present case, the radicals, as they vary in amount of carbon and hydrogen which they contain, produce, in each case of their combination with water, an alcohol possessing a different property or different properties from the other alcohols. The table No. II. illustrates the increase of carbon or hydrogen in the radicals of the series.

TABLE II.—RADICALS OF ALCOHOLS.

Composition.		Old Name.	New Name.
C	H_3	Methyl	Prolylen.
C_2	H_5	Ethyl	Deutylen.
C_3	H_7	Propyl	Tritylen.
C_4	H_9	Butyl	Tetrylen.
C_5	H_{11}	Amyl	Pentylen.
C_6	H_{13}	Hexyl	Hexylen.
C_7	H_{15}	Heptyl	Heptylen.
C_8	H_{17}	Octyl	Octylen.
C_{10}	H_{21}	Decatyl	—
C_{16}	H_{33}	Cetyl	—
C_{30}	H_{61}	Melyl	—

In the first of these radicals, methyl, you will see that the radical is composed of one of carbon and three of hydrogen. The radical ethyl of two of carbon and five of hydrogen. The radical propyl of three of carbon and seven of hydrogen, and so on, the increase in the equivalents of the elements being after a given rule in the whole series, the carbon increasing one, and the hydrogen two with each progressive step. So, as the alcohols progressively change from the first of the series, the methylic, they grow richer in carbon and hydrogen, and proportionately, they grow heavier, less soluble, and less volatile.

A very simple experiment suffices to show the increase of carbon in these series. If I take a piece of cotton wool, place it in a glass cup, pour upon it a little methylic alcohol (in which alcohol you will notice from the table there is the smallest amount of carbon), set fire to it and hold a white plate over the flame, the plate remains white because the air that reaches the flame is sufficient to consume all the carbon. If I do the same experiment with ethylic alcohol, although the carbon is a little greater, yet the result remains the same. If I move two steps higher, viz., to butylic alcohol, in which there are four equivalents of carbon, the combustion is not quite complete, and therefore a shade or stain of carbon is left on the plate; and if, going one step further in the series, I use amylic alcohol, then the combustion is rendered so imperfect that a thick layer of carbon, derived from the alcohol, in the destruction of it by the burning, is left upon the white surface.

I may digress here for a moment to state—if the practical fact about to be told be considered a digression—that this simple mode of testing common alcohol will serve roughly to detect adulteration of it with the heavier alcohol—fusil oil. This heavier alcohol is used in adulteration, and as you will learn when you hear of its effects, it is a dangerous adulterant. I was dining a few months ago with some friends, one of whom produced a small flask of precious liquor he had had presented to him, and which was said to be an unusually choice hollands. On examining it I felt sure it was a gin treated with fusil oil, and on burning a little of it, this suspicion was confirmed by a deposit of carbon upon a white dish. I warned my friends forthwith of the danger of drinking this heavy, though certainly pleasant spirit, and the majority took the warning. Two, less prudent, indulged, to suffer for the next two or three succeeding days to an extent that convinced them there was no mistake in the scientific and friendly admonition they had received.

The physical distinctions between the various alcohols now before us are marked by other signs. For example, as we move from the methylic alcohol upwards, we discover that their vapours increase in weight, that as fluids they grow heavier, and that their boiling point, that is to say the temperature required to make them boil, has to be increased. In Table No. III. these facts are presented in relation to the four alcohols of the series:—

TABLE III.—ALCOHOLS.

NAME.		Chemical comp.	Vapour density.	Specific gravity.	Boiling Point.	
Old	New		$H_2 = 1$	Water 1,000	Cen.	Fah.
Methylic..	Protylic..	CH_4O	16	814	60	140
Ethylic ..	Deutylic..	C_2H_6O	23	792	78	172
Butylic ..	Tetrylic ..	$C_4H_{10}O$	37	803	110	230
Amylic ..	Pentylic..	$C_5H_{12}O$	44	811	132	270

Thus you will see that the vapour density of methylic alcohol is 16 when compared with hydrogen gas as a standard; of ethylic alcohol, 23; of butylic, 37; and of amylic, 44. In respect to the specific gravity of the fluids, that is to say of the weights of the fluids themselves, compared with water reckoned as a thousand, the same rule extends, with the one remarkable exception, viz., that the methylic alcohol appears heavier than the ethylic, after which the weights increase, so that amylic alcohol stands as 811 to 792, the weight of ethylic. Again, as to the boiling points, the lightest alcohol boils at 140, that is 72° below the boiling point of water; ethylic at 172; propylic at 205; butylic at 230, or 18° above the boiling point of water; and amylic at 270, or 58° above the boiling point of water, on Fahrenheit's scale.

The analogies between these various alcohols are sustained throughout by other chemical changes relating to them. If we expose diluted common alcohol to the atmosphere under fitting conditions it becomes acidified; in other words, it is converted into vinegar. This is due to its oxidation, in which process there are two steps, one by which the spirit is converted into a substance called aldehyde (dehydrated alcohol—al-de-hyd), and then into acetic acid, or vinegar. In the formation of the aldehyde two atoms of the hydrogen are oxidized, by which water is produced, and the aldehyde has therefore the composition of C_2H_4O. In the formation of the acetic acid another atom of oxygen is added and the acetic acid has therefore the composition of $C_2H_4O_2$. This same series of changes extends through all the alcohols, as will be seen from the next table.

TABLE IV.

Alcohols.	Aldehydes.	Acids.
Mythylic ....CH_4O	Formaldehyde CH_2O	Formic ......CH_2O_2
Ethylic ....C_2H_6O	Aldehyde.... C_2H_4O	Acetic...... $C_2H_4O_2$
Propylic ....C_3H_8O	Propionaldehyde ......C_3H_6O	Propionic .. $C_3H_6O_2$
Butylic ....$C_4H_{10}O$	ButylaldehydeC_4H_8O	Butyric .... $C_4H_8O_2$
Amylic ....$C_5H_{12}O$	Valeraldehyde$C_5H_{10}O$	Valerianic.. $C_5H_{10}O_2$

I said, in the first lecture, that from common or ethylic alcohol a new compound can be obtained by heating it with sulphuric acid, to which compound the name of ether is applied. In like manner, an ether can be obtained from the other alcohols.

TABLE V.—ETHERS.

Name.	Composition.	Form.	Boiling Point.
Methyl..........	C_2H_6O	Gas	..
Ethyl	$C_4H_{10}O$	Fluid	94°Fah.
Propyl	$C_6H_{14}O$	"	153°Fah.
Butyl	$C_8H_{18}O$	"	219°Fah.
Amyl	$C_{10}H_{22}O$	"	348°Fah.

If chlorine be brought to bear upon ethylic alcohol the elements of water are removed—that is to say, the oxygen and the hydrogen—and are replaced by chlorine, and there is formed chloride of ethyl. This change can be extended to all the other alcohols, the properties of the products being modified by the base, as will be seen by reference to the tables subjoined.

TABLE VI.—CHLORIDES.

NAME.		Chemical comp.	Vapour density.	Specific gravity.	Boiling Point.	
Old.	New.		$H_2=1.$	Water 1,000	Cen	Fah.
Methyl..	Protyl....	$C H_3 Cl$	25	Gas	..	..
Ethyl ..	Deutyl ..	$C_2 H_5 Cl$	32	921	11	52
Butyl ..	Tetryl....	$C_4 H_9 Cl$	46	880	70	158
Amyl ..	Pentyl ..	$C_5 H_{11} Cl$	53	..	102	216

The same rule extends to the action of iodine on the alcohols, as is shown in the next table:—

TABLE VII.—IODIDES.

NAME.		Chemical comp.	Vapour density.	Specific gravity.	Boiling Point.		Per cent. of Iodine.
Old.	New.		$H_2 = 1$	Water 1,000	Cen.	Fah.	
Methyl	Protyl.	$C H_3 I$	71	2240	42	108	89·4
Ethyl..	Deutyl	$C_2 H_5 I$	78	1946	72	162	81·4
Butyl..	Tetryl.	$C_4 H_6 I$	92	1604	120	248	69 0
Amyl..	Pentyl.	$C_5 H I$	99	1511	146	295	64·1

Once more the rule extends to the action of nitrous acid, as indicated in the following:—

TABLE VIII.—NITRITES.

NAME.		Chemical comp.	Vapour density.	Specific gravity.	Boiling Point.	
Old.	New.		$H_2=1$	Water 1,000	Cen.	Fah.
Methyl ..	Protyl....	$CH_3 NO_2$	30	..	Gas.	Gas
Ethyl	Deutyl ..	$C_2H_5NO_2$	37	0·917	18	64
Butyl	Tetryl....	$C_4H_9NO_2$	51	..	64	147
Amyl	Pentyl ..	$C_5H_{11}NO_2$	58	0·877	96	205

These illustrations could be largely extended, but they are sufficient for our purpose. I have brought, for those who are curious to see them, twelve specimens of these different compounds formed on the alcohols. Six of these belong to the ethyl, or common alcohol series, six to the amyl, and they include respectively specimens of the alcohols, of the acids of the alcohols, of the ethers, of the chlorides, of the iodides, and of the nitrites. One of these specimens, I mean the nitrite of amyl, has within these last few years obtained a remarkable importance owing to its extraordinary action upon the body. A distinguished chemist, Professor Guthrie, while distilling over nitrite of amyl from amylic alcohol, observed that the vapour, when inhaled, quickened his circulation, and made him feel as if he had been running. There was flushing of his face, rapid action of his heart, and breathlessness. In 1861-2, I made a careful and prolonged study of the action of this singular body, and discovered that it produced its effect by causing an extreme relaxation, first of the blood vessels, and afterwards of the muscular fibres of the body. To such an extent did this agent thus relax, I found it would even overcome the tetanic spasm produced by strychnia, and having thus discovered its action, I ventured to propose its use for removing the spasm in some of the extremest spasmodic diseases. The results have more than realised my expectations. Under the influence of this agent, one of the most agonising of known human maladies, called angina pectoris, has been brought under such control that the paroxysms have been regularly prevented, and in one instance, at least, altogether removed. Even tetanus, or lock-jaw, has been subdued by it, and in two instances, of an extreme kind, so effectively as to warrant the credit of what may be truly called a cure. I notice this action of nitrite of amyl because it will be referred to again in explanation of certain of the effects of alcohol.

I should have liked, if there had been time, to have dwelt at greater length on many other interesting points bearing on these different alcohols and their derivatives. I should have been pleased to have presented to you a more extended account of the progress of discovery during the past century leading to these modern facts; and I should much have liked to have rendered more complete the description of the alcohol series of bodies, by explaining the differences of what are called monatomic, diatomic, and triatomic alcohols; but I must desist for two reasons, first, because the study would lead me into too great detail, and secondly, because it would introduce to notice a series of compounds, the physiological action of which are not so well understood as are those to which I shall soon direct your attention, and the study of which is more than enough for the time that is at our disposal. It must be considered sufficient, therefore, if I have succeeded in showing that the common alcohol is but one of a group of a series of chemical compounds, and that its superior claim to our notice rests upon its antiquity as a discovered substance, and on its enormous distribution in civilized communities, rather than on its special or distinctive properties as a chemical agent.

One other series of facts I would, however, briefly describe before leaving this part of my subject. If into this ethylic alcohol I throw a portion of the metal sodium a brisk action immediately begins to take place; as you will see, a gas escapes, which I easily collect in a glass tube, which burns, and if mixed with air, explodes, as you hear. The gas is hydrogen. A change or substitution has occurred in this experiment. The hydrogen belonging to the water of the alcohol has been replaced by the metal, and what is called sodium alcohol has been formed. If potassium had been used, the result would have been similar.

By acting on common alcohol with strong potash, then with sulphuretted hydrogen, and afterwards with iodide of ethyl, a new alcohol is produced called mercaptan. In this fluid the oxygen of the alcohol is replaced by sulphur, so that the formula for it is (C_2H_5) HS. It is a fluid, whitish in colour, and of so offensive and penetrating an odour that it can hardly be approached until it is largely diluted with common alcohol. It is nearly insoluble in water, but imparts to it its peculiar odour: its specific gravity is 832, compared with water as 1000; it is thirty-one times heavier than hydrogen, and it boils at 135° Fahrenheit.

Sulphur alcohol is very rarely seen, but there is a diluted specimen here which has been prepared with very great care. There is only five per cent. of it in the solution, and yet its odour is as much as can well be borne.

From this point I proceed to dwell on the action of certain of the alcohols which have been brought before us up to the present time, excluding on this occasion the alcohol best known, I mean the common alcohol of commerce, or, as we now know it chemically, ethylic alcohol. The point I shall aim at will be to show the influence of these alcohols upon animal life, and thereby to lead up to the action of ethylic alcohol pure and simple. The subject is one entirely new, and is limited to a very few bodies of the alcohol group, viz., to methylic alcohol, butylic, amylic, the potassium and sodium alcohols, and sulphur alcohol or mercaptan.

(*To be continued.*)

Parliamentary and Law Proceedings.

The Prosecution of a Chemist and Druggist for Selling "Morning Tonic."

At the Hull Police Court, on Friday the 15th inst., the adjourned summons, charging Wm. Staning, chemist, Cogan-street, with retailing spirits, to wit, a compound called "pick-me-up," or "morning tonic," on the 1st of October, without having a license for the sale of exciseable liquors, was heard before the police magistrate (T. H. Travis, Esq.).

Mr. F. Summers again represented the Excise Authorities, by whom the information was laid, and Dr. Rollit, representing the Hull Chemists' Association, appeared for the defendant.

Dr. Rollit briefly stated the points of defence, which were, that the "morning tonic" was a tincture or medical preparation having curative properties, that it was sold as a medicine, and that the directions on the bottle, as to dose, were capable of explanation, and in short, that the compound was such as a physician might prescribe, and a chemist dispense from the former's prescription. He then called—

Walter Staning, who said: I am the son of and assistant to the defendant. I have passed the necessary examinations to qualify myself for a chemist's assistant. I have on one or two occasions made the morning tonic sold by the defendant. It was made in a quantity of about four gallons at a time. [The witness was asked several questions about some of the tonic being made shortly before the 1st of October, but it appeared that he did not remember any being made in September, and he left home for a time at the latter part of the month.] It was not sold until three weeks or a month after it had been made. It was not in a fit state, medicinally, to be sold until after the lapse of that period. There was some tonic in stock on or about the 1st of October, but he did not know when it was made. The tonic was sold in bottles at 1*s.*, 2*s.* 6*d.*, and 3*s.* 6*d.*, as required. If a person wanted a shilling's worth it would be given him from the bulk. It was kept in a room at the back of the premises in a carboy. The quantity sold might average a shilling's worth per day. The average quantity of spirit purchased by the defendant per annum for purposes of business was about twenty-one gallons. During the three or four months that I was at home about six gallons of spirit were used, or were in stock in the shape of tinctures.

Dr. Rollit: Now, will you tell the Court the class of bottles you were in the habit of using. I don't mean of that tonic only, but generally?—We use ordinary medicine bottles.

Do you use any other sort?—We use any kind of bottles we can get hold of.

Do you use many bottles of this sort (holding up that in which the tonic was sold, a disused hock bottle)?—We do, for economy's sake. We use them for oils, cattle medicines, the tonic, etc. For smaller quantities of the tonic medicine bottles were generally used, but for the larger quantity usually a round bottle like the one in question. The price of the medicine bottle would be about 3*d.*, and the one produced ½*d.* or 1*d.* The trade used all kinds of bottles.

Are bottles like this one used in the trade?—Yes, often. No difference was made in selling the tonic to the custom in selling other things. It had been sold like all other medicines in the shop. Since I have been with my father the tonic has, so far as I know, been made with the same ingredients.

Will you tell us the quantities of the ingredients used?

Mr. Travis (smiling): You will lose your trade if you do. Let us first get the ingredients.

Witness: Gentian, coriander seeds, cascarilla, chiretta, orange peel, cayenne pepper, calumba root, raisins, quassia, cardamoms, chamomile, cochineal, cinnamon, nutmegs, spirit, and water. Proof spirit was used. Proof spirit, as we know it, is "half and half"—half spirit and half water. Rectified spirit is alcohol, with a certain percentage of water.

Now, will you tell me, please, the medicinal properties of each of these compounds?—Gentian is a bitter; quassia is a bitter; cardamom, an aromatic bitter; calumba, a bitter; chamomile is a stomachic; cascarilla is a tonic; and coriander—that is a stomachic. I do not know that there has been any difference in the way the tonic has been made.

The witness was asked to taste the tonic that had been sold, and having done so he said: The tonic produced is the same as that dispensed by me in September, and on all occasions, so far as I know.

By Mr. Summers: I have been in the habit of manufacturing this tonic for about six years.

Have you advertised it?—When first we made it we did so, and we gave it up because we did not wish to push the sale of the tonic as the profit upon it was only small.

Did your father get a certain class of customers for it?—We had no regular class.

Did you sell the largest quantity of the 3*s.* 6*d.*, the 2*s.* 6*d.*, or the 1*s.* bottles?—The 3*s.* 6*d.* bottles.

Then your customers liked to have a good lot of it?—It is cheaper.

Now, the gentian, quassia, and calumba root, are they not bitters, pure and simple?—Yes.

And the coriander, nutmegs, cayenne pepper, orange peel, they are condiments?—Yes, but they are also tonics of a kind.

Are they not more of a flavouring quality?—Yes.

And the chamomile flower, is a stimulant?—It is a stomachic.

Now, all the ingredients you have mentioned, are they not used in the manufacture of bitters?—I am sure I don't know; I have never made any bitters.

Have you not studied the component parts of the manufacture of British bitters?—No.

Now, gentian, calumba, chiretta, coriander, and nutmegs, are they not found in bitters?—They are tonic bitters.

Mr. Summers then drew the witness' attention to the directions on the bottle :—" A small wineglassful may be taken at any time ; when mixed with a little sherry it forms a milder and very agreeable tonic."

Mr. Travis said he had not noticed the mention of the sherry on the last occasion.

Dr. Walton, who was here appealed to by the stipendiary, said a small wine glass would hold about an ounce.

Re-examined by Dr. Rollit, witness again described the character of the drugs used, and said they were aromatic, carminative, and tonic.

In reply to Mr. Travis, witness said : If any one asked me for a " pick-me-up," I should give a little tincture of gentian, and a little orange water.

Mr. Travis : Then, what do you call this ?—A morning tonic.

Mr. Travis : Your father knew what "pick-me-up" was. When any one asked you for a bottle of "pick-me-up," you would give him this medicine ?—Yes, because it is the name given it by the public. If any one asked me for a " pick-me-up," I should give him a draught there and then, but if I were asked for a bottle, I should give him the " morning tonic."

Mr. William Hunt: I am editor of the *Eastern Morning News*. I have been in the habit of using this tonic. It has curative properties, or I should not have continued the use of it; I have used it occasionally for six years. I have never taken it as a beverage, but as a medicine. It is too bitter to be taken as a beverage. Other persons in my house have taken it with advantage besides myself.

Mr. Summers: I ask you, Mr. Hunt, is it not very nice ?—It is a very good tonic.

Doesn't it warm the stomach ?—So do many other nastier things. It is bitter in the mouth.

Which will leave you in five minutes ?—I don't know.

Supposing it is diluted, won't it make it more agreeable still ?—Yes, if you followed the directions, and diluted it with sherry. It was less bitter in water.

Were you aware of the large quantity of spirit this tonic contained ?—I never noticed it.

Nearly 70 per cent. of proof spirit ?—I know nothing about it.

By Dr. Rollit: The tonic is decidedly bitter ; I have tasted bitterer things.

Mr. Travis : Is it not a thing persons use who habitually take spirits ?—I have but slight experience.

Dr. Gibson, a medical man, of thirty-five years' practice, was the next witness. He said : I have just tasted the " tonic." I could detect potass and quassia from its excessive bitterness. There was also gentian, and I believe I can taste chamomile. The taste, the colour, and the mixture generally with the presence of the various ingredients that had been named. Assuming that it was made of proof spirit he should describe it as a stimulant and tonic.

I ask you as a medical man, is it such a mixture as you would prescribe under certain circumstances ? — No, I scarcely should. I should prefer a tonic of a more simple nature, such as gentian or quassia. If, however, I had not a more simple tonic by me I should prescribe it.

Would the other ingredients besides those you prefer alter its character as a tonic ?—They make it a stronger one.

Supposing you prescribed gentian, would the preparation of spirit be greater or less ?—I have not analysed the mixture.

Supposing this to be proof spirit ?—It is not proof. Proof spirit is 100, and this is only 67.

Assuming it to be 67, would it be less than you would prescribe ?—It would be less.

In prescribing tincture of gentian you would be administering more spirit than there is contained in this tonic ? —Yes.

Mr. Travis : You do not mean to say if you prescribed tincture of gentian you would tell the patient to take a glass whenever he liked ?

Dr. Rollit remarked that tincture of gentian was more concentrated.

Dr. Rollit : We will take it that you prescribe tincture of gentian, would you tell us what amount you would give ?—If a patient came to me in the morning, say 10 or 11 o'clock, and said he felt exceedingly depressed, that he had perhaps been taking wine too freely the night before, I should not have the least hesitation in giving him six drachms of gentian, or an ounce of tincture of cardamoms, which would contain the same quantity of spirit. There would be about one-third less of spirit if he gave this medicine than in six drachms of gentian or an ounce of the tincture of cardamoms.

So that the distinction between the tonic and the medicine you would prescribe would be the presence of a greater number of ingredients and less spirit in the former ?—Yes.

Are gentian and the other ingredients recognized drugs in the medical profession ?—Certainly, as tonics and carminatives.

Would you describe this as a beverage ?—No, as a medicine, and a very nasty medicine, too. (Laughter.) I should be very glad to get the taste out of my mouth.

If you treated it with water, would it become more refreshing ?—That would make it more bitter.

And you say that no person with an ordinary sense of taste would take this for a beverage ?—Certainly not.

You don't think any person would become addicted to it ?—I think not, when there are so many other things so much more pleasant.

If a person wished to imbibe spirit covertly by going to a druggist instead of a public house, is there anything more pleasant in the Pharmacopœia ?—Nothing more delightful than compound tincture of cardamoms taken in aromatic spirit of ammonia.

With regard to the question of dose, what is understood by a small wine-glassful ?—It is a little over an ounce, about nine drachms. To be taken once a day the dose would not be excessive. If taken three times a day, I think the bitters, the ingredients, would have such a dry effect on the passages that the tonic would be deleterious; not that the quantity of spirit would be deleterious, but the ingredients in solution. An ounce of tincture of rhubarb was frequently taken by ladies, so that an ounce was a recognized dose in the Pharmacopœia. An ounce of tincture of rhubarb would contain 30 per cent. of spirit more than this tonic.

And that would be given in as large a dose ?—Yes, to be taken occasionally.

By Mr. Summers : What do you call this preparation, Doctor, a tincture or a compound ?—I can scarcely answer that question, tinctures are compounds.

Do not tinctures contain a larger quantity of spirit than compounds ? You have already mentioned tinctures of rhubarb.—Yes, that is a compound tincture.

And contains, you say, more spirit ?—Yes ; 30 per cent.

So that it would be nearly 100 ?—Yes.

You say you describe this as a pure and simple medicine ?—Certainly; as a stimulant and tonic.

Will you taste this bitter (handing to witness a bottle) ? —Witness: It is very much stronger of spirit.

Mr. Summers : This is the ordinary commercial bitters, and contains 60 per cent. of proof spirit.

Dr. Rollit: You have been asked about the compound tincture, will you tell me the purpose of the spirit ?—It is merely to take up the medicinal ingredients. If the preparation was not required to be kept, less quantity of spirit would serve.

Would it be possible, bearing in mind the presence of the gentian and other matters, to abuse the use of this medicine ?—Any stimulant or liquid may be abused if a man is bent on getting alcohol. I knew a janitor who drank spirits out of the jars in which we had diseased preparations. (Laughter).

To any ordinary man, would the presence of these ingredients prevent him taking it regularly?—I should say so.

Is there not a distinction between public-house bitters and this compound?—I have had so little experience of public-house bitters.

But I limit your experience to the one produced of which you have tasted.—It is more pleasant than the tonic.

You would not think the selling of the tonic a mere colourable evasion for the purpose of taking spirituous liquors?—No.

Mr. Travis drew attention to the label: "A small glassful at any time. When mixed with a little sherry it forms a milder and agreeable tonic."

Witness: It does not say it is to be continued.

Dr. Rollit: We call it a "morning tonic" on the label produced.

Dr. Walton was then examined: I have been a practitioner in Hull for about twenty years, and I have also had experience as a chemist and druggist. I have examined and tested the tonic produced. It contains 35·2 of alcohol. The presence of spirit in the compound is less than in many tinctures in the Pharmacopœia. There is about 13½ less of alcohol than in Nicholson's gin. There was rather more than half a scruple of solid extract in each ounce. Sugar and bitters were present to a considerable extent in the tonic. Under certain circumstances, I would, as a medical man, administer the tonic, taking it to contain what is described.

Is it properly described as a beverage or a medicine?—I have never heard of any one putting a teaspoonful in the mouth, as one would rum or brandy.

You would describe this, then, as a tonic or a medicine?—It is a medicine.

Is it such a compound as might be abused in its use?—Not twice by the same person. He would be satisfied by one or two trials, it is so excessively nasty. It is very nasty. I once took a dose at ten o'clock in the morning, and could not get rid of it till night.

If a man wanted to take his spirit in the shape of physic, are there any pleasanter means than this?—Yes, tincture of cardamoms and gentian, that is a common thing to give.

Is the dose placed upon the label excessive?—No.

Would it be injurious, either from the quantity of spirit or the ingredients, supposing it to be taken every morning?—There would really only be about 30 per cent. of alcohol in a wineglassful, which is the dose. Most of the vegetable tinctures will be given from one drachm to an ounce. The dose will depend on the concentration of the tincture. This, so far as the spirit is concerned, is a diluted tincture. The solid matters were present in such a quantity as to be distinctly curative.

The witness was handed two samples of public-house bitters to taste, and he said: The tonic is not a mere public-house bitter. Sherry is often a medium for taking a thing of this sort.

Mr. Summers: Will you say what there is in the tonic produced that differs from the public-house bitters?—There are a great many things in the bottle produced which are not in this.

Are they not simply flavouring matters?—No, chiretta, which is in one and not in the other, is a most powerful bitter. The tonic is a medicine and not a beverage. No one would take it a second time unless it were ordered as a medicine.

Re-examined: There is no similarity between the tonic and the bitters. The presence of quassia in the compound creates a great difference between the two.

Mr. Travis: Though you say it would not be a beverage, supposing you take it for the purpose of mixing it with large quantities of wine, is it not a beverage then?—It would spoil the wine. It is a tonic and stomachic, and the object of mentioning the sherry is to make it as pleasant as possible. I would do it myself, but it does not make it a beverage.

Mr. Travis: You would only take the proper quantity of it?—I would not take it at all if I could help it.

Mr. Jas. Baynes, jun., pharmaceutical and analytical chemist, said: I have made a careful analysis of the morning tonic. It contains 67·382 of proof spirit; the solid residuum is 3·1 per cent., and the ash only ·2. I should think the quantity of spirit was not more than sufficient for extractive purposes. I produced the residuum of the tonic, as also that of the analysis of a publican's bitter. They are very different in colour, and one contained 3·1 per cent., while the other had 10·08 per cent. of residuum. There was scarcely any trace of sugar in the morning tonic, whilst the greater part of the residuum of the publican's bitters was sugar. The solid constituents of the compound were about the same as Pharmacopœia tinctures; and the spirit was nearly 33 per cent. less. I should think the tonic could not be taken for a beverage. It is often left to the patient as to when he should take the medicine.

In reply to Mr. Travis, witness said: Were it not a breach of etiquette I could show you, in a prescription book, prescriptions for certain medicines to be taken "if required," and "occasionally" is also a frequent word.

Mr. Anthony Smith, President of the Hull Chemists' Association: I have been in practice as a dispensing chemist for twenty-one years. During the whole of the time I have been in business it has been usual to dispense such compounds as the one produced. The mixture is decidedly such an one as I and others would dispense as a medicine. If I were asked or wished to gratify the palate of a person who simply desired some spirits I should most decidedly not administer the mixture produced. I should give a compound tincture of cardamoms from the Pharmacopœia, or a simple tincture of orange alone. Bottles like the one produced are frequently used, because they can be obtained second-hand from some family customer. They would cost about one shilling per dozen, and medicine bottles about half-a-crown a dozen. There was nothing unusual in the reading of the label so far as the chemist was concerned. Every day we receive prescriptions where the direction is "to be taken occasionally," "to be taken when necessary," or "to be taken when required." The word "occasionally" is used by all the leading physicians in the kingdom in their prescriptions. The tinctures of the Pharmacopœia generally contained more spirit than is in this compound.

Mr. G. Myers, Vice-President of the Hull Chemists' Association: I have heard the evidence of Mr. Smith, and concur entirely with it. The label with the words "to be taken occasionally" is similar to what is frequently employed. I believe it is the invariable practice of the trade to give the same label with quinine wine, "to be taken occasionally."

Mr. Summers: Do you know what number of grains per ounce is contained in quinine wine?—I cannot say from memory.

Do you know that unless there is one grain per ounce of solid matter in it, an Excise license must be taken?—I do not.

Mr. F. Earle: I have been in business as a chemist in Hull for fourteen years, and I entirely concur with the evidence of Messrs. Smith and Myers, as to the label.

Mr. C. B. Bell, Secretary to the Chemists' Association: I have been in the trade twenty-one years; I agree with the evidence of Messrs. Smith, Myers, and Earle, as to the label. I have tasted the tonic; it is a medicine, and a very nasty one.

Dr. Rollit then addressed the court, and begun by pointing out the importance of the case to the trade of the chemist. He was instructed on behalf of his client and those associated with him not to take any technical objection, but to ask for a decision on the general facts of, and principles involved in, the case. He referred his Worship for a moment to the state of the law on the question. In order to sell spirits off the premises an Excise license must be obtained, where those spirits were sold in less quantities than a reputed quart, and no quantity of spirit could be sold merely off the premises in a less quantity than a quart. Therefore, if tinctures were held to be spirits, they must be prepared in quantities not less than a quart, and in that case a license must be obtained from the Inland Revenue in order to sell them. It amounted to this, therefore, that a small quantity of tincture could not be sold off the premises,—for instance, a small bottle of essence of ginger,—and no quantity under a quart, could be sold. Again, if the tinctures were held to be spirits, a single teaspoonful could not be consumed on the premises without the license of the Excise and a certificate from the magistrates. In other words, if these compounds and tinctures were held to be spirits, and they were sold off the premises, at least a quart must be purchased and a license procured from the Excise; and if consumed on the premises in the smallest quantity a license must be obtained from the Excise, and also a certificate from the magistrates. The druggist's shop would therefore really be turned into a public house, and any person might demand to be supplied with any spirit he chose. His Worship, he should think, would shrink from a decision which involved such consequences as these. Dr. Rollit went on to point out that if these things were held to be spirits, after the closing hour prescribed by the Act not one of the simplest of tinctures, such as tincture of ginger, a very common article, could be obtained, not even in the large quantity of a quart. Up to the present the Inland Revenue had not interfered in a matter like the present, simply because these things were held to be medicines, and were dispensed to the public as such. It appeared to him (Dr. Rollit) that the chemist was under governance of a higher law than man's, the law of humanity, which directed that he should help to heal the sick, even if it were by dispensing medicine in breach of Licensing Acts! The question his Worship had to consider was this: had the defendant been selling a dram, a mere beverage, under colour that it was a medicine, or was it *boná fide* the latter? His friend opened his case on the same ground, appealing to the taste as confirming his view. With the exception of the chemist whom Mr. Summers called, and who said this tincture was similar to the publicans' bitters, the whole of the witnesses, Dr. King and the rest, had stated that the mixture was very objectionable to the taste, and that had a man wanted to gratify his palate out of the Pharmacopœia, there were other things infinitely more agreeable. Supposing this tonic were even agreeable to the taste, surely the very triumph of medicine and surgery in our day had been the amelioration of pain, and nasty taste was a form of pain. But it was, he submitted, proved that the medicine was disagreeable to the taste; and, so far from its being acceptable, the medical evidence had shown a strong reason why a man would not continue it—viz., that his whole system would be dried up by the tonic qualities of the compound as to prevent one from taking it glass after glass. Then, again, in respect to the question of price, which was one means of finding out whether this compound would be likely to be used as a beverage or not, it was not only excessively nasty, but very far from being cheap. It was dearer, unquestionably, than brandy, and therefore one would imagine that if a person had the drinking of spirit in view he would use brandy in preference to this mixture. But it appeared to him that this argument was almost beside the question, for were the tonic cheap, it would be one of the reasons which would make it as a medicine more advantageous to the public. Now, with regard to the question of the bottle, he ventured to submit that this was a point that had been quite explained away so far as his friend's case was concerned; its having been proved that the bottles were used for economy's sake. Let him next consider the mode of sale. There was no evidence that the tonic was prominently exhibited in the window, that it was even made up and ready bottled for immediate use. On the contrary, he (Dr. Rollit) believed that the person purchasing it had to call two or three times before he could obtain it. Surely, had this been a mere beverage which people were asking for day by day, had Mr. Staning been selling it as a medicine, as a mere subterfuge for breaking the law, surely his object would have been to have had bottles ready and even exposed for sale. He submitted that the mode in which it was dispensed was the same as in the case of all other medicines supplied by Mr. Staning, and that this was a strong argument in his favour. Now, with regard to the question of its being a dram. If it were a mere public-house bitter, no one would question the legality of the course the Inland Revenue had taken; but it had been proved in the witness box, with regard to the taste, colour, and by the residuum, that there was not an atom of similarity between the bitters on the one hand and this tonic on the other. The conclusion to be come to on this head was that the publicans' bitters were found to contain a great quantity of saccharine, while in this tonic the chief ingredients were bitters which are unacceptable to the taste. Next, with respect to the question of the dose, he must draw his Worship's particular attention to the reading of the label. He contended that it was not too large, and would be the same practically as prescribed by a physician, the tonic not being so concentrated as some of the tinctures that had been named. Then as to the label, the words "morning tonic" were the prominent words upon it, and moreover, gave it its name. Surely a "morning tonic" could not be twisted into something to be taken in the evening. They must construe the other directions on the label with the words he had quoted, and judge of the implication that was suggested; whether it did not mean that it was a tonic to be occasionally taken in the morning as the patient thought desirable. A "morning tonic" could not be thought to mean something to be taken three or four times a day. Then as to the words, "when taken in a little sherry it forms a very agreeable tonic," that implied that it was not agreeable to the taste taken alone. Dr. Rollit referred further to the evidence of Mr. Hunt—than whom there was not a more abstemious man in Hull—and said he had taken it for its curative properties and with advantage. In conclusion, he submitted that there was not the slightest ground for saying there had been any evasion of the law, that the dose was not such as would be deleterious, that his witnesses had been unanimous in describing it as a medicine and not as a beverage, that it had been proved there was less spirit in it than in ordinary tinctures, and that it was entirely different from the bitters sold by the publican. He asked his Worship to put a reasonable and liberal construction upon the Act of Parliament, and to say that the sale of a medicine, or what should be properly described as a medicine, was no breach of the Act.

Mr. Summers said, in reply, that the contents of the bottle had been analysed, and it was found that the "morning tonic," so called, was nearly similar in character to the bitters sold by publicans and others, so that a license would be required to sell it.

Mr. Travis: There is no spirit licence taken out for bitters.

Mr. Micks (collector of Inland Revenue): No person could get a special licence for bitters; only a person to sell them must have a licence for the sale of liquors.

Dr. Rollit: That makes it a public house.

Mr. Travis: Supposing a man wanted to sell bitters exclusively, would not that require a licence?

Mr. Micks: Oh, certainly.

Dr. Rollit: I think that is admitted.

Mr. Summers said that under the 16th George II., Chap. 8, Sect. 12, it was provided that the law as to licences should not extend to any physicians, apothecaries, surgeons, or druggists, with respect to medicines made up for lame, sick, or distempered persons. The question there was whether this was a medicine or not.

So far as this bottle was concerned, various witnesses called said it was a medicine and not a beverage, but the label certainly would lead any person to a different conclusion, for, as it says, this tonic taken in a glass of sherry is a very agreeable tonic. The Inland Revenue should have no desire to strain this matter as against the defendant, or the trade to which he belonged, so long as their business was carried on properly, but his Worship would see at once that in the event of a chemist or druggist being permitted to make up tonics of this kind in simply a little colouring matter, so as to take away from them the character of pure spirits, the chemist and druggist might carry on business when public houses were closed and at other times, and a person would go into a druggist's shop who would not go into a public-house.

Mr. Travis said he did not think it mattered what was the quantity of spirits contained in the liquor. If it was not made up as a *bonâ fide* medicine, the defendant would be liable. He (Mr. Travis) could not lay down a principle which would regulate all cases of this nature, as each case—if any more were put before him—would depend upon a separate class of facts. The label on the bottle was a most condemnatory label, and he agreed with Dr. King that it was not wise to leave to the discretion of the patient the taking of a wine-glassful of a preparation at any time he thought proper. Whatever was the result defendant must thank himself for what had occurred. This was the first case of the kind, and it was hardly one in which he thought the Excise would press severely.

Mr. Micks said that whatever was the decision of the Magistrate it would be satisfactory.

Mr. Travis, in intimating that he would give his decision in a few days, remarked that if he agreed to respite judgment, it must be understood that loose labels of this sort should not be used, perhaps opening the door to evasions of the law.

The Alleged Poisoning by Corrosive Sublimate.

Mr. Holl, acting for Mr. Carter, coroner for East Surrey, resumed at Saint Thomas's Hospital, on Monday, the inquest on Celine Marin, a French woman, who was alleged to have died from the effects of corrosive sublimate administered by mistake under circumstances already narrated in this Journal. The inquest has been three times adjourned, chiefly owing to rumours prevalent in the neighbourhood, which the police, directed by Inspector Cook, of the E division, were instructed to sift. The only additional evidence given on Monday was that of Eugene Bonis and Jean Putzera, both of whom spoke briefly of having seen or heard of a woman serving in the shop on former occasions.

In reply to an inquiry by a juror a medical certificate was handed in stating that Mr. Kupitz, the assistant, was unwell and unable to attend. In support of his statement when under examination that he was "a member of the Pharmaceutical Society," Mr. Kupitz sent the Registrar's acknowledgment of the receipt of his claim to be put on the Register of Chemists and Druggists, sent in before the 31st December, 1868.

The Coroner remarked that Mr. Kupitz's name did not appear on the Register of Chemists and Druggists for 1874; but he did not think that fact pertinent to the present inquiry. As to Mrs. Kant, he did not think that she had committed an offence against the Pharmacy Act, since she did not keep an open shop for the sale of any of the poisons included in the schedule to that Act; neither had it been shown that she was in the habit of selling those poisons. She had apparently sold soaps, scents, glycerine, and such simple articles, in the absence of the qualified assistant, and it was whilst endeavouring to serve a customer with a substance that was not in itself poisonous that the mistake was committed which led to the fatality. He would now put it to the jury whether the case was not one of misadventure which might have happened to anybody. The time that had been spent in its investigation, however, was not lost, as the attention called to the matter might be the means of preventing the deplorable practice of drugs being served by persons not properly qualified.

The jury returned a verdict of "Death from misadventure."

Reviews.

Materia Medica and Therapeutics. Vegetable Kingdom. By Charles D. F. Phillips, M.D., F.R.C.S.E, —London: J. and A. Churchill. 1874. (8vo., pp. 584.)

There already exist so many treatises and text-books with titles more or less similar to that which stands above, that one is naturally inclined to somewhat critically examine the claims to notice of any addition to their number. The title tells us but little; we are equally prepared to find in the book anything or everything comprehended in the departments of the technical botany of medicinal plants, the history, chemistry and physical properties of drugs, and the action of medicines. However, what we discover the book actually to be is a treatise on therapeutics. The author tells us in his preface that he has aimed at "bringing together in a moderate compass a more extensive series of facts respecting the action of drugs, and especially a more enlarged view of what has been done in other countries, than will be found in the ordinary text-books," and it is certainly a sufficient justification for the *prima facie* crime of adding a new "materia medica" book to our shelves, that it gives us, instead of the usual *réchauffé* of old-fashioned botany and chemistry, extended information about medicines from the point of view of a modern physician, familiar himself with their use and conversant with the observations and researches of others.

It seems at last to be becoming recognised that the attempts so long and persistently made in lectures and text-books to say everything that can be said about medicines in all their various aspects, are futile. It cannot be too strongly insisted upon that the botany of drug-yielding plants, the composition, nature, and preparation of the drugs themselves, and their action on morbid states of the human organism, are all subjects of separate inquiry. Their forced union has been most unfortunate for the student of medicine, who has had his attention directed away from the, to him, all-important study of the therapeutical action of medicines, by a heterogeneous mass of facts and fiction quoted at second hand, presented to him in an unattractive and disconnected form, and obviously serving no useful purpose in his education as a practitioner.

How interesting the study of Pharmacology may become it is unnecessary to say; the pages of Messrs. Flückiger and Hanbury's 'Pharmacographia' have just given us fresh evidence of it, if any were needed. The botanist and the chemist, too, do not require to be told of the various problems and questions of interest as to the origin and chemistry of drugs which still remain to be solved at their hands. What is contended is, that these are special lines of research, and have no necessary or close connection with therapeutics.

The author of the present book has, we think, fairly succeeded in carrying out the object expressed in the above extract from the preface, but he has not been able to entirely give up botanical and chemical descriptions. He has endeavoured to retain their "useful parts" and omit the "superfluous," and the result does not appear to us very satisfactory. We find the plants placed, indeed, under the Natural Orders, but these Orders follow no recognised sequence; this the author considers a point "of little importance," but it was surely going out of his way to set at nought every principle of arrangement by placing, for instance, *Smilaceæ* between *Myrtaceæ* and *Simarubeæ*, and *Melanthaceæ* flanked by *Corylaceæ* and

Salicaceæ. Surely even alphabetical order would have been preferable to such meaningless juxtapositions. We are, on the whole, also inclined to think that the book would have lost little by the omission of the section headed *Description*, which commences each article. This gives a very short and meagre account of the aspect, characters, and native country of the plant; though usually correct, the information here is too slight to be of value; in not a few cases, too, we find statements considerably behind the time, and there are a few decided blunders. Under the second head, *Active ingredients*, we have a brief notice of the constituents of importance in a medicinal point of view, inert substances being omitted.

It is the sections devoted to *Physiological and Therapeutic Actions* which constitute the bulk of the volume, and in which the value of the treatise lies. In the more important drugs these remarks extend to the length of many pages. The first portion states the results of experiments and observations on the effects which the drug is capable of inducing in the healthy body, and the second deals with its therapeutic action in disease. This Journal is not the place to speak in detail on medical matters; it is sufficient to say that the whole subject seems to be well brought up to date, recent researches, both at home and abroad, being quoted and discussed. Many original observations on the employment of medicines will be found scattered through the book, and as not a few of these relate to drugs which are not in common use in this country these practical remarks have a special value. It is to be wished that definite references to the sources of information had been more systematically given. The therapeutical uses are arranged under the heads of the various diseases in which the medicine has been employed. A fifth section enumerates the various preparations and doses.

Two very full and complete indexes complete the volume, which will be read with profit and interest by both students and practitioners of medicine.

Obituary.

Notice has been received of the death of the following:—

On the 7th January, 1875, Mr. T. E. Edwards, Chemist and Druggist, of Widcombe, Bath. Mr. Edwards had for twenty-one years occupied the post of dispenser at the Bath Royal Hospital.

On the 7th January, 1875, Mr. Henry Tomlinson Todd, Chemist and Druggist, of Newcastle-on-Tyne.

On the 10th January, 1875, Mr. Owen Lloyd Jones, Chemist and Druggist, of Bettws-y-Coed. Mr. Jones had been a member of the Pharmaceutical Society since 1871.

On the 13th January, 1875, Mr. Richard Oakley, Chemist and Druggist, of Gornall Wood, Staffordshire.

On the 19th January, 1875, Mr. Edward Cotterell Darby, Chemist and Druggist, of Broad Street, Worcester.

In the announcement, on p. 579, of the death of Mr. Forbes, he is erroneously described as "of Reading;" it should be "of Reigate."

Notes and Queries.

[424]. UNG. ACID. BORACIC. COMP.—Can any correspondent oblige me with the formula for "Ung. Acid. Boracic. Comp. (Gibbon)?"—QUÆRENS.

[425]. MANGE LOTION.—Can any reader oblige me with the recipe for Colonel Appleby's Mange Lotion for dogs, horses, etc.?—A. A.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE HOURS OF BUSINESS IN PHARMACY.

Sir,—I was not at all surprised to hear of the illness of "Veritas," as it was a natural consequence of the close confinement he underwent as an apprentice and assistant in an atmosphere contaminated with the noxious emanations from poisonous drugs, which has undermined many a strong constitution. This is testified by the pale and emaciated faces of the majority of pharmaceutical chemists, and if no other argument could be brought forward in support of the early closing movement, that would be sufficient to show that it justly claims the consideration of every pharmacist.

I am not the only one who, in the opinion of "Veritas," does not evince "intelligence" in seeing no difference between a chemist's business and that of grocers, etc., in the matter of early closing, as he will see by reading the latter part of an editorial article on page 491.

The experience of "Veritas" in modern pharmacy must be very limited indeed if he thinks a sleeping draught cannot be procured when the shop is closed. At most of the pharmacies in the town I write from, as at Bedford, the principal, or one of his *employés*, is always on the spot after the shop is closed to supply medicine required in urgent cases. Sometimes medicine is required in the night, and according to the method of reasoning adopted by "Veritas," the shutters should be down and the gas flaring, otherwise the patient cannot have the prescription dispensed. Certainly your correspondent "does not evince intelligence," to use his own expression, in bringing the "sleeping-draught fact" forward as an argument against early closing; on the contrary, it is one of the strongest arguments in its favour, for when a grocer, draper, or ironmonger is closed, his day's labour is ended.

He also cannot, or will not, see, that in many businesses an assistant could frequently have an hour or so for study without injuring his employers. If he reads the advertisements in the *Pharmaceutical Journal* he will frequently see such phrases as the following:—"Duties light; time for study," "Would suit a man studying for the Minor." Under such circumstances many have acquired sufficient knowledge to pass the Minor examination in a creditable manner, and I venture to assert that if some such arrangement as that mentioned in my "second stipulation" could be more generally adopted it would do more towards crushing the giant "Cram" than any scheme which has hitherto been proposed, and the Society would doubtless have less cause to complain of so few candidates for the non-compulsory examination.

"Veritas" wishes to know why many employers prefer not to have a "Square" man. I answer: first, they would in many instances have an assistant whose scientific knowledge exceeded their own. Second, the services of one who has not passed the examination may be obtained for a smaller salary.

As the remainder of his letter has no bearing whatever on earlier closing, or opportunities for study (the subjects of my former letters), it is unnecessary for me to make any further comments upon it.

AN EXAMINED ASSISTANT.

Sir,—In replying to the query of "Veritas" in last week's Journal, I have much pleasure in informing him that I spoke "to the card" with regard to the number of assistants kept in Bedford. Most of the chemists have three or four young men to assist them, *i.e.*, assistants and apprentices. Perhaps "Veritas" will say you cannot call an apprentice an assistant. I beg to inform "Veritas," however, that each apprentice is equal to a junior assistant after being there a short time, and to prove my words I can assure him that one of the apprentices passed his "Minor" in honours before he was out of his time, and another soon after, without going anywhere to study, thanks to the early closing movement. How could they have done so if they had had to work in the shop late at night? My opinion is that it is not necessary to keep pharmacists' shops open later than seven o'clock, and that one assistant is sufficient to stop in, when ordinary business is over, to dispense sleeping draughts or any medicine required. It is not necessary to keep all in for the sale of sponges, sponge gloves, tooth-brushes, powder, etc., and a number of things that the public could wait for until the following day, quite as well as the gent who wants a book or the cook the lard. By serving only medicine you would relieve two out of three assistants every night, and hence give them the evenings for study, which would enable them to pass their examinations.

A. W. Waring.

January 19th, 1875.

Sir,—I think the first query of "Veritas" as to why many masters prefer not to have a "Square" man can easily be answered. Of course the apprentices of the good old times (say twenty or twenty-five years ago) are apprentices no longer, but many of the masters of the old school are existing, hale and hearty as ever, and retaining their prejudices for old customs. They did not pass examinations, but served stringent apprenticeships, and having acquired a thorough practical knowledge of their trade, think that that is all they require in their assistants.

With regard to the preparation of night draughts, which "Veritas" speaks of in his third paragraph, they could be prepared and left at the patient's house in the day, and in a serious case the physician would probably let the druggist know what medicines the advanced stages of the ailment would require. A doctor is not in the habit of knocking up a chemist nightly with a fresh prescription to be got ready in an hour.

Anyone who is cognisant with the pharmaceutical world can affirm, without fear of perjury, that the average number of chemists who begin with £200 or £300 and retire with £500 a year at forty, would be nothing like a twentieth part of the community.

A. Warren.

Sir,—"Veritas" seems, in keeping his shop open to a very late hour, to be actuated by a very laudable desire to alleviate the "sufferings of distressed humanity." "Two sleeping draughts," he says, "will not be taken the next night, to make up for the one missed on this."

Certainly not, but as sleeping draughts may be required as likely at four o'clock in the morning as at nine o'clock in the evening, parties by calling at their chemists' house can have their medicines prepared, without the chemist or his assistant waiting a whole evening, in expectation of a draught being required. When people know that druggists' shops are kept open very late they are, of course, in no hurry to procure their medicines, for it is a well-known fact that patients who feel unwell all day, in many cases wait till the last moment, expecting to get better, and, then, when they find that all places where medicine can be procured are about to be closed, they suddenly discover that they require the attendance of a medical man, and consequently require medicine. But if "the last moment" at which medicine can be procured be fixed at an hour earlier, the result will be that parties will call an hour earlier.

I believe in an improved future for druggists in the shape of early closing, without taking the very sarcastic advice which "Veritas" gives us. Nearly eighteen months ago in our town we got the hour for closing changed from 9 p.m. to 8 p.m., and no inconvenience has arisen from the change. A petition was drawn up and signed by the assistants and apprentices, and presented to the medical men, requesting their assistance, which (all honour to them) we received. Armed with the promised assistance of the doctors, we then waited upon our masters, who, like the medical men, granted our request. It was then advertised in the local paper for three weeks, and no one has suffered from it. The same plan has been successfully carried out in some of the neighbouring towns.

"Veritas" certainly gives young men very little encouragement to study. It seems rather strange that a young man who employs his leisure hours in study, and who succeeds in passing his examinations, is informed upon applying for a situation "that the preference would be given to one who has not passed the examinations."

A Country Student.

Sir,—As a careful reader of the Journal I have perused the letters upon the subject introduced by "An Examined Assistant," and think one important point to consider in this matter is the danger which would result from the estrangement of thought advocated by "An Examined Assistant." The accidental substitution of poisonous medicaments is unfortunately not unknown in the trade, and is probably due to "absence of mind."

I quite agree with "Veritas" that in any well-appointed pharmacy there is sufficient work to employ the assistant, if he is not a mere articulating machine requiring to be reminded continually of the work to do, or content to attend behind the counter and supply only that which is asked for.

The remark of "Veritas" that a pharmacist may commence with £200 or £300, and retire in twenty years with a fortune of £10,000, will probably astonish "An Examined Assistant," and does certainly refer to some very exceptional case, nevertheless if "your heart" is in the business it can be carried on with advantage, and with half the manual labour of the trades referred to.

Observer.

Sir,—I trust young men who, like myself, have entered the business of a chemist and druggist, will not be led to overrate the pecuniary advantages of the business by the remarks of "Veritas" in the last issue of the Journal. He says a young man with £200 or £300 to commence with, may confidently hope to retire on £500 a year by the time he is forty, or on £1,000 a year by the time he is fifty.

There is no doubt it will be an easy matter for him to "confidently hope," but he must not trust to the above, or in ninety cases out of one hundred he will be disappointed. This will be seen by the daily advertisements of businesses for disposal, which are generally to the effect that the incoming must be equal to the returns or nearly so; therefore according to "Veritas" a young man who invests £300 in a business, and receives returns, as we presume, adequate to the ingoing, must lay in store the whole of the returns to produce results as stated by "Veritas," which he could not accomplish if the returns were £600, double the ingoing, after deducting cost of rent, taxes, housekeeping, and other incidental expenses. Of course a realization of £500 a year may be effected in the drug trade by the time a man attains forty years of age, but not with an expenditure of £200 nor yet £300.

"A Young Observer."

January 19th, 1875.

A Problem.

*Suggested by the letter of "*Veritas*" in the* 'Pharmaceutical Journal' *of January 16th.*

A pharmaceutical chemist commences business at the age of twenty-five years with a capital of £300. He retires with £10,000 (or as much as may suffice to being him in £500 a year) at the age of forty: what must his average yearly returns be, supposing his profits to be 50 per cent. of his returns, and his personal and household expenses 50 per cent. of his profits?

H. J. C.

Cambridge, January 16th, 1875.

Sir,—"Veritas" must indeed believe in an improved future condition of the drug business when he speaks of a chemist commencing with £200 or £300, and retiring at the age of forty upon £500 a year, and at fifty upon £1,000 a year.

If there is any chemist living who has done this clever trick I should like to make his acquaintance.

R. Huggins.

235, *Strand, January 18th*, 1875.

*** Since the foregoing communications were in type, we have received several others in which the same opinions are expressed with more or less variation. The publication of these we think it better to defer for the present.

"*A Registered Apprentice.*"—No.

S.—See a note by M. Magnes-Lahens, *Pharmaceutical Journal*, [3], vol. iv., p. 575.

H. T. J.—Wanklyn's 'Water Analysis.'

"*Quærens.*"—We are unable to say, not knowing for what purpose the tar is to be used.

W. S. T.—Apply to Messrs. Butler and McCulloch, Seedsmen, Covent Garden.

Communications, Letters, etc., have been received from Mr. H. Watts, Mr. H. Bell, Mr. Thorp, Mr. Mackay, Mr. Sutton, Mr. J. Baynes, jun., Mr. J. Farr, Dr. Symes, "Nil Desperandum," "Amor Veritas," A. E. J., A. C. M.

MIST. GENTIANÆ COMP.

BY CHARLES SYMES, PH.D.

This preparation, after having undergone some amount of transition, both in character and name, has become a comparatively popular medicine, being daily prescribed by many practitioners; it still, however, admits of some improvement.

In the P. L., 1851, it consisted of

Inf. Gentianæ Co.
Inf. Sennæ Co.
Tinct. Card. Co.

Banished in name from the B. P. of 1864, it existed there in composition as Infusum, not the old mixture, not the infusion of the P. L., but that of the U. S. Pharmacopœia, which in the present B. P. receives the name of Mist. Gentianæ Co.

Now there can be no objection to copying from the Pharmacopœias of other countries, either continental or transatlantic, but we certainly should show our discretion by avoiding their faults. When we copy Pulv. Glycyrrhizæ Co. from Prussia, we improve it into something which the bulk of the profession object to prescribe; but when we copy the U. S. Inf. Gent. Co. we take it, faults and all, even though dissatisfaction had been expressed concerning it in the country of its origin, and although some slight modification is introduced, it tends rather to increase than diminish its unsatisfactory appearance.

When this preparation has been kept a few days it commences to throw down a flocculent pectic-like deposit, which floats near the bottom of the containing vessel; the upper half of the fluid might be poured off moderately clear, but the lower portion will be exceedingly turbid, unless it is filtered through paper, after which slow process it is too bright to correspond with the former, and thus two mixtures made with these portions respectively will have a somewhat different appearance. This, perhaps, is only a small difficulty, but one which causes frequent annoyance to the dispenser, and is quite worth surmounting. To do this satisfactorily it is necessary to consider, first, the characters of the materials we have to deal with—gentian, orange-peel, coriander seeds, and as menstrua or solvents, proof spirit and water. From the gentian we desire to extract the bitter principle soluble in both the latter; from the orange-peel a small quantity of aromatic bitter principle and some volatile oil, and from the coriander, volatile oil, both sparingly soluble in water, more so in proof spirit. To accomplish this we are instructed, first, to macerate the ingredients with the proof spirit for two hours, and then to add the water and continue the maceration for a like period, resulting in the preparation above described. If the proof spirit and water be divided respectively into three portions and the three ingredients are treated with these separately, according to the Pharmacopœia directions, and the strained liquors are placed in separate bottles, the coriander solution is clear, the gentian and the orange *slightly* turbid. In a few days a flocculent deposit begins to form in the latter, so that on slight agitation it will be seen that the turbidity has much increased; the gentian changes very little, the coriander not at all. From our experience in the manufacture of Tinct. Aurantii, we know that proof spirit dissolves nothing from the peel which produces this deposit, and we conclude that the water subsequently added does this. Experience thus gained points us to another experiment as follows:—In one vessel place the coriander seeds and orange peel, pouring on them the proof spirit; in another place the gentian, pour on it the water; at the end of two hours strain off separately and mix. Mist. Gentianæ Co. is thus produced in one half the usual time, possessing the full aroma of the flavouring ingredients, the bitterness of the gentian, and a brightness similar to that of its infusion. Samples which have been kept two months have undergone no change, other than the very slight deposit which always occurs in fresh infusions after standing a few hours, and from which the clear liquid is readily decanted.

It might require some caution on the part of one decidedly opposed to *concentration* of infusions to recommend it here; but giving my readers credit for readily distinguishing between things which so widely differ, I do not hesitate to point out that in the case of Mist. Gent. Co., not only is it unobjectionable, but positively beneficial. In treating the gentian by the B. P. process, or by the modification indicated above, a quantity of mucilaginous matter is dissolved by the water, which to say the least is undesirable; by concentration in the following manner this is readily got rid of. To produce one pint—

Take of bruised coriander seeds } of each 240 grains.
Bitter orange peel . }
Pour on proof spirit . . . . 16 ounces,

and set aside to macerate.

Gentian root very thinly sliced (or better in coarse powder) . . . . 2 ounces.

Pour on this, distilled water, rather more than sufficient to cover it, allow to stand one hour, pour off the liquor, and repeat the process to the third or fourth time, when less than a pint of fluid will be obtained, and the exhaustion will be completed; evaporate to four fluid ounces, and mix with the tincture previously strained from the coriander and orange peel. The mucilage is precipitated by the spirit, and by filtration a bright concentrated liquid is produced, which keeps as well as any tincture, and on dilution in the proportion of one part to three of distilled water forms Mist. Gentianæ Co. that will compare favourably with, and contain nothing which is not contained in that freshly prepared by the Pharmacopœia process, and over which it possesses the decided advantage of keeping a longer time without change.

Liverpool, January 20th, 1875.

THE PRESENCE OF LEAD IN OIL OF LEMON.

BY HARRY NAPIER DRAPER, F.C.S.

In common with many others for whom the subject must have had interest, I read Dr. S. Macadam's paper (*Pharm. Journ.*, Jan. 16th) "On the Presence of Lead in Aërated Waters." Some of the author's experiments, and the deductions made from them, struck me as worthy of more attention than was given to them in the discussion which followed the lecture.

One or two of these I shall mention presently, but I wish more especially to comment upon the statement that "oil of lemons is often loaded with lead."

I think I shall be able to show that while we have to thank Dr. Macadam for indicating that lemon-oil may contain lead, we have not any reason whatever for anxiety on this score, or for fear that from this cause lemonade may be harmfully contaminated with lead.

I fortunately happened to have the means of making the following experiment:—

An ordinary copper of superfine lemon-essence, shipped at Messina in February 1874, had remained unopened until the 20th inst.; that is, its contents had been in contact with its metallic lining for at least eleven months. This copper was opened, and a pint (= ·567 litre) of the essence removed and treated as follows:—The essence was mixed with 25 grammes of acetic acid, strong enough to dissolve in it without turbidity, and after standing for an hour, 100 grammes of distilled water were added, so as to withdraw the acid. The supernatant essence was separated by decantation and a wet filter from the acid liquid, which was next evaporated to about 10 c.c., again acidulated with acetic acid, pure sulphuric acid added, and double the volume of the whole liquid of alcohol. The mixture was now allowed to rest for twenty-four hours, and the precipitate which had formed collected on a filter, which when dry was with its contents ignited and weighed with the usual precautions. The lead sulphate thus obtained weighed 0·0248 grammes, which represents 0·0182 grammes of metallic lead. Reduced to English weights and measures, we have thus the result that a pint of essence of lemon contained 0·281 grain, that is a little more than a fourth of a grain of lead. Mr. Umney (*Pharm. Journ.*, p. 584) assumes that the quantity of essence used in making lemonade syrup seldom exceeds 0·15 per cent., and as published formulæ support this statement, I will take it as a fair basis of calculation.

Thus we find that a pint of essence would make 83 gallons of syrup, and as a volume of this usually makes ten volumes of lemonade (Parrish), the quantity of lead found would be distributed over 830 gallons, or 13,280 ordinary half-pint bottles!

I next cut open the copper and examined the alloy which lined it. It contained 81·03 per cent. of tin, and therefore a maximum of certainly not more than 19 per cent. of lead.

Looking at these figures, one can scarcely avoid the conclusion that even were the lining of the copper lead alone, and even were the contents of a partly emptied copper exposed to atmospheric oxidation, which are the worst conditions I can suppose probable, the quantity of lead which could be thus introduced into lemonade would still be absolutely unimportant, and for my own part I cannot wonder that Mr. Umney should feel a doubt as to whether the statement was really made in earnest.

Two other points in Dr. Macadam's paper I shall shortly dismiss. He seems, if I have read rightly, to account for finding more lead in lemonade than in other aërated waters by the solvent action of the acid and saccharine liquid upon leaden vessels or pipes. He certainly does not directly say so, but if this be not the view he takes, the experiments upon the solvent action of lemonade upon lead have no significance. All who are practically conversant with the subject will understand me at once and see (what Dr. Macadam himself must well know) that as the syrup is only mixed with the aërated water *in the bottles*, its previous contact with lead could only arise from the grossest ignorance or carelessness.

Again I must, on behalf of all who value accuracy in chemical work, enter a protest against the serious setting forth of the indications of a colour test, such as that described, as worthy of the slightest confidence in a case like this. Several commonly occurring metals, other than lead, give coloured precipitates in acid solution with hydrogen sulphide.

The analyst suspects the presence of lead in a water; he makes a standard lead solution, applies his colour test to this, and to the suspected water, and reads the result as indicating so much lead. There is no reason whatever, beyond a preconceived opinion, why a standard *copper* or *silver* solution should not be used, and the result read as copper or silver. *Dilettante* chemistry is a pretty amusement enough, but it may be as well not to import it into such serious matters as charges of lead contamination involve.

I cannot think, however, that a quantitative colour test for lead will gain much favour, because perhaps the first time that it is relied upon as good chemistry or fair evidence, it may be demonstrated beyond doubt that it is neither one or the other, and in that case I am not aware that there is any especial ægis for sheltering the analyst from the consequences.

SOME PHYSICAL PROPERTIES OF QUININE.*

BY JULES REGNAULD.

Several chemists have during recent years published the results of their experiments upon the solubility of the salts of quinine, and they have specially occupied themselves with the substitution of the ordinary sulphate of quinine by a compound more soluble in water and better adapted for hypodermic use. The author proposes to test the correctness of the frequently discordant statements by means of well-defined salts prepared by himself from perfectly pure quinine. In the present preliminary note he treats of the solubility of the free alkaloid in water, alcohol, chloroform and sulphuric ether.

Solubility in Water.—Pelletier and Caventou, in their 'Analyse chimique des Quinquinas,' say simply, "Boiling water dissolves about 0·005 of quinine; cold water dissolves still less." From this it might be inferred that the solubility of quinine in water is pretty considerable; for, calculating according to the coefficient 0·005, one gram of quinine would dissolve in 200 grams of boiling water, and would require a larger, but undetermined, quantity of cold water. The greater portion of French standard treatises give different numbers, but unfortunately do not indicate their origin. The disagreement may be illustrated by the following examples:—

Quantity of Water required to Dissolve one gram of Quinine.

According to	At + 15° C.	At 100° C.
Dumas	——	200 grams.
Gerhardt	350 grams	400 „
Pelouze and Frémy	400 „	150 „
Wurtz	400 „	350 „
	At + 19° C.	
Berthelot	480 „	200 „

According to the same authors one gram of ordinary sulphate of quinine, $(C_{20}H_{24}N_2O_2)_2H_2SO_4$, requires about 750 grams of water (the author has found about 755) at 15° C. to dissolve it. From which it would result that an aqueous solution of quinine upon being neutralized by sulphuric acid, throws down, under the form of a deposit of insoluble sulphate, nearly half the alkaloid it contained: an inference manifestly incorrect. In fact, the figure

* *Journal de Pharmacie et de Chimie* [4], vol. xxi., p. 9.

given for the solubility of quinine in water by Pelletier and Caventou, and other French chemists, is exaggerated.

Dragendorff, in his 'Toxicologie,' represents the solubility of quinine in water as 1 in 1667; this number, though widely differing from the preceding, is still, according to the author's experiments, considerably beyond the true one. Three experiments were made by him with pure quinine, from which all traces of the other cinchona alkaloids had been carefully removed. This quinine was anhydrous, and presented the appearance of vitreous, amorphous, completely colourless and transparent scales. Finely pulverised in a glass mortar and then agitated during twenty-four hours with a large excess of pure distilled water, previously made to boil, it yielded a solution which after being kept during two hours at a temperature of 15° C., gave the following results:—

	Saturated Solution at 15° C.	Pure Quinine dried at 110° C.
	gr.	gr.
1st Experiment .	49·8278	0·025
2nd " . .	49·9780	0·024
3rd " . .	49·6950	0·025

These figures give for each 100 grams of saturated solution at 15° C.—

	Pure Quinine dried at + 110° C.
	gr.
1st Experiment	0·0501
2nd "	0·0480
3rd "	0·0503

Or a mean of 0·0494 gram of quinine in each 100 grams of solution; from which the author concludes that the coefficient of solubility at that temperature is 1 in 2024; or that one gram of pure quinine requires for its perfect solution at 15° C. rather more than two litres of distilled water.

The solubility is considerably increased at 100° C., as stated by most authors, and as is shown by the following experiments:—

	Water saturated at 100° C.	Pure Quinine dried at 110° C.
	gr.	gr.
1st Experiment .	64·5430	0·0870
2nd " .	65·5265	0·0840

Or a mean for each 100 grams of 0·1314 gram; from whence the author concludes that the coefficient of solubility of quinine in water at 100° C. is 1 in 760. Therefore water saturated with quinine at 100° C. deposits in cooling to 15° C. nearly two-thirds of the alkaloid originally dissolved.

Solubility in Alcohol.—The author used absolutely pure and anhydrous ethylic alcohol. One carefully conducted experiment gave a result so nearly concordant with what is stated in chemical treatises that it was not repeated.

Absolute alcohol saturated at 15° C.	Quinine dried at 110° C.
gr.	gr.
41·454	19·428

This is equal to 46·866 grams to 100 grams of solution, and the coefficient of solubility at 15° C. would be 1 in 1·133; in other words, 1 gram of pure quinine will dissolve in 1·133 gram of absolute alcohol at 15° C. Several chemists have mentioned the great solubility of quinine in alcohol. Dragendorff and Wurtz have it as 1 in 2, which is too low. The difference, however, probably depends upon a slightly hydrated alcohol having been used, for the solubility of quinine in alcohol decreases rapidly with the smallest addition of water.

Solubility in Chloroform.—100 grams of chloroform saturated at 15° C. gave 34·177 grams of quinine dried at 110° C., being equal to 1 in 1·926. This number is substantially in agreement with Pettenkofer's statement of 55 per cent., or 1 in 1·801. The coefficient 1 in 6·58, corresponding to 15·2 per cent. (Schlimpest), mentioned by Dragendorff, is evidently erroneous.

Solubility in Sulphuric Ether.—The ether used in these experiments was entirely free from aldehyde, alcohol, and water.

	Ether saturated at 15° C.	Quinine dried at 110° C.
	gr.	gr.
1st Experiment. .	32·3545	1·3990
2nd " .	18·6590	0·7965

Or a mean equal to 4·2314 of quinine to each 100 grams of solution. From which the author concludes that the coefficient of quinine in pure sulphuric ether at 15° is 1 in 22·632. This value is very different from that indicated by Dragendorff, who, according to Pettenkofer, supposes that 100 grams of ether dissolve 1·66 grams of quinine, or equal to 1 in 60, instead of 1 in 22.

Observations upon Aqueous Solution of Quinine.—The determination of the exact composition of the aqueous solution afforded the author opportunities for making numerous experiments upon some of the reactions of this alkaloid. The solution of 1 part in 2000 is bitter, and presents very clearly the emerald green coloration under the influence of chlorine and ammonia. Gallo-tannic acid causes an abundant precipitate. By means of mixtures consisting of definite proportions of this solution and distilled water the author ascertained that it is necessary to dilute one part of this solution of 1 in 2000 with ten parts of distilled water before the opalescence resulting from the formation of the tannate ceases to be visible in the sunlight, gathered in the focus of a convergent lens; 1 part in 20,000 is therefore the extreme limit of the sensitiveness of this reagent. This experiment shows that the solubility at a temperature between 10° C. and 20° C. is extremely slight, and that some statements that have been made upon this point are incorrect.

The fluorescence of the aqueous solution of 1 part of pure quinine in 2000 is almost invisible if the solution be examined in the direct sunlight. It is, however, perceptible up to an extreme limit of 1 in 20,000, if according to the method proposed by Stokes,* the rays converging from a lens or a concave metallic mirror be thrown upon it.

It is known that the presence of an excess of sulphuric acid increases the fluorescent power of quinine, and the author has found that this singular influence renders the solution of 1 in 20,000 twenty times more energetic. In fact, he has found that a solution of 1 part of quinine in 500,000 of water, when sulphuric acid has been added, possesses still a visible fluorescence, which is instantly destroyed upon the addition of hydrochloric acid, as stated by Stokes.†

From the fact above stated the author deduces the following propositions:—

(1). The solubility of quinine in water is at 15° C., 1 in 2,024, and at 100° C., 1 in 760; in absolute alcohol, at 15° C., 1 in 1,133; in chloroform,

* *Philosophical Transactions*, 1852, p. 463. † *Loc. cit.*

at 15° C., 1 in 1,926; in pure sulphuric ether, at 15° C., 1 in 22,632.

(2). The solubility of tannate of quinine in water is below 1 in 20,000.

(3). The fluorescent power of quinine becomes twenty times more energetic under the influence of an excess of sulphuric acid.

(4). By means of this exalted fluorescence, it is possible to recognize the presence of the alkaloid in a solution containing quinine only in the proportion of one part in five hundred thousand; a degree rather beyond that stated by Flückiger who recommends this reaction. The author finds it to surpass in delicacy, in the ratio of 5 to 4, the opalescence caused by the double iodide of mercury and potassium, which however furnishes no clue as to the nature of the alkaloid of which it reveals the existence.

ON SOME SUBSTITUTIONS.*

BY JOHN M. MAISCH.

Agaric, or *White Agaric*, is a drug which was formerly much more frequently employed than at present, but is still occasionally used in the United States, particularly in domestic medicine, and mainly as an ingredient in several bitters, which, among a portion of the German population, enjoy some popularity. The drug consists of the pileus, or cap of a fungus, named *Polyporus officinalis*, Fries, s. *Polyp. laricis*, Roques, s. *Boletus laricis*, Jacquin, s. *Bol. officinalis*, Villars, s. *Bol. purgans*, Persoon. It occurs in the market in irregular masses of the size of a fist and larger, is occasionally semilunar in shape, or resembles the section of a cone. It is of a white colour, light and friable, nearly inodorous, and possesses a taste which is at first sweetish, but soon becomes bitter and acrid.

Recently a sample of a so-called white agaric, which had been obtained in New York, was sent to me; it was in the form of a coarse white powder, intermixed with some larger, irregular white pieces, none of which exceeded a quarter of an inch in length or thickness, but, on superficial examination, possessed the physical characters of true agaric. The powder was of a sweetish, subsequently bitter, acrid taste, which, however, was much less marked than in the genuine drug; the larger pieces, freed from the adhering dust, were nearly insipid and entirely devoid of bitterness. A section placed under the microscope showed it to consist of the peculiar filamentous cells of the fungi; but on searching a number of works on materia medica, I found no adulteration or substitution mentioned, except by Wiggers, who states that agaric is occasionally mixed with pieces of *Polyporus igniarius*, Fries, made to resemble agaric by covering it with the powder of the latter. The substance in question, however, is not derived from a *Polyporus*, which genus is characterized by having the hymenium or gills concrete with the pileus or cap, and consisting of subrotund pores.

Some of the pieces have fragments of lamellæ still attached, showing the substance in question to be most probably the cap of a species of *Agaricus*, from which the lamellate gills have been almost completely removed, and which was afterwards broken into small pieces and mixed with some powder of the larch agaric, to impart a bitter taste. The substitution can easily be detected by examining some of the larger pieces in the manner indicated above.

Gossypii radicis Cortex of the U.S. Pharmacopœia, is the bark of the root of the cultivated species of *Gossypium*. The woody, conical, nearly simple root of the cultivated cotton plant is covered with a thin bark, about half a line to one line in thickness, rarely thicker. Externally, the bark is of a brownish-yellow colour, with larger irregular patches of a brownish-orange, caused by the abrasion of the outer layer of cork, and smaller ones more scattered, of a nearly black colour. The yellowish portion has a slight satiny lustre, the other parts are dull. The thin, corky layer which adheres well to the bast layer, forms shallow longitudinal ridges, often becoming confluent into narrow, elongated meshes. Suberous warts or their scars are scattered over the surface, at first circular in shape, ultimately forming short transverse, black lines. The inner surface is of a whitish, or reddish-white colour, a silky lustre, and finely but, to the naked eye, distinctly striate in a longitudinal direction. A pocket lens reveals these striæ as thin, medullary rays penetrating into the bark. The bast fibres are long and tough, and arranged in tangential rows, on account of which the inner bark may be separated into very thin, almost transparent layers without difficulty. The bark is without odour; the bast possesses scarcely an acrid taste; the corky layer is in the main rather feebly astringent.

Some months ago, in one of our wholesale stores, I met with a so-called cotton-root bark, which had been obtained from the State of Georgia, and which is so entirely different from the root bark of our cultivated *Gossypium*, as to leave no doubt whatever in regard to its origin from a different plant. The bark is in quills or curved pieces, several inches to a foot or more in length, and one-eighth to one-fourth inch in thickness, inodorous, of a slight astringent, afterwards bitterish and distinctly acrid taste; pale brown to rust-brown throughout in colour, and destitute of silky lustre, except the bast fibres upon a fresh fracture. The exterior surface is deep brown, the younger bark with shallow, longitudinal suberous ridges, the older bark with the soft cork more or less fissured, and exfoliating in small patches. The interior surface is of a dark brown or blackish-brown colour, and striate by the rather coarse bast fibres. The bark breaks transversely with little difficulty, and exhibits a coarse, splintery fracture from the numerous bast fibres, which are disposed in tangential rows; the inner bark separates in the same direction in rather thick layers. Some of the coarser pieces of bark are found with a clayey earth adhering in the grooves and bends.

The characters described are, with very insignificant variations, observed in the bark of the root of cotton plants, which some years ago were furnished me from several varieties grown in four or five of our Southern States, and for which I am indebted to the kindness of Dr. Robert Battey, of Rome, Ga., and Mr. Gallagher, of Washington, North Carolina.

It will be observed that the description agrees in several important points with the characteristics of mezereon bark, to which cotton-root bark bears a close resemblance, if colour and taste are not considered; the thin, ribbon-like appearance, the silky lustre of the internal surface, the transverse scars of suberous warts and the toughness of the bast fibres are common to both.*

What is the origin of this bark? It can scarcely be doubted that it is derived from the root of a tree, and it is not unlikely that it must be referred to one or more species of *Populus*, several of which are popularly known as *cotton-wood*, on account of the cotton-like filaments found in the fruit. This name is more particularly applied to the following three species: *Populus angulata*, Aiton, the western cotton-tree which is found from Pennsylvania to Wisconsin, and further southward; *Pop. monilifera*, Aiton, cotton-wood or necklace-poplar, from Western Vermont to Illinois and southwestward to Louisiana; *Pop. hetero-*

* *American Journal of Pharmacy* for January.

* After the above was in type, I have received, through the kindness of Dr. A. W. Miller, a sample of cotton-root bark collected by Wallace Bros. and Stephenson, of Statesville, North Carolina. This agrees in every respect with my cotton-root bark, except that it is more or less quilled, showing that it has been taken from the recently collected root, and dried without endeavouring to prevent its quilling; my bark was stripped from nearly dry roots and purposely kept in bands. I have not noticed any striking difference in the root-bark of the long and short staple cotton.

phylla, Lin., cotton-tree or downy-poplar, found in about the same localities, though rarer than the preceding in the New England States. The three species grow along river banks and in swampy localities, and it does not seem unlikely that one or all three yield at least a portion of the so-called cotton-root bark of commerce.

I am not aware that authentic specimens of the bark of *Gossypium* or of these species of *Populus* have been submitted to analysis, but as far as can be judged from the taste, and other sensible properties, I am inclined to the belief that at least a considerable portion of the commercial fluid extracts of cotton-root bark have *not* been made from the officinal *Gossypii radicis cortex*, but from this substitute.

The question then presents itself to which cotton-root bark must be ascribed the reputed emmenagogue properties, upon the strength of which *Gossypii radix* and afterwards *Gossypii radicis cortex* were admitted into the Pharmacopœia? The writer would be thankful to manufacturers of fluid extracts, to wholesale druggists, and particularly to physicians and pharmacists of the Southern States where *cotton-root bark* appears to be principally used, for authentic specimens of the plant and of its root, to which the medicinal properties are ascribed.

OS SEPIÆ.*

BY THOMAS S. WIEGAND, PH.G.

There are many among those who daily handle, and even sell the common cuttle-fish bone, as it is ordinarily termed, who would be quite surprised to learn that it is not a bone at all, at least in the same sense that the term bone is used in speaking of the vertebrate animals, the frameworks of whose bodies are bony. This "fish-bone," which is frequently found floating in the Mediterranean Sea, and in much greater quantity on the shores of Australia, is of an oblong oval shape, from three to ten inches long, and its breadth is about one-third of its length, hard upon its upper surface and edges, but soft on its lower side, both surfaces being convex; its specific gravity is about ·935. Its composition, though calcareous, is quite different from bone, being about 83 per cent. of carbonate of calcium, with some magnesia and common salt, and but little animal matter. The structure of the bone is quite peculiar; a fresh fracture, when examined, shows the layers of the calcium salt, supported by pillars of the same material, arranged in regular rows, likened by Wood, the naturalist, to a miniature giant's causeway.

The *Sepia officinalis*, for this is the title of the fish which furnishes the little songsters with their tiny grindstones whereon to whet their bills, belongs to the class mollusca and order Cephalopoda; this term alluding to the feet being attached close to the head. Its generic name *Sepia* is in consequence of the colour which it ejects when chased or angered. It is most commonly found on the Australian coast, though most of the commercial supply is derived from Europe.

The various names of great polypus, colossal cuttle-fish, gigantic squid, kraken, devil-fish, etc., will appear to be well deserved when some of their performances, for which very truthful observers vouch, are narrated. Montfort has described their habits fully, and shows them to be very dangerous and disgusting, even when so small as not to be dreaded for their size and strength; their activity and determination is very remarkable. The attack of one upon a ship, sailing from St. Malo, a seaport in France, is celebrated by a painting, hung up in the church of St. Thomas in that city, representing the vessel with the arms of the fish clasped about the masts and sides of the vessel which was only freed from the monster by the vigorous efforts of the crew in cutting away the encircling arms. The reader must remember, however, that the *Sepia officinalis* are not to be held answerable for these performances, they belong to other branches of the family; the smaller members are generally peacefully inclined, but when irritated they become exceedingly annoying to those who molest them. The rocks and coast of Madagascar is shunned by the natives who wish to swim on account of the rock squids fastening upon the persons of the swimmers with their suckers, if they venture too near the shore. One of the most recent accounts which appears well authenticated, is contained in a late number of the *London Spectator*, which tells of a cuttle-fish that appeared off the Newfoundland coast, in Conception Bay; some fishermen supposing it, from its size, to be a portion of a wreck, pulled out for it, and striking at it, they so enraged it that it raised its beaked head and encircled the boat with two of its slimy arms; instantly the men cut them away with their axes, and the fish, finding the fight too severe for him, sailed away, inking the sea for several hundred yards. The arm, which was of a pale pink colour and entirely cartilaginous, was preserved in St. John's Museum, and was found to measure nineteen feet; this report, so well authenticated, gives some show of truth to the marvellous story which Victor Hugo has so graphically depicted in his tale of the "Toilers of the Sea."

The use to which *Os sepiæ* is put in pharmacy proper is but trifling, it furnishing when levigated and dried, a very fine variety of carbonate of calcium, but is more generally employed in the fabrication of tooth powders, being the basis of Betton's dentifrice, and the cuttle-fish powder of Piesse, formulas for which are appended to this article.

There is one other product of the cuttle-fish which is used in the arts, a substance called sepia, a colouring matter of black colour, and when well prepared highly prized by artists. This substance is secreted by the fish from a bag or sack, which it can contract at will, and thus discharge some of the colouring matter into the surrounding water, and staining it for the purpose of preventing its enemies from seeing it so as to be able to pursue it.

A few words about the proper method of making the class of powders mentioned will perhaps be useful to the readers of the Journal. It is of the highest importance that the basis of all tooth powders should be so free from all sharp, gritty particles that there will be no danger of abrasion to the enamel of the teeth. This fineness, of course, is to be obtained only by careful pulverization and passing the powder through a sieve of fine bolting cloth, all the various materials being reduced to an equal degree of fineness. When colouring matter is to be added, and this generally is some shade of pink, the finest colour is obtained by washing the calcareous powder with a solution of carmine in aqua ammoniæ, and exposing the powder to the air until free from ammoniacal odour and moisture; to this prepared calcareous base the remaining powders are added, and the whole thoroughly incorporated by sifting together.

Betton's Dentifrice.

Take of—

Powdered cuttle-fish,	
,, orris root, each	4 pounds.
,, prepared chalk	1 ,,
Musk	8 grains.
Oil rose and lavender (Mitcham), each	48 drops.
Carmine, No. 40	2 drachms.
Aqua ammoniæ	5 fluid drachms.
Water	6 fluid ounces.

Rub the carmine with the aqua ammoniæ diluted with the water, and with this solution imbue the prepared chalk and powdered cuttle-fish bone. After the moisture has all disappeared, sift the orris root, perfumed with the essential oils, together with the coloured lime salts.

Piesse's Cuttle-Fish Powder.

Take of—

Powdered cuttle-fish	½ pound.
Precipitated carbonate of lime	1 ,,
Powdered orris root	½ ,,
Oil lemon	1 ounce.

* *American Journal of Pharmacy.*

Oil of neroli	½ ounce.
Carmine	⅓ drachm.
Aqua ammoniæ	2 fluid drachms.
Water	1½ fluid ounce.

Proceed as in former recipe.

THE VOLUMETRIC ESTIMATION OF IODIDE OF POTASSIUM.*

BY M. PERSONNE.

M. Personne has proposed a method of titration of iodide of potassium, which has been favourably reported upon by a committee of the French Academy of Medicine. It is based upon the following reaction: If solution of bichloride of mercury be added, a little at a time, to a solution of iodide of potassium, chloride of potassium is formed, together with a soluble compound of iodide of potassium and biniodide of mercury. But when one-half the iodide of potassium has been decomposed by the bichloride of mercury, the smallest further addition of that compound produces a persistent red precipitate. Thus, if to a solution of iodide of potassium, containing two-tenths of an equivalent or 33·20 grams per litre, ten cubic centimetres of a solution of bichloride of mercury, containing one-tenth of an equivalent or 13·55 grams per litre, be added, the red precipitate, which is at first formed, disappears, and is only reproduced upon the addition of a drop of the mercurial solution.

To prepare the test liquor 13·55 grams of bichloride of mercury and 8 or 10 grams of chloride of potassium or sodium are dissolved in 300 or 400 grams of distilled water; afterwards sufficient water is added to bring the quantity up to 1000 c.c. In another vessel 33·20 grams of the iodide of potassium to be tested are to be dissolved in sufficient distilled water to form a litre of solution. Ten c.c. of the solution of iodide of potassium are then placed in a glass vessel, and the mercurial solution is added drop by drop from a burette, graduated to tenths of a cubic centimetre, the mixture being continually shaken. The reaction is terminated when the mercurial solution produces a perceptibly red and persistent precipitate. It is only necessary then to read off from the burette the number of divisions employed to ascertain the richness of the iodide.

M. Personne has ascertained that the presence of carbonate, chloride, or bromide of potassium, is no obstacle to this application of volumetric analysis.

* *Repertoire de Pharmacie*, vol. ii., p. 737.

RIVERS POLLUTION COMMISSION.

The Rivers Pollution Commission, appointed in 1868 to inquire into the best means of preventing the pollution of rivers, having now completed its examination of the principal running waters of England and Scotland, has presented a fifth report. The report is rather lengthy, extending through fifty folio pages, and contains much interesting and valuable matter. The following is an abstract:—

"Former reports have described the evils arising from the discharge into river channels of town sewage; drainage waters from cotton, woollen, silk, flax, and jute works; from print and dye works; from tanneries, paper mills, and bleach works; from alkali, chemical, and soap works; from distilleries, starch, and sugar works, and from paraffin oil works. In every case the Commission has reported that efficient remedies exist and are available in sewage irrigation and intermittent filtration. But those remedies depend for their efficiency on the action of the air within the soil in oxidizing putrescible matters, and are applicable therefore only in cases where river pollution is due to the presence of matters of animal or vegetable origin. Many rivers and streams in the country, however, owe their polluted condition to mineral matters suspended in them; and in such cases it is by prevention rather than by cure, that a remedy must be sought. The Commission has accordingly recommended that the discharge of all solid refuse matters into the river channels be strictly forbidden under adequate penalties.

In the present Report the Commission deals with river pollution arising from mining operations, and from various kinds of industry connected with metals.

In describing the nature and extent of injury to rivers caused by mining operations, the following classification of sources of pollution has adopted:—(1) Pollution by collieries and coal-washing; (2) iron mines; (3) lead, zinc, copper, and arsenic mines; (4) tin mines; (5) manganese mines; (6) baryta mines; (7) china-clay works.

The first, second, fifth, and seventh classes contribute polluting matter which, though in many cases very unsightly, is, as a rule, not directly injurious to health, but the waste matters discharged into rivers from the third, fourth, and sixth are frequently of a character to produce injury to the health of persons using the water for domestic purposes, or of cattle grazing in fields which have been flooded by water so fouled. The polluting matters are nearly always in suspension and scarcely ever in solution; and as water polluted by mining refuse is almost invariably too muddy and repulsive in appearance to be used for drinking, it very rarely happens that injury to health arises in this way. Many of these refuse matters, however, are very destructive to fish.

1. *Pollution by Collieries and Coal-washing.*—Although coal is commonly termed a mineral, it undoubtedly consists chiefly of organic matter resulting from the very slow petrefaction of certain plants which flourished at a period of the earth's history inconceivably remote. The variations of quality are almost infinite, but all are commonly classified under the four following heads:—Cannel coal, bituminous coal, Welsh or smokeless coal, anthracite. The difference between these four descriptions is found to depend upon a difference in the chemical composition of the organic part of the coal, as is seen from the following analytical table:—

COMPOSITION OF VARIOUS KINDS OF COALS.

Constituents.	Cannel Coal.	Bituminous Coal.	Welsh Coal.	Anthracite.
Carbon ...	79·23	82·64	88·66	94·18
Hydrogen ...	6·08	5·31	4·63	2·99
Oxygen ...	7·24	5·69	1·03	·76
Nitrogen ...	1·18	1·35	1·43	·50
Sulphur ...	1·43	1·24	·33	·59
Ash (mineral matter)	4·84	3·77	3·92	·98
	100·00	100·00	100·00	100·00

The sulphur is present chiefly in the form of iron pyrites, a compound of sulphur, iron, and a variable but usually small proportion of arsenic. This compound is also rarely absent from the rocks in immediate contiguity to the coal; indeed it is sometimes found there in very large proportion. Until it is exposed to the air in the mine, iron pyrites is quite insoluble in water, but, in contact with atmospheric oxygen, it undergoes a slow oxidation and becomes transformed into sulphate of iron, which readily dissolves in water. It thus happens that the water discharged from those mines in which iron pyrites abounds is often much polluted by sulphate of iron. Such water is recognized by becoming turbid on exposure to the air and depositing an orange-yellow ochrey sediment of basic persulphate of iron, which adheres to and colours rocks or stones over which the polluted water flows. Water so contaminated is very fatal to fish, because the transformation of the protosulphate into persulphate of iron is effected, like that of the original iron pyrites into protosulphate of iron, by the absorption of oxygen. The water is thus deprived of its dissolved oxygen, which is absolutely necessary to fish life.

Analysis shows that whilst coal-pit waters are contaminated with but a small proportion of organic matter (organic carbon and organic nitrogen), they are occasionally acid, and frequently contain a considerable proportion of iron. The metal is in the state of carbonate in the water pumped from the Rainton meadow colliery, but it generally exists in the condition of protosulphate; both compounds are very fatal to fish, and may be injurious to cattle. This polluting agent also renders river water turbid and unsightly until the precipitated matter has had opportunity to subside. After subsidence, however, the river water is often considerably purified by the precipitation of a portion of its dissolved organic constituents.

The effects of ferruginous coal pit water are, therefore, partly deleterious, and (in the case of already polluted rivers) partly beneficial. But vast volumes of non-ferruginous or but slightly ferruginous water are pumped from collieries and discharged into rivers with unmitigated benefit to the latter. Colliery water is indeed occasionally sufficiently pure to be used for all domestic purposes.

Another pollution of water by collieries is that which arises from coal-washing, a process which has assumed important dimensions during the past ten years. In addition to the large masses or "cobs," and the smaller fragments or "nuts," there is always a considerable percentage of coal raised from the pit in the form of "slack," or even dust, mixed with the shale which is commonly found interstratified with coal. This latter material was, to a great extent, formerly regarded as waste; it was sometimes "tipped" into any convenient watercourse, but more frequently it was slowly burnt in vast heaps at the pit's mouth. Attempts to utilize this small coal, when it was of a bituminous nature, by coking it in ovens, and thus transforming it into coherent masses, failed on account of the large proportion of shale and of iron pyrites with which it was mixed. Coal has a much lower specific gravity than either shale or pyrites, and it was found that if the refuse material was placed in a stream of water, the coaly matter was carried forward by the stream whilst the shale and pyrites were left behind. The principle here involved is applied in a variety of ways; sometimes the refuse coal is placed upon large sieves of wire or perforated zinc, through which a stream of water is forced upwards in a succession of powerful pulses by the action of a steam pump. The coal is thus carried to the surface, and is washed off, or can be scraped off, from the shale below. The water after use is made to run through settling pits in which a considerable quantity of valuable coal dust is deposited, and after the water has become very black and turbid, it is run off, to the fouling of any stream into which it may run.

Vast quantities of refuse are piled upon the banks of the streams, with the obvious purpose of getting rid of it during floods, and thus rivers are silted up and caused to overflow their banks, grievously injuring the neighbouring meadows by covering them with coal dust, which kills the grass. Streams are also sometimes seriously polluted by arsenic derived from the pyrites of the coal.

2. *Pollution by Iron Mines.*—In iron mining there are no operations requiring the use of water. The ore is sold as it is raised from the pit, but the water discharged from the mines is usually contaminated by the trampling of the men in the passages underground. The pollution of water by iron mining arises therefore almost exclusively from matter in suspension, and as the suspended material is chiefly peroxide of iron, and not in any way injurious to health, this form of river pollution may be regarded as of comparatively little importance.

3. *Pollution by Lead, Copper, Zinc, and Arsenic Mines.*—Of all forms of mining industry carried on in this country, lead mining is the one which causes the most serious pollution of rivers. This arises not only from the essentially poisonous character of the ores themselves, but also, and chiefly, from the elaborate treatment, involving the use of large volumes of water, which these ores require before they are ready for the market. The lead ore raised from British mines is almost exclusively galena (sulphuret of lead).

Lead	86·6
Sulphur	13·4
	100·0

With the exception of the mines of Leadhills in Scotland, where a considerable proportion of the ore is phosphate of lead, all the lead mines visited yield only galena. In several of these mines, however, the occurrence of small quantities of carbonate of lead was noticed, which, being a virulent poison and not capable of profitable extraction for the market, plays, in all probability, a conspicuous part in the injury to cattle which is alleged to arise on the banks of streams polluted by the waste from lead mines.

Galena is met with in masses or nests, which are sometimes lenticular and sometimes nearly globular in shape; it also occurs still more frequently in lodes or veins. In almost all cases it is found deposited upon or embedded in a crystalline matrix, which usually consists of quartz, fluor spar, sulphate of baryta, or more rarely, carbonate of baryta. The galena and its crystalline matrix are found chiefly in the most ancient stratified rocks of the transition series. The proportion of lead ore in the crystalline matrix, as well as the comparative amount of metalliferous material to waste rock, varies excessively in different mines, and not unfrequently exercises an important influence upon the comparative pollution of the neighbouring streams, by producing in some cases but a small proportion, in others a very large one, of waste material per ton of ore.

The orey stuff is first sorted by hand into waste rock and useful lumps, the latter are then crushed either by chilled iron rollers or stamps. The next operation is technically known as "jigging;" it is performed by putting the crushed ore into horizontal sieves, which are then lowered into troughs of water and subjected to sudden jerks, communicated to them either by machinery or by levers worked by hand. The effect of these sudden movements is the subsidence of the galena to the bottom of the mass, and the accumulation of the rocky matrix near the surface; the latter, termed "skimpings," is removed by scrapers, and is sometimes deposited in heaps which attain a vast size; too frequently, however, the skimpings are tipped into the nearest stream.

The process of jigging is rarely successful in extracting the whole of the ore from the rocky matrix; indeed, where the operation is carelessly performed, or where the ore is disseminated in small particles throughout the mass of the rock, a very large proportion of ore is wasted. Such metalliferous skimpings usually find their way into the nearest watercourse, whence they are carried down the river, causing great destruction to fish and to poultry. In some cases, however, it is the practice to preserve skimpings, as far as practicable, from being carried away by rivers; and there can be no doubt that this consideration for the riparian proprietors below will receive its merited reward, since such skimpings, containing as little as 1¼ per cent. of galena, are now being profitably worked over again at the Wheal Wray mine, near Liskeard, in Cornwall.

The lower portion of the contents of the jigger sieve consists chiefly or entirely of galena, which is sometimes sufficiently pure for the market; more frequently, however, it requires to be again crushed or stamped, after which it is washed upon a slightly inclined plane; the heavy galena is left upon the plane, whilst the rocky matter, which is now reduced to the condition of mud, is carried along by the water to settling pits, where the coarser and more metalliferous portions are deposited, whilst the finer matters, which frequently contain, in addition to galena, carbonate of lead and blende or sulphuret of zinc, are allowed to escape into the nearest watercourse. The mud collected in the settling pits, technically called "slime pits," contains sufficient galena to render the further operations upon it remunerative. It is mixed with water so as to make it capable of flowing upon certain machines termed "buddles," the construction of which varies at different mines. The principle is, however, the same in all: the creamy mud is received upon a slightly inclined plane, which is sometimes stationary and sometimes revolving: here it is subjected to a comparatively sluggish stream of water, by which a more or less complete separation of the heavy galena from the lighter mud is effected. The latter is in some instances again run into slime pits to be once more "buddled," but more frequently it is allowed to flow directly into the next watercourse, although it often contains a large per-centage of galena. Such mud is distributed over the riverside land in time of flood, producing much mischief, if not absolute ruin, to the herbage, and occasionally poisoning cattle, if the latter be turned to graze upon the recently flooded lands.

In addition to galena, lead mines not unfrequently yield blende or sulphuret of zinc, copper pyrites, which is a double sulphuret of iron and copper, and mundic or arsenical pyrites, a compound of iron, arsenic, and sulphur. Of these, the first and last are not unfrequently disregarded by the miner; the blende being washed away with the waste slimes from the buddles, and the mundic being either thrown into the nearest watercourse or stacked in immense heaps, where by its gradual decomposition it yields, after rain, an arsenical drainage. Both blende and mundic contribute, therefore, in an important degree to river pollution; but copper pyrites is too valuable to be thus wasted, and its specific gravity is too low to allow of its being separated from its rocky matrix by washing. It is, therefore, picked out by hand, and does not, after its removal from the mine, pollute running water. Copper pyrites is, however, subject to slow oxidation by which some of it is converted, in the mine, into the sulphates of copper and iron which dissolve in the underground waters and reach the surface by pumps or adits. But even in this case the copper is only rarely allowed to escape into rivers, being precipitated by scraps of old iron.

At the Devon Great Consols the water pumped from the mine contains, besides arsenious acid and sulphate of iron, a proportion of sulphate of copper so considerable as to render the extraction of the metal remunerative. The water is first filtered through sand, by which an ochreous deposit, consisting of basic suphate of iron, is separated. The filtered water is then brought into intimate and prolonged contact with refuse scraps of iron. The copper in the sulphate of copper thus becomes replaced by iron, but the contact with scrap iron requires frequent repetition before the last traces of copper are removed from solution. By this method copper in a pulverulent or spongy condition, and of a high degree of purity, is obtained, whilst the polluting character of the mine water is very greatly mitigated The effluent water from this mine was reasonably free from all objectionable matter, except arsenic. Although the drainage is not discharged directly into the river, but is first mixed with a very large volume of water, the actual discharge from this mine into the *Tamar* was found to contain no less than ·6 part of arsenic in 100,000 parts of water, the standard of the commission permitting only ·05 part in 100,000 parts of water. The mundic or arsenical pyrites is utilized for the manufacture of arsenious acid. It is roasted in a current of air, and converted into marketable arsenious acid or white arsenic, of which, at the time of the visit of the Commission, as much as 165 tons, sometimes rising to 200 tons per month, was being sold. It is a startling reflection that, even at the lower rate of sale, there leaves this single mine every month an amount of white arsenic competent to destroy the lives of more than 500,000,000 of human beings. Stored in its warehouses, ready packed for sale, was seen a quantity of white arsenic, probably sufficient to destroy every living animal upon the face of the earth. It is, perhaps, still more startling to reflect that there is at present no efficient law to prevent many fold this amount of this deadly material from being cast monthly into the rivers and watercourses of this country; not, it is true, to expend its poisonous energy at once, for the mundic is insoluble in water, but, by its slow decomposition, to render rivers so treated poisonous and uninhabitable by fish for many generations.

4. *Pollution by Tin Mines.*—Tin occurs in nature both as sulphuret and oxide, but it is the latter one only, commonly called "tin stone," which interests the miner. This tin stone is hard, and nearly seven times as heavy as water. In colour it varies from grey to yellow, red, brown, and black. The Cornish ore occurs sometimes in veins or nodular masses, and sometimes disseminated throughout porphyritic rock or alluvial deposits. It is frequently associated with a large amount of friable peroxide of iron, which communicates to the effluent water from the dressing floors a dark red tint. Copper pyrites is often found along with tin in the same mine, the copper being usually nearer to and the tin further from the surface. It is, therefore, no uncommon thing for a Cornish copper mine to be gradually transformed into a tin mine, to the great enrichment of the adventurers.

The treatment of the tin ore varies at different mines, but the principle employed is the same in all; the tin stone with more or less of its rocky matrix is stamped in water to fine powder under large wooden pestles shod with iron; and the tin stone is then separated from the refuse slime by the action of water upon the mixed materials which possess widely divergent specific gravities. The effluent water from tin mines is polluting only by reason of matters in suspension. Amongst numerous samples analysed there was not one which even approached the transgression of any of the Commission's proposed standards relating to dissolved matters; indeed in most cases, mere subsidence leaves the supernatant water much purer than the average of potable water supplied to towns, the only objectionable constituent in solution being arsenic, which is present, however, in but very small proportion. On the other hand, these waters grievously pollute and silt up the rivers into which they flow, by the suspended matters contained in them. Each 1,000,000 gallons of water issuing from the Dolcoath mine, for instance, carries with it more than 80 tons of suspended rubbish, 200 lbs. of which are metallic arsenic, equivalent to 264 lbs. of white arsenic. Nearly the whole of this suspended matter is easily deposited when the water is quiescent. None of the samples contained copper in solution or exhibited any marked acidity.

5. *Pollution by Manganese Mines.*—Peroxide of manganese is an important mineral used in alkali works for the manufacture of chloride of lime. It is rarely met with, however, in this country, and only one instance of river pollution arising from mines of this description is mentioned. At Chillaton near Tavistock, peroxide of manganese is found in large bunches in a siliceous and ferruginous rock known by the name of "capel." The ore on being brought to the surface is washed and sometimes crushed. There is a small quantity of ochre associated with the ore which imparts a strong pink tint to the water issuing from the washing apparatus. The crushed peroxide of manganese is retained in catchpits, but the pink ochre, crushed siliceous matrix, and a considerable amount of the manganese ore find their way into a stream which, after a run of about five miles, joins the Tamar.

An unpolluted upland stream enters the mine and is used partly for power and partly for washing. It leaves the washing floors badly polluted with suspended matter, and contains also a small proportion of arsenic in solution. In the bed of the stream a considerable amount of mud is deposited. A sample of this mud contained 52·94 per cent. of siliceous rock insoluble in acids, 16·16 per cent. of peroxide of manganese, and a trace of tin. It can scarcely be doubted that so considerable a proportion of peroxide of manganese, worth about £6 per ton, would repay the expense of more elaborate subsidence than that employed at this mine.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, JANUARY 30, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

IRREGULAR MEDICAL PRACTICE.

ONLY a few weeks ago we ventured to congratulate our readers that there were indications of a healthy advance in opinion respecting the line of demarcation which should divide the doctor and the druggist. It is, therefore, with very much regret that, after so short an interval, we record this week a case in which that line has been ignored and overstepped, and the regret is enhanced by the fact that the person whose conduct is challenged is a registered chemist and druggist.

The main portion of the evidence given during the two days' inquest at Redruth, briefly reported at p. 617, was intended to clear up the points whether a club doctor, who found unexpectedly that his instructions respecting the treatment of a patient were being set aside in favour of those of another person, was justified in retiring from the case, and whether the treatment of either or both prescribers contributed towards the death of that patient. Neither the question of etiquette nor that of practice can be discussed in these pages; on neither do we assume to offer an opinion. When such disputes arise medical gentlemen have their own tribunals to which they can carry their grievances, and the freedom with which they have recourse to them seems to imply that they find them sufficient. But we remain quite within our province when we express an opinion—and that a very decided one—that the second person called in had no right to meddle with the case at all. For the fact that Dr. ROWE's name does not occur on the Medical Register, and does occur on the Register of Chemists and Druggists, warrants us in inferring that he possesses no legal qualification for carrying on medical practice in Great Britain. In our opinion, therefore, the—in this respect—minor question as to whether Dr. ROWE had a right, without consultation, to alter the treatment of the medical man originally in charge of the case, is decided by the more comprehensive fact that he did wrongly in interfering and prescribing in the case at all. And we quite agree with Mr. HITCHEN in the surprise that Dr. ROWE should take such a case, since he was not legally qualified to treat it.

Of course we are aware that it does not fall to the lot of pharmacists to carry out the provisions of the Medical Act, notwithstanding that this has been roundly asserted on at least one occasion in a medical journal. If the Medical Council feel unable or unwilling to enforce the penal sections the Act in this respect must remain a dead letter. But there can be little doubt that the true interest of the pharmaceutical body will be promoted by every individual member of it acting as far as possible in accordance with the spirit of that Act, and refraining from trespassing upon the ground sacred to medical men. And it is in this that we find our justification for condemning the conduct of Dr. ROWE, that he has acted antagonistically to the welfare of the body of which he is a member.

There is another occasion for regret in connection with this case, which may however be due to the officiousness or ignorance of a reporter. In one newspaper report which has reached us the words "Member of the Pharmaceutical Society" are appended to Dr. ROWE's name in a manner very suggestive of the title being intended to do duty in the absence of a medical qualification. For the reason before given, that it was possibly the result of an accident, we refrain from saying more than that the introduction of the title was most inopportune; for although Dr. ROWE is at present a Member of the Pharmaceutical Society, nothing could be more opposed to the policy hitherto advocated by the Society than his conduct as described in the evidence given at the inquest on JAMES CARKEEK.

TAXES ON PHARMACEUTICAL SPECIALITIES

HOW to impose taxes in a manner that shall be least irritable to the taxed is a study that has been carried to great perfection by British financiers, but they have hardly yet arrived at the pitch of consulting their intended victims as to the most agreeable way of conducting the operation. In France, however, several propositions having been submitted to the National Assembly for the imposition of a tax upon pharmaceutical specialities and new and special remedies, the Government, in August last, applied to the Academy of Medicine, in which pharmacists are well represented, for assistance in framing a definition of such articles that would be satisfactory. The subject was entrusted by the Academy to the consideration of a Committee which has recently issued its Report.

The first and main difficulty encountered by the Committee lay in the great variety of articles that might be denominated pharmaceutical specialities or special remedies, ranging from an ordinary article of the Pharmacopœia, the preparation of which has become a special feature of a particular house, to articles of food recommended for remedial properties. But the Committee came to the conclusion that although many specialities have their origin in a desire to perfect the art of pharmacy, it is characteristic of them all that their preparation is carried on for the purposes of profit. Deploring that at the present these special medicines nearly everywhere take the place of normal medicine, and recognizing that this result has been brought about mainly by advertising, the Committee chose advertising as the distinguishing mark which would best indicate the taxable article.

But there are advertisings and advertisings, and although the puff direct would be easily recognized, the puff oblique might give rise to greater difficulties. The Committee evidently feared that an obtuse officer of revenue might fail to discriminate between the puff contained in the newspaper or handbill and that uttered in the course of scientific discussions, even such as might take place within the Academy walls. It therefore recommends that the latter class of advertisements should be specially exempted, but that, with this exception, all medicines advertised in the journals, by handbills, or circulars, or by any other method of giving them publicity, and all substances, however prepared, or of whatever composed, which are so advertised to possess medical properties, should be deemed pharmaceutical specialities, and liable to the tax.

Even after five months' labour the Committee has failed to obtain perfect acquiescence in its conclusions; for, although the report was adopted by the Academy of Medicine, it has been sharply criticized by pharmacists outside. A writer in the *Répertoire de Pharmacie* suggests that the Committee having recognized the difficulties of its task, might have gone a little further with advantage and pronounced it impracticable. He also points out that the quotation of such an article as cod-liver oil in an ordinary trade list would bring it within the Committee's elastic definition of being advertised. On the other hand, it is asserted that a considerable trade might be carried on in an article that would otherwise be fairly deemed a pharmaceutical speciality without bringing it within the proposed definition, provided that the advertising be limited to the form of scientific memoirs and discussions, and the reports of them.

There appears to be some plausibility in these objections; but it may be that the French Government will consider them to be but manifestations of "ignorant impatience of taxation" of any kind whatever. It is rather curious that, judging from a statement made at the last meeting of the Philadelphia College of Pharmacy, some of our American brethren are giving vent to a similar outburst of impatience, the provocation in their case being the conduct of the Excise officers in rummaging their stores in search of unstamped "patent medicines."

THE "MORNING TONIC" CASE.

It is stated that the magistrate will not give his decision in the case of the prosecution at Hull of a Chemist and Druggist for the sale of "Morning Tonic," until the 2nd of February.

At the next Evening Meeting of the Pharmaceutical Society, which will be held on Wednesday, February 3, Mr. F. Sutton will bring forward the subject of the Construction of an International Pharmacopœia. There will also be a paper read on a New Variety of Senna, by Mr. E. M. Holmes. The Chair will be taken at half-past Eight precisely.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The annual entertainment was held on Friday, January 15th, 1875. There was a crowded meeting, and a good programme of readings, songs, and recitations, rendered the evening a very enjoyable one. Mr. Hester presided, and was supported by Messrs. Masters and Druce; the vice-chair being occupied by Mr. Osborne, supported by Mr. Wallis.

A special meeting of this Association was held on January 22nd, 1875. Mr. Hester presided. Mr. Druce (the Secretary), after reading the minutes of previous meetings, said that Mr. Sutton had sent the Association a quantity of prescriptions, and that in answer to their appeal a fair number of chemists in the town had become honorary members. He was very pleased to add that two of them had promised to read papers before the Association shortly.

Mr. Hester thought that the meeting should pass a vote of thanks to those chemists who had joined as honorary members, and the motion having been proved by Mr. Kemp, and seconded by Mr. Wallis, was unanimously carried.

Mr. Druce then read a paper on the English Cruciferæ, first describing the characteristics of plants of the order, dwelling particularly upon the uses they were put to, and their general wholesomeness. He then proceeded to show specimens of the greater portion of the order, describing their uses, the effects of cultivation upon them, their habitat, and other points of interest; as, for instance, the erratic occurrence of *Sisymbrium sophia*, which in 1873 he could not find in Northamptonshire; but in 1874 he found it not uncommonly in places as far distant as Daston and Higham Ferrers, Rothersthorpe and Brampton. *Brassica oleracea*, the origin of cultivated cabbage, cauliflowers, brocoli, etc., had been cultivated from very remote antiquity, the Greek poet attributing its origin to the circumstance that Zeus being troubled one day in an attempt to reconcile two conflicting oracles, perspired, the cabbage growing from that perspiration. The cabbage was probably first grown in England by the Saxons, who were so fond of it that they called February "Sprout Kale." The preparation of saurkraut in Germany was then described, and the peculiar growth of kohl rabbi, and the enormous size of the Jersey cow cabbage noticed. The mustards, *Sinapis alba* and *S. nigra*, with their principles, having been touched upon, Mr. Druce alluded to the falling away of the parenchyma in the leaves of the horseradish when young on dry soils, and the establishment for the last few years upon the Nene banks of *Lepidium draba*. He concluded his paper by saying that out of the 1600 species included in the order, some 60 or 70 of the Cruciferæ were found in England, and of these, perhaps, a dozen had been added to our Flora by long cultivation for food, ornament, or medicine. The order was not generally a favourite one, as with few exceptions the plants were not distinguished by striking beauty or odour; but to the pharmacist it could not fail to be interesting and suggestive. The formation of oil of mustard, the composition of oil of horseradish, the occurrence of iodine in water-cress, the colour in woad, the trimethylamine smell of *Brassica incana*, the seed coats of *Sinapis*, the geographical distribution of *Hutchinsia petrea*, the bulb-producing growth of *Dentaria*, were subjects which would take up much time before their wonders were exhausted.

After the usual vote of thanks the meeting adjourned.

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

The fifth general meeting of the session was held on the 20th January. Mr. John Currie, President, presided. In the course of the usual preliminary business donations were announced from The Glasgow Apothecaries' Company and Messrs. Frazer and Green, W. and R. Hatrick and Company, James Taylor, etc.; and several new members were enrolled. Arrangements were also completed for the annual festival (supper and ball), which will take place on the 3rd February.

Dr. Campbell Black was the lecturer of the evening, who chose for his subject, "Some Aspects of the Glasgow Medical Charities." Dr. Black reviewed, in a racy and interesting manner, the institution and progress of the various charitable dispensaries and infirmaries connected with the city, and pointed out what he considered some of the circumstances connected with them, more especially as affecting the retail drug trade. The address was listened to with attention, and at the close, on the motion of the chairman, Dr. Black was awarded a hearty vote of thanks. It is understood that Dr. Black leaves Glasgow for London very shortly.

Mr. Paul's motion for the admission of lady chemists and druggists as members of the Association, was lost by a large majority.

The Secretary (Mr. Fairlie) intimated the result of the special meeting of the trade on the question of prices and examinations. The price list committee were instructed to confer with the Edinburgh committee, and a committee was also appointed to draw up a memorial to the Council of the Pharmaceutical Society, drawing attention to the examination question.

BRIGHTON ASSOCIATION OF PHARMACY.

At an ordinary meeting of the above Association, held on Friday evening, the 22nd inst., W. D. Savage, Esq., J.P., in the chair, that gentlemen read the following paper:—

"At the opening of a session it has been usual to commence with a review of the work done in the past, and, when circumstances permit, to foreshadow the future; but on the present occasion a supper inaugurated the session, and except that some kind friends have promised to read papers, we have no systematic teaching or lectures to anticipate; the few assistants and apprentices in the town that can avail themselves of any aid the Association might render are insufficient to justify any great outlay. It seems to be a complaint general throughout the country that such associations are not, as a rule, prosperous. Some noteworthy exceptions do occur, where local talent and energy combine to ensure success; but, as a rule, after a few years of struggle such efforts as most towns can command become exhausted through want of time or appreciation by the young men, and die out. Several circumstances combine to produce such results. It may be that the young men will not unite to make efforts for themselves; but rather trust to a few of their employers to initiate and carry forward any movement, although it must, in the nature of it, be more for their advantage than it can possibly be for the masters'. Judging from past experience, the young men who have succeeded in passing their own examination, and are therefore most capable of conveying practical information to those who look forward anxiously to pass the minor and major, do not put in an appearance at our meetings. This is much to be regretted, but it is none the less true. Moreover, it happens in some cases that as the principals take an active part the assistants cannot leave business during their absence. In the new order of things it was only reasonable to expect a great effort would be made to meet the educational requirements of the Council, but I am afraid that some are calculating on spasmodic efforts for six weeks or two months in London, instead of the steady acquisition of knowledge so essential for permanent success. The Council of the Pharmaceutical Society are most willing to help all local associations that are capable of giving evidence of vitality and which show their anxiety by practical work to help themselves.

"Having said thus much as preliminary, I will now endeavour to interest my young friends at least in the following remarks in connection with the *Pharmacopœia*. In Nuremberg a young student, named Valerius Cordus, whilst on a short visit showed the results of his assiduity by producing a collection of medical recipes, which he had carefully collected from the works of the most eminent writers. The physicians of the city were so struck with the value of the selection that they urged him to print it for the benefit of the apothecaries, and having obtained for his work the sanction of the Senatus, the first known Pharmacopœia was published at Nuremberg in 1542. Previous to the publication of a Pharmacopœia, we are told that Avicenna and Serapion's work on 'Simples,' the 'Liber Servitoris,' the 'Antidotarum,' and similar works by different authors, arranged alphabetically, furnished such general information as could be obtained bearing on Pharmacy, or, as its name implies, 'Drugs.' In the early days of pharmacy, there were so many strange combinations of snails, woodlice, frogs, toads, puppy dogs, foxes, etc., etc., that the term pharmacy as now understood would scarcely apply; for in a comprehensive sense it means the department of natural science which treats of the collection, preparation, and preservation of medicines, and also the art of dispensing them according to the Pharmacopœia and the prescription of medical practitioners. In other words, 'Pharmaceutical Chemistry' and the Pharmacopœia consist of the materia medica, simple or compound, with characters and the tests for the determination of purity, together with directions for preparing articles of the materia medica and chemical compounds in accordance with approved prescriptions. Bearing in mind these characteristics, all civilised nations have national Pharmacopœias; those of the United States, France, and Germany are best known to us. In tracing the progress of pharmacy, we find that seventy-six years intervened between the date of the appearance of the Nuremberg Pharmacopœia and that of the first English one in 1618. We must not lose sight of the remarkable changes that have been effected since then by railways and the telegraph, which have brought nations into as near proximity now as Brighton was in those days to the metropolis. Subsequently we find that the next English Pharmacopœia followed in 1627, or nine years after; another edition followed in 1635, or eight years after; another in 1650; and then there was an interval of 27 years, or until 1697; then 24 years, to 1721; then another 25 years, to 1746. Then followed the longest interval, being 41 years, which brought the date up to 1787; then 22 years, to 1809. From this date shorter periods intervened; 1824, 1836, 1851, 1864, and 1867. So that if we compute the 14 editions in 249 years, we shall find an average of 18 years or nearly so (17y. $9\frac{6}{14}$m.) intervening betwixt each publication.

"It is not my intention to take a review of the different editions of the Pharmacopœia; it would occupy much more space and time than I can afford to give, at the same time would scarcely repay for the trouble. However, I shall make some selections so that we may be enabled to judge of the progress that has been made from time to time.

"In the first edition of 1618, after the introduction, follows an address to the candid reader, and a *brief* of His Majesty (James I.), assuring him (as all subsequent editions do) of the care and industry of the College of Physicians in compiling the work—that it is now perfect and will greatly tend to the public good. It requires that the apothecaries, to whom the book is addressed, shall in future abolish all uncertainty; that all medicines and medicinal receipts, the distillation of all waters and oils, and other extractions, be prepared according to the said book and according to the weights and measures that are or shall be therein limited, and not otherwise, under pain of the royal displeasure and the incurring of such penalties and punishment as may be inflicted for contempt of royal authority; and all majors, sheriffs, justices of the peace, constables, etc., are required to aid and assist in carrying out the law. Then follows the special privilege of printing and publishing the Pharmacopœia to John Marriot, of London. Any offender against this law was to pay a penalty of £5. Then follow the weights—of grains, scruples, drachms, ounces, and pounds (of course 12 oz.). Amongst the measures, a spoonful of syrup was to be ½ oz.; whilst the same quantity of water is ʒiij; a glass or cup, 1½ oz. Then comes *Hemina* ℥ix, or ¾ of a pint, a lb., and a sextarius or double heminos, ℥xviij. Then the gallon, or six sextarii, or 12 oz. short of our present gallon. In the order of publication follow a catalogue of simples, embracing 146 roots, 33 barks, 14 woods, 287 herbs, 81 flowers, 212 fruits and seeds, gums, juices, plants, animals, etc., etc., and it is curious to see the arrangement. For instance: five flowers, cordials; five herbs, emollient; four seeds, carminative, etc., etc. There are no less than 180 distilled waters, besides 26 compound waters with more or less spirit. A remarkable contrast is presented on endeavouring to compare the first Pharmacopœia with the last, and the most striking peculiarity will be observed in preparing 'the simples,' as the materia medica of 250 years ago was called. There were then no less than 62 syrups, and whilst some of the names are now familiar with us, the mode of preparation was very different. For instance: there was syrupus è papavere, minus compositus, which, besides the capsules of the black and white poppy, contained seminum lactucæ, and flor. violæ. Again, the same capsules, with maidenhair, liquorice, mallow, and quince seeds, formed the papavere magis compositus. Syr. papav. erratico was recent red poppies, lbiij; water, lbiv: sugar, lbiij. There was a syrup of roses and another of violets; also simple oxymel and oxymel of squills, differing in no essential from our present preparations. Syrupus augustanus vel de rhabarbaro was anything but rhubarb, there being besides a little rhubarb fifteen other articles in it. After these follow six robs, or inspissated juices with sugar, some lohochs—a preparation, as its name implies, to be licked up; 61 condita, or preserves; 53 conserves; some aromatic powders for electuaries. Amongst the powders I find pulvis ad scabiem, and it is satisfactory to find that amongst other things, our present useful friends, sulphur, nitre, and hellebore had a prominent place. A compound powder of senna, cream of tartar, cloves, cinnamon, etc., etc., was called pulvis sanctus, and pulvis sennæ was senna, cream of tartar, mace, ginger, etc. Electuaria are numerous. Lenitive electuary appears four times with different ingredients, amongst which are senna, rhubarb, rasins, and tamarinds. But amongst the preparations with sugar, honey, or treacle, is one extraordinary compound called 'antidotus magna,' with something like *one hundred and fifty simples,* a rival to the well-known 'mithridate.' Such a compound would, if placed on the examiners' table in Bloomsbury Square, puzzle the examiners as well as the examined. Hiera picra, of two hundred and fifty years ago, was composed of cinnamon, wood aloes, mastic, saffron, etc., but was in the form of an electuary. Amongst the surviving names of pills are —aloes and mastic, rhubarb, pil cochiæ, and assafœtida; but in no single instance the same as now. Take, for instance, the pilulæ de rhabarbaro: rhuharb, liquorice, mastic, hiera picra, etc., etc. Another peculiarity amongst the pills is 'laudanum,' containing ext. opii, castor, croci, etc., etc. So that the poor, asking as they sometimes do for liquid laudanum, are not so absurd as we sometimes think.

"There were only three preparations with white wine, viz., wormwood, antimony, and squills. With white wine vinegar there were six, the acet. destil. and acet. scillæ being amongst the number. There are nine recipes for decoctions, one of which is for decoc. sennæ, containing, besides senna and ginger, eight other articles, and one curious compound called 'lac vergineum,' consisting of crude alum, lytharge, and wine vinegar. Amongst the forty varieties of troches is a curious one, 'trochisci de vipera,' and the better to understand the value then supposed to be in the viper, Mr. J. Miller, in his new course of chemistry (1753), describes the method of distinguishing the true viper from the common snakes, and adds, 'We generally meet with the vipers skinned, gutted and dried; but the people who sell them are apt to mix snakes of the common kind among them; it is best to buy them alive, and see them skinned and prepared for drying at home.' Just imagine a pharmaceutical chemist receiving from the country a few of these venomous reptiles to skin for a strumous patient, as per ℞. The number of expressed oils from seeds is much more in agreement with what we now have than anything else, although of course there are many others that we know not now. There were other oils made from infusions and decoctions, but these for the most were from such vegetables as did not readily part with their oils, being first infused and then subject to the action of fire on an alembic. Sometimes we are told that it was necessary to add sea-salt, or even its acid spirit. In some preparations fixed oils were added to vegetables and pressed out. A simple oil of scorpions was, thirty scorpions to lbij, bitter oil of almonds. Amongst the recipes for compound oils is 'the blessed oil,' another the oil of Exeter, and also one of foxes. In the order of arrangement follow, ointments, plaisters, and cerates. Amongst the ointments are unguentum basilicon, majus and minus, with forty-five others. Thirty-eight plaisters then follow. Amongst them is the old well-known oxycrocium, a very different thing, however, from what some of us may recollect under that name. The succeeding pages of this Pharmacopœia of 1618 are occupied with some chemical oils and other great chemical preparations of iron, cream of tartar, antimonials, etc., etc. One cannot help being struck with the absence of *all* tinctures, with the old preparations, and the great complexity of what were called simples, which in the form of infusions and syrups were not always made with water, but sometimes contained white wine. There were no extracts at all analogous to what we now have; indeed I think we must all confess that there has been progressive improvements in Pharmacopœias, not only in their arrangements but in the definite character of the different preparations.

"As I have said before, I shall not attempt to review the successive editions of the Pharmacopœia; it would occupy too much time, and would scarcely repay the effort. However, it may perhaps be as well to show the progress made so early as thirty-two years after the first edition, passing two intermediate editions. Let us just glance at the one of 1650, as given in a copy of 1668. I find seven spirituous preparations and *ten* tinctures in the former; the only *name* familiar to us is sp. lavend. co., a very different compound, however, for besides lavender and santalum rubrum, it contains thirty other articles, some of which are now unknown in medicine. As it may be interesting I will give the names of the tinctures then ordered:—they were castor, celandine, saffron, strawberry, east arrow (*ononis*), sun-dew (*rosa solis*), water germander (*scordium*), treacle and verdigris. As you will perceive, only two, castor and saffron, are well known to us. The others like these are not simple tinctures, but are compounds supposed to have analogous effects, although in the case of the treacle I cannot trace any likeness. Besides treacle and other things, there is mithridatium, an article with forty-eight constituents. I should remark, by the way, that the 1618 Pharmacopœia is a large book, 12 in. by 7½ in., whilst the 1650 is a small pocket edition of 5 in. by 3¼ in.

"Again I will ask you to pass over a period of one hundred and fifty years, and consider with me the textbook of our trade one hundred years ago. It is more than that time, but, as in 1864, we enter upon a new era when the British Pharmacopœia was produced, it will be well to consider the editions of 1747 and 1787 as compared with 1851. The pretty pocket edition still continues, and presents a remarkable progress. The weights and measures are the same. The simple extracts are 12 altogether: 7 of them will be found in the Pharmacopœia of 1851, viz., gentian, liquorice, jalap, logwood, cucumber, bark and chamomiles. The only compound extract, extract of coloc. co., is essentially the same as now. The mineral dilute acids are recognized, and the alkalis (kali and natron), and the preparations of sulphur, antimony, iron, mercury, lead and tin; then follow distilled waters and no less than 17 spirits. The decoctions, of which there are 11, contain hartshorn, one for enemas, and one of mallows and chamomiles for fomentations. The mucilages are starch, gum and quince. The infusions are gentian, senna and roses. The wines are aloes, antimony, iron, ipecacuanha and rhubarb. Perhaps the most important progress after all is manifested in the tinctures, 37 in all; 33 of which re-appear in 1851. The 4 omitted are tinct. bals. peruv., tinct. rhei sx., galbani and savine co. It is somewhat remarkable that the Inland Revenue should now for the first time pounce upon one of our trade for selling bitters, simply because they are called 'morning tonic,' when I find that in 1747 tinct. amara was composed of gentian, orange-peel, cardamoms and proof spirit; and for 127 years this compound, or one very similar, has been sold without let or hindrance. It seems strange that the susceptibilities of the Excise should be so unexpectedly aroused, but I hope only to subside, with a conviction that the proper province of the druggist is the sale of tonics, and if any have infringed the rules of trade it is surely the publican, who takes such a portion of our trade, legitimately our inheritance. When the apothecaries in 1624 were accused by the grocers of usurping their trade by buying and selling all drugs and distilled waters (spirits), King James said, '*I do allow it*, that the grocers are only merchants and unskilled;' so I think the 'King Public' might now say the publicans are unskilled, whilst the chemists have the requisite knowledge: and at any rate I do trust that we shall all, as far as we can, avoid infringing the law. I must apologise for this digression. In the so-called mixtures were camphor, chalk, and musk, with milk of almonds and ammoniacum; musk is the only one withdrawn. Of fifteen syrups, three only are left out, viz., cloves, black currant, and raspberry. Out of nineteen formulæ for powders, eight only survive: pulv. aloes co., pulv. antimonialis, pulv. cretæ compositus, pulv. cretæ opio, pulv. ipecac. co., pulv. scammonii co., and pulv. tragacanth co. Of six recipes for pills, four only are retained, aloes, aloes and myrrh, blue pill, and squill. Amongst the curiosities of the London and Edinburgh Pharmacopœias of that time may be mentioned, crabs' claws (*chilæ cancrorum*), literally, the black tips of the common great sea crab; then follows crabs' eyes (*oculi cancrorum*). How they could have obtained that name seems a mystery, for they are said to be concretions (like small stones), found in the stomach of the cray fish, and as counterfeits, made of pipe-clay and chalk, were sometimes substituted, a means of testing them is supplied; for whilst vinegar or the stronger acids diluted, will entirely destroy the spurious articles, the genuine remain unaltered in shape, but become soft and transparent. They formed the basis of a powder as well as a lozenge. Another article of the Pharmacopœias of London and Edinburgh was millipedæ, *alias* wood lice, hog lice, slaters, once highly commended for suppression of urine, obstructions of the bowels, jaundice, etc. Millar says they are best prepared for medicinal use by being held over the steam of hot spirits of wine. One more illustration: bezoar, another of these animal concretions from the goat family. There were two kinds, *oriental* and *occidental*, the first was of the greatest value, and came from the East Indies; the Arabians considered it effective against poisons (alexipharmic), others as a sudorific, but as it was insoluble in the gastric juice we may safely question its virtues. Before leaving this subject I must advert to one other article, because it is sometimes met with in old works, and it is well to know what kermes, London and Edinburgh, is. My notion was that it was a metal, and to a certain extent I should be right, but the kermes of the Materia Medica of 1747 was a round grain about the size of a pea, which was found in Spain, Italy, and south of France, adhering to the branches of a tree, and full, when fresh, of small reddish ovula, or animalcules, of which they were the nidus. To preserve them, vinegar was sprinkled over them to prevent the exclusion of the ova and to kill such of the animals as were already hatched, otherwise the change into a winged insect would leave the grain an empty husk. Pills composed of kermes, etc., are said by Geoffroy to prevent miscarriage and to make a joyful mother. But I must now bid adieu to ancient pharmacy, and consider briefly the most important epoch in our pharmaceutical history. The difficulties which dispensers had up to this period to contend with were mainly due to the different Pharmacopœias of the London, Edinburgh, and Dublin Universities. To obviate this difficulty the Medical Act of 1858 was obtained, and eight English, five Scotch, and five Irish physicians, together with six nominated by the Privy Council, constituted the first executive of the British Pharmacopœia of 1864. To alter and assimilate the different preparations of the different countries was a task of considerable difficulty, involving much time and great labour, and when finished it was by no means perfect. The change from the troy to the avoirdupois weight occasioned much difficulty, as the ʒj and ℈j were abandoned—so that the lb., oz. and gr. were the only recognized weights. Although the symbols for measure were plain and distinct, as fld-oz., fld-dr., etc., few could be induced to adopt them. Who cared to represent half an oz. as $218\frac{1}{2}$ grs? The change was not an improvement. Amongst the chemical nomenclature we have our old friend calomel as hydrargyri subchloridum (1750, mercurius sublimatum dulcis), whilst its dangerous relation, sublimate, is called hydrargyri corrosivum sublimatum (1750, mercurius sublimatum corrosivum). These changes perplex, and are at all times unsatisfactory. As our chemical knowledge is constantly altering it is far better to have a definite fixed name than such frequent alterations. As the result of the joint labours, of the *excluded* articles 72 were from the E. P., 46 from the L. P., and 36 from the D. P. Comparing the B. P. with the L. P. of 1851, 51 new organic substances were introduced. The arrangement, having the materia medica in one division, and the preparations in another, caused a good deal of dissatisfaction. In one place you look for the process, and have to refer to another for characteristics and tests. One illustration will suffice. Ammoniæ acetatis liquor, in alphabetical arrangement, is found in page 15, whilst the method of making, under the head of liquor ammoniæ acetatis is found at page 267. This first effort of the combined wisdom of the three universities was doomed to an early and unregretted end, for in the next edition of 1867 more interest was manifested in obtaining public opinion, by submitting proof impressions to those willing and able to give an opinion, so that when suggestions likely to improve the work were offered, they were adopted before the final issue, and the result has proved the wisdom of the course adopted. Valuable suggestions from Mr. D. Hanbury, Mr. Haselden and others, were not lost sight of, and with the able co-operation of Dr. Redwood in the committee, a work was produced, that, although having still some faults, we may well be proud of. Subsequently we have added to the B. P. those new and well-recognized preparations which in the progress of events must be constantly cropping up, and will have to be provided for. I will not, however, trespass much longer on your time and patience; all recent events are so well known that it would be wearisome to dwell upon them. But I must just advert to the change of names again, especially in mercurials. We have to recognize calomel as *hydrargyri subchloridum* and sublimate as *hydrargyri perchloridum*. I do hope that our familiar friends may now be permitted to enjoy their new names for a long time to come. In taking a retrospective view of the changes that have occurred, one cannot help being struck with the old and popular names that have survived so long, such as pil cochiæ, hiera picra, milk of sulphur, lenitive electuary, paregoric, etc., etc. Curious enough is a recipe for *nepenthe*. Homer's nepenthe, by which Helen diverted the melancholy of those who entertained her, must have given rise to a preparation of bugloss, saffron, opium, etc., by the which others hoped to accomplish a like object.

Mr. Savage also exhibited two copies of Pharmacopœias, one 200 and another 100 years old.

Mr. Cornish proposed, and Mr. Haddock seconded a vote of thanks to Mr. Savage for his interesting paper, with a request that it be sent to the *Pharmaceutical Journal*, which was carried unanimously.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

The third meeting of the session was held December 15th, 1874, Mr. A. P. Brown in the chair. Professor Maisch, on behalf of Messrs. Kurlbaum and Co., presented two samples of crude material from which borax is prepared: tineal, from the East Indies, which is no longer used for refining in the United States, and Hayesine, called after the mineralogist, a native borate of calcium from Peru. Professor Remington, on behalf of Messrs. Powers and Weightman, presented a basket, consisting of a beautiful crystallization of copper sulphate, coated with dammar varnish, thus protecting the salt from atmospheric influences.

Mr. A. P. Brown stated that he had found the market supply of oils of Ceylon cinnamon adulterated with oils of sassafras and cloves. Several of the members present stated that they had noticed the same adulteration.

Professor Maisch read a paper by Mr. George W. Kennedy, upon the occurrence of arbutin in *Kalmia latifolia*, an Ericaceous plant, from which the following is an extract:—

"The genus takes its name in honour of Peter Kalm, a distinguished Swedish botanist. The *Kalmia latifolia* is known by the names of calico bush, mountain laurel, and spoonwood, the latter name being given because the Indians made spoons from the wood. It is an evergreen, and is found abundantly from Maine to Ohio and Kentucky, growing on hillsides and mountains, preferring damp soil; the leaves are mostly alternate, bright green on both sides, ovate-lanceolate or elliptical, tapering to each end, and tenaceous. It grows from four to twenty feet high, its growth being influenced by the locality; on level grounds and small hills it is scarcely ever found above ten feet high, whereas in mountainous regions it grows as high as twenty feet, presenting a tree-like appearance.

"The process adopted for the extraction of arbutin was that of Kawalier, and was conducted in the following manner: Three pounds of the fresh leaves were collected by the writer and carefully dried in a room, when they were found, upon reweighing, to have lost sixty-three per cent. The dried leaves were coarsely powdered and treated with boiling water for several hours, strained and expressed, and again treated in a similar manner. The mixed decoctions were precipitated with acetate of lead and filtered, the filtrate was then submitted to the action of sulphuretted hydrogen to remove all the lead; the liquid was then again filtered and evaporated to the consistence of a soft extract. The evaporation in the first experiment was carried too far, leaving a viscid, reddish-coloured mass, in which, after standing several days, no crystals of arbutin were perceptible. Another similar experiment was made, with the exception that the liquid, after being treated with acetate of lead and sulphuretted hydrogen, was not evaporated so much; this time the arbutin separated in crystals, repeated experiments giving the same satisfactory results. A few crystals were separated from the mass to which they were adhering and dissolved in water. The solution was made alkaline by ammonia as directed by Jungmann, and phosphomolybdic acid added, when immediately the beautiful blue colour characteristic of arbutin was produced. Quite a weak infusion of *Uva ursi* was at the same time made and tested as above, which gave the same blue colour. If an impure solution is examined, which with ammonia will make an orange colour, the phosphomolybdic acid added to this will change it to a bluish green. *Kalmia latifolia* does not contain arbutin so largely as *Uva ursi*; the yield from the mountain laurel was so small that I did not separate it from the adhering mass. The process of Kawalier is certainly a very good one as to simplicity of extraction, with the exception of acetate of lead, for which the basic salt may be substituted with advantage, to separate gum and colouring principles, the presence of which will retard the crystallization of the arbutin. Besides arbutin, the presence of gum, tannin, lime and iron were noticed incidentally."

Professor Maisch remarked that this paper was of much interest, and that he had himself suggested the prevalence of arbutin in many Ericaceous plants (*Am. Jour. Phar.*, 1874, p. 314). Professor Maisch also read a paper by himself on substitutions lately found in the market of agaric and *Gossypii radicis cortex* (see page 604).

This paper was received with much interest, general surprise being expressed that the cotton-root bark of commerce was of uncertain origin.

Mr. W. H. Walling said that during a sojourn in the South he had been told by physicians that it was the root of the cotton plant they used.

Mr. R. V. Mattison said he had prepared fluid extract of gossypium, and recently, in conversation with a manufacturer of fluid extracts, was shown a large bale of cotton-root, as being probably the root bark of a *Populus*.

Mr. E. M. Boring had seen a fluid extract, light in colour, which deposited until very little was left in solution.

Professor Maisch remarked that, in going over the reports, he had found no instance in which physicians had made experiments with cotton-root bark of the true origin of which they appeared to be aware.

A paper by Mr. F. B. Power, on elaterin, was read.

Dr. Miller wished to caution against the purchase of cheap sugar-coated quinia pills. He said there were in the market 45,000 such pills which do not contain a trace of quinia. They were made from muriate of cinchonia, furnished by a New York house as sulphate of quinia to some of the makers of sugar-coated pills, and by them thrown back on the hands of the dealer upon the discovery of the fraudulent nature of the article.

Mr. Blair called attention to the construction which the Internal Revenue officers place upon the law. They claim the right to go through premises from garret to cellar, whether they have reason to believe the law relating to the stamping of articles was being evaded or not. Those who are familiar with the construction and intention of the law, are of the opinion that it did not apply to the retail apothecary, but was intended for liquor and segar manufactories. The Government officers further claim, that a refusal on the part of the apothecary to permit such domiciliary examination makes him subject to a fine of 500 dols. Where there is reason to believe the law is being violated, and the officer is refused admission, it seems but proper that he should report to his superior, and procure a special warrant to examine the premises. Another understanding is that goods exposed for sale only must be stamped. The fact that these officers have, or assume, the right to make these visits, is subjecting apothecaries to an annoyance which is unjust, and a suggestion was made that they should use their influence, individually, with their representatives in Congress to have this law repealed or modified.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture II.

The Alcohol Group of Organic Bodies—Actions of different Alcohols.

(*Concluded from page* 594.)

Action of Methylic Alcohol.

Methylic alcohol, pyroxylic spirit or wood spirit, as it has been differently called, the spirit contained in the liquid got by distilling wood, has been known for about sixty-two years. It was discovered by Mr. Philip Taylor, in 1812, and was soon applied for lamps and for other purposes as a spirit. It was probably first made commercially by Messrs. Turnbull and Ramsay, of Glasgow. Its properties were investigated and reported upon by Sir Robert Kane, of Dublin, in 1836, and it was also analysed by Messrs. Dumas and Peligot, who determined that it contained 37·5 per cent. of carbon, 12·5 per cent. of hydrogen, and 50 per cent. of oxygen. When it is pure it remains clear in the atmosphere. It has an aromatic smell, with a slight acidity. The specimen I have used for my research had a specific weight of 810, water being 1000, and it boiled at 140° Fahr.

The spirit has been much used in the arts in the place of alcohol for making varnishes. Having a lower boiling point it is more volatile than common alcohol. It is now also largely used in museums for preserving purposes, and it yields on oxidation a very powerful preservative vinegar. For the sake of economy it is often employed in the manufacture of other compounds called methylated.

Owing to the volatile nature of this alcohol it may be exhibited freely by inhalation in the same manner that chloroform is administered. It then enters the blood by being carried with the air that is inspired into the pulmonary tract, and thus into the air vesicles. Here it is absorbed into the circulation by the minute blood-vessels which make their way from the heart over the lungs, and which ramify upon the vesicles. By administering the vapour of methylic alcohol in this way its effects are rapidly developed, for it condenses quickly in the blood, is carried rapidly into the left side of the heart, and thence is distributed by the arteries over the whole body as quickly as it is condensed and absorbed.

The alcohol may be administered in the same way, that is to say, in combination with water, hot or cold. In this way it is not unpleasant to the taste, and in one instance, as I am informed by a veteran member of my profession, this alcohol was invariably drunk by a well-known physician, in preference to common alcohol. He was accustomed to make it into toddy, with water and sugar, and considered that while it was as pleasant to take as ordinary spirituous drinks it was less injurious than they are. I have myself, of late years, when compelled to allow the administration of alcohol in some form, recommended this methylic lighter spirit, and, I am satisfied, with better results than if the heavier or ethylic spirit had been employed. I have ventured also to suggest that in many instances other physicians might follow the same practice with advantage; for methylic alcohol is much more rapid in its action, and much less prolonged in its effects than in common alcohol, so that it produces its effects promptly, and what is of most importance, it demands the least possible ultimate expenditure of animal force for its elimination from the body. This latter fact, I repeat, is of great moment, for, in the end, all these alcoholic fluids are depressants, and although at first, by their calling vigorously into play the natural forces, they seem to excite, and are therefore called stimulants, they themselves supply no force at any time, but cause expenditure of force, by which means they get away out of the body and therewith lead to exhaustion and paralysis of motion. In other words, the animal force which should be expended on the nutrition and sensation of the body, is in part expended on the alcohol, an entirely foreign expenditure.

The lighter the alcohol therefore, *cæteris paribus*, the less injurious its action, and so we may put down methylic alcohol as the safest of the series of bodies to which it belongs. But it is not without potency of effect, and the phenomena it produces are sufficiently demonstrative. Its effects are developed in four distinct stages.

The first stage is that of excitement of the nervous organisation; the pulse is quickened, the breathing is quickened, the surface of the body is flushed, and the pupil is dilated. After a little time there is sense of languor, the muscles falling into a state of prostration and the muscular movements becoming irregular. Thereupon the second stage follows, if the administration be continued. In this second stage the muscular prostration is increased, the breathing is laboured, and is attended by deep sighing movements at intervals of about four or five seconds, followed by further prostration, rolling over of the body upon the side, and distinct signs of intoxication. From this condition the subject passes into the third stage, which is that of entire intoxication, complete insensibility to pain, with unconsciousness of all external objects, and with inability to exert any voluntary muscular power. The breathing now becomes embarrassed and blowing, with what is technically called "bronchial rale," or rattle, due to the passage of air through fluid that has accumulated in the finer bronchial passages. The heart and lungs, however, even in this stage, retain their functions, and therefore recovery will take place if the conditions for it be favourable. Also, if the body be touched or irritated in parts, there will be response of motion, not from any knowledge or consciousness, but from what we physiologists call "reflex action;" that is to say, the impression we have made by irritation upon the surface of the body has travelled by its usual route through the nerves, to its nervous centre in the brain, and uncontrolled there by the consciousness has rolled back again, stimulating in its course some muscular fibre to motion. Probably the reason why the heart, which is a muscle, and the breathing muscles, continue to beat while all the other portions are at rest is due to this fact, that the blood which the heart drives to the brain and other nervous centres conveys to the centres which supply the heart a wave of motion that rolls back upon these vital muscles, and sustains them still in their rhythmical motion.

During all these stages there is no violent convulsive action from this alcohol, and no distinct tremor; but one phenomenon has been step by step more marked, and that phenomenon is a reduction of the animal temperature. Even though the body of the subject be exposed to a temperature of 84°, that is summer heat, it will begin to cool, from the first, and continually decline through all the stages, so that at last the loss of heat will become actually dangerous; for the body cannot throw off water freely, and therefore fluid collects in the lungs, and there is risk of what may be plainly considered suffocation like as from drowning. I have seen this decline of temperature from methylic alcohol, in animals narcotized by it, proceed to the loss of eight degrees of heat on Fahrenheit's scale when the insensibility was at its extreme point.

Presuming that the administration of the methylic spirit be continued when the third degree has been reached, there is a last stage, which is that of death. The two remaining nervous centres which feed the heart and respiration cease simultaneously to act, and all motion is over. After the death the blood throughout the body is found charged with the alcohol. The circulation of blood over the lungs has continued to the last, and so the lungs are found containing blood in both sides of the heart; the vessels of the brain are engorged with blood, as are the other vascular organs. The blood itself is not materially changed in physical quality, but

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

coagulates or form into clots, rather more slowly than usual.

If at the third stage of insensibility the administration of methylic spirit be stopped, recovery from the insensibility and prostration will invariably take place on one condition, that the body be kept dry and warm. From four to five hours, however, are necessary before the recovery is complete, and under the best conditions the restoration of the animal temperature is not perfect under a period of seven hours.

Happily we have no data to guide us that will show the effects on the animal body of the long-continued use of methylic alcohol, for men have not as yet steadily plied themselves with it as a drink to induce phenomena of chronic intoxication from it. The above-named facts, however, drawn from careful observations, in which the effects of the agent were seen on the inferior animals, and in one instance where the fluid was taken by accident by the human subject, show that methylic alcohol, though it may be less potent than its allies, is sufficiently potent, and the inference is fair, indeed, irresistible, that if the use of it were persevered in for long periods of time, it would lead to structural change in the body, just as all other chemical agents do that modify and pervert the natural mechanism. An agent that causes congestion of the brain cannot be employed many times without destroying the delicate organization of the vascular structure of the brain, neither can it influence the other vascular organs in the same way without prejudice to their structure; neither can it destroy the function of the nerves, of the muscles, and of the organs of the senses, without prejudice to their functions. In many respects this, the highest and least injurious of the alcohols, resembles chloroform in the ultimate action it produces on the body. It still more closely resembles ether, although recovery from the effects of both these agents is very much more rapid than from the spirit. It may consequently, as a chemical agent possessing a specific power of action over the living organism, be fairly classified with these agents. It is quite as artificial as they are, it is quite as dangerous in the long run, and its effects are more prolonged.

Action of Butylic Alcohol.

I pass over the second alcohol of our series, viz., ethylic alcohol, the common alcohol of wines and spirits, because that will of itself engage our attention for the remaining part of the course, after this lecture is concluded. I pass over propylic also for the reason that it is not easily separated as an alcohol, and is less perfectly studied than the other members of the group before us. Thus I am brought to what is called butylic alcohol.

With this spirit we arrive at one of the heavier bodies of the group in which, as our table shows, there is an increased proportion of carbon and hydrogen over those that are placed above it in the scale. Compared with common alcohol the weight of its vapour is as 37 to 23. Its weight, as a fluid, is 803 to 792, and its boiling point 230 Fahr. to 172. It is a heavier fluid; it mixes indifferently with water, but it is not unpleasant to take when diluted and sweetened. Applied to the lips and tongue when in a pure state it creates a sensation of burning, in the same way as common spirit, but with more intensity, and there is this remarkable fact connected with the sensation, that after the burning effect has passed away an extreme numbness of the part where the fluid was applied remains. I made this observation originally in 1869, and I have since often applied the knowledge with effect, in relieving, by the application of the agent, local pain. Toothache, for instance, is very quickly soothed by it.

The alcohol is not obtained by special process of distillation; it is produced with other alcohols in the process of fermentation, and is obtained by what is called fractional distillation, that is, by distillation of it at certain fixed temperatures, from fusil oil, or from the oil of beet-root, or from molasses after distillation of ethylic spirit.

The action of butylic alcohol on the animal body is divisible into four stages, the same as we have seen in respect to methylic spirit, but the period required for producing the different stages is greatly prolonged; and when the third stage, that of complete insensibility, is eached, there is added a new phenomenon which does not belong to any of the lighter alcohols. In this third degree, after the temperature of the body is depressed to the minimum by the butylic spirit, distinct tremors occur throughout the whole of the muscular system. These come on at regular intervals spontaneously, but they can be excited by a touch at any time, and in the intervals where they are absent there is frequent twitching of the muscles. The tremors themselves are not positively muscular contractions, but are rather vibrations or wave-like motions through the muscles, and are attended with an extreme deficiency of true contractile power in the muscular fibre. An electrical current passed through the muscles, which would, in health, throw them into rigid contraction, will now excite the tremors and keep them proceeding, but will not excite complete contraction. So long as the tremors are present the temperature of the body is depressed, falling even half a degree; but when they cease the temperature rises again, not to the natural standard, but to or near that which existed before the tremors were excited. After the tremors are once established, they continue without further administration of the alcohol for ten and twelve hours, and so slowly do they decline, they may remain in a slight degree even for thirty-six hours. They subside by remission of intensity and prolongation of interval of recurrence. One fact of singular significance attaches itself to these muscular tremors. They are the tremors which occur in man during the stage of alcoholic disease, when there is set up that malady to which we give the name of *delirium tremens*. An ordinary intoxication with a lighter alcohol is insufficient to produce this extreme perversion of nervous and muscular power, but the introduction of one of these heavier alcohols, or it may be the excessive saturation of the body with a lighter spirit, for on this point I am not sure, is sufficient to cause the tremulous motion. What the nature of the muscular movement is, what unnatural relationships exist between the nervous system, the muscles and the blood, to lead to them, are questions still unsolved. Involuntary, developed even against the will, excited by any external touch, attended with great reduction of temperature, and remaining as long as the temperature is reduced, they indicate an extreme depression of animal force; a condition in which all the force of life that remains has to be expended on the mere organic acts of life, on the support of the motions of the heart, the muscles of respiration, and the functions of the secreting glands. The voluntary systems of nerve and muscle are indeed well-nigh dead, and recovery rests entirely on the maintenance of the organic nervous power. Still recovery will take place if the body be sustained by external heat and by internal nourishment.

In the extreme stage of intoxication from butylic alcohol the red blood in the arteries loses its rich colour, and the blood, which flows with difficulty from the veins, is of a dirty hue. The blood coagulates readily, but the clot is loose, and the fibrine of which it is composed separates in a coarse network or mesh. The little corpuscles of the blood run into each other, forming rolls or columns. Indeed it is wonderful how the blood circulates through the structures it should nourish. The vascular membranes of the brain are found charged with this tarry blood; the brain structure is softened, and gives the odour of the poison, and the muscles, when divided by the knife, cut without firmness, yielding from numerous points the same tar-like blood. The vascular organs—spleen, liver, lungs, kidneys—are equally changed, and in a similar manner. Their fine structures are infiltrated with the deteriorated vascular fluid which was intended for their maintenance, and even the secretions and cavities of the body are perverted by being charged with fluid derived from the unnatural blood. This is the state of the body of one who dies insensible after the delirium and tremors which mark even the human malady, self-inflicted and terrible, known as *delirium tremens.*

Action of Amylic Alcohol.

Amylic alcohol, the next of our series, is obtained by the fermentation of potato starch, or starch of grain, and when pure is a colourless fluid. Its weight compared with water as 1,000 is 818, and it boils at 270° Fahr. It is from this alcohol that the active substance, nitrate of amyl, to which I have before referred, is derived. The odour of amylic alcohol is sweet, nauseous, and heavy. The sensation of its presence remains long. In taste it is burning and acrid, and it is itself practically insoluble in water. When it is diluted with common alcohol it dissolves freely in water, and gives a soft and rather unctuous flavour, I may call it a fruity flavour, something like that of ripe pears. From the quantities of it imported into this country it is believed to be employed largely in the adulteration of wines and spirits.

Amylic alcohol, when it is introduced as an adulterant, is an extremely dangerous addition to ordinary alcohol, in whatever form it is presented, whether as wine or spirit. Its action on the body is the same as that of butylic alcohol. It produces three stages of insensibility, ending in the profoundest narcotism, or coma, followed by reduction of temperature and by muscular tremors. These tremors recur with the most perfect regularity of themselves, but they can be excited at any moment by touching the body, or blowing upon it, or even by a sharp noise, such as the snap of the finger. In all other respects the phenomena induced are the same as are observed from butylic alcohol, except that they are much more prolonged, from two to three days being sometimes required for the complete restoration of the animal temperature. The reason of this prolongation of action lies in the greater weight and the greater insolubility of this spirit, that is to say, the force required to decompose it, or mechanically to lift it out of the body when it has once entered it, is so much greater than is required for the lighter spirits, which can diffuse readily through the secretions, volatilise by the breath and possibly undergo rapid decomposition. The odour of the substance remains for many hours in the animal tissues. Amylic alcohol acts upon some resins and resinous substances, I believe, dissolving certain of them more easily than the lighter spirits, but its peculiar odour prevents its application on a large scale.

Action of Sodium and Potassium Alcohols.

The action of the sodium and potassium alcohols is exceedingly interesting in a physiological point of view, and in this I think only, except in respect to their varied uses as chemical re-agents. They act on the living animal tissues as caustics, and will one day be considered of great service to the surgeon. Brought into contact with blood in solution, there is produced by them an almost instant crystallization of needle-like crystals spread out in beautiful arborescent filaments. This arborescent appearance is identical with a crystallization which can be induced in the alcohols themselves, but there are also formed smaller radiant crystals due to the crystallization of the crystalloidal matter of the blood cells, and singularly like the forms which, since the time of Dr. Richard Mead, have been described as occurring in the blood after infection by the poison of the viper.

These metallic alcohols are powerful antiseptics, like common alcohol, over which they have an advantage in that they more thoroughly harden soft structures. I have taken advantage of this action to employ them for the preservation of nervous matter, which is rapidly prone to decomposition.

I should add that, by some chemists these alcohols are called ethylates of sodium or potassium, a term which is thought to define more correctly their chemical construction.

Action of Mercaptan or Sulphur Alcohol.

I have already referred briefly to this most curious body of the alcohol series, describing it as an alcohol in which oxygen is replaced by sulphur. In experimenting with it a solution containing 5 per cent. is sufficient, and the vapour of it may be inhaled in order to produce its effects. These are most remarkable.

I found, by direct experiment, that the vapour is not irritating to breathe, but that its influence on the system is speedily pronounced. There is a desire for sleep, and a strange, unhappy sensation, as if some actual or impending trouble were at hand. This is succeeded by an easy but extreme sensation of muscular fatigue ; the limbs feel too heavy to be lifted, and rest is absolutely necessary. There is, at the same time, no insensibility to pain, and no intoxication. The pulse is rendered feeble and slow, and remains so for one or two hours, but, in time, all the effects pass off, and active motion in the air helps quickly to dispose of them.

On the inferior animals the action of mercaptan is equally peculiar. Frogs exposed to its vapour fall asleep, and seem to pass into actual death, except that the eye remains bright. They may be left in this apparently lifeless state for half an hour, then, removed into the air, in the course of an hour and a half or two hours they commence to breathe again, and gradually recover, precisely as if they were awakening from sleep. The action of this alcohol on the animal body, though it produces these extreme effects, is less injurious than that of the other alcohols. It escapes mainly by the breath, and in some new form, as a sulphur compound. It thus communicates to the breath an odour which is by no means uncommon in persons who indulge to a great extent in the use of ordinary alcohol. This observation suggests a most important explanation of certain phenomena connected with the action of common alcohol. It appears to me that in some states there is actually produced in the living organism, by the vital chemistry, sulphur compounds, derived probably from the bile, a substance rich in sulphur, which compounds, distributed by the blood to the nervous matter, create the phenomena similar to those I have described as following upon the inhalation of mercaptan. Thus, under unnatural modes of life, the body actually makes its own poisons, and the doctor is often asked to remove what the patient, if he were a better chemist and a wiser man, would never produce for the exercise of the doctor's skill.

Parliamentary and Law Proceedings.

Irregular Medical Practice.

An inquest was commenced on the 11th instant, at Redruth, respecting the death of James Carkeek. From the evidence, it appeared that the deceased having fallen and hurt his elbow was attended by his club doctor, Mr. Hitchen. The deceased or his wife being dissatisfied with Mr. Hitchen's treatment, Dr. Rowe, a registered chemist and druggist, was called in. Of this fact Mr. Hitchen was not informed until he noticed that his instructions were not being followed. He then refused to attend any longer. Dr. Rowe continued to attend, and the deceased was afterwards visited by Dr. Hudson, but eventually died on the 8th inst. The jury returned a verdict of "Accidental Death," adding their opinion that Mr. Hitchen was perfectly justified in withdrawing from the case when he found his directions were not followed out.

Charge of Poisoning.

A domestic servant named Matilda Alberta Foreman is in custody at Diss, Norfolk, on a charge of attempting to poison an infant named Robert Balls, by administering to it tea with which arsenic had been mixed. The accusation against the prisoner is that she was instructed by her mistress, Mrs. Balls, to make some tea, and that she put into the teapot some arsenic which was lying in a cupboard for the purpose of destroying rats, and which she had been cautioned not to touch. The child drank some of the tea which the prisoner had made, and almost immediately became very ill, and vomited into his mother's lap. The prisoner was immediately accused by Mrs. Balls of having put arsenic into the tea, and she admitted having done so, being unable, at the same time, to give any reason or explanation for her conduct. The contents of the teapot were poured by Mrs. Balls into a basin, and the girl threw the poisoned tea away when her mistress's back was turned. When Mr. Balls returned home he destroyed the remainder of the poison. The child eventually recovered.—*Daily News.*

Review.

Report by Dr. M. C. Cooke, on the Gums, Gum-resins, Oleo-resins, and Resinous Products in the India Museum, or produced in India. Prepared under the Direction of the Reporter on the Products of India. London: India Museum. 1874.

Any fresh information concerning the natural products of India, more particularly those of a medicinal or economical character, cannot fail to be interesting. Few countries produce such a varied assortment of gums and gum resins, yet comparatively little is known concerning the origin of many of them, and the little that is known is surrounded with more or less of uncertainty. The difficulties in the way of obtaining reliable information from the natives who collect these products, is very great, every inquiry relative to these natural productions being met by the natives with replies intended to throw the inquirer off the scent, and to prevent his causing injury to their trade. Added to this, the difference in the native names and districts is very wide, as will be seen by reference to the list of native names in this report. A further difficulty arises from the fact that many of these substances are not produced in, but imported into India from other countries. For these reasons neither a botanical nor an alphabetical arrangement of these products is possible.

Hence the only convenient one has been followed, and the products treated of and arranged under four heads, viz.:—Gums, Gum-resins, Resins, and Oleo-resins.

These, again, are divided into lesser groups, according to the necessities of the case; thus Gums are arranged under True Gums, Bassorin or Pseudo-Gums, and Astringent Gums. Each article is placed under the botanical name of the plant supposed to yield it, or where that cannot be ascertained, the name of the article is substituted, and these names are arranged alphabetically, references to plates, a list of botanical synonyms, and of the native names in different dialects, a short botanical description, and in the better known articles, such as myrrh, gamboge, etc., an account of the bibliography, and tables of the exports from and imports into the Bombay Presidency alone, are given, while copious extracts from various works are quoted.

By this means the different and often contradictory accounts of the sources of the products are thus laid before the reader at one glance; but the large space so occupied might perhaps have been more advantageously used for practical information upon the properties and possible uses of many of the articles, original information of this kind concerning a large number of them being exceedingly scanty. This is acknowledged in a prefatory note by Dr. Watson, who states that a very extended series of experiments is necessary to determine their commercial value and possible uses, and to this end gives a few practical hints to those who send home specimens to be reported upon, and these hints it may be useful to briefly quote here.

"1. In most cases 20 or 25 pounds are sufficient for the purpose; but it is comparatively useless to send quantities so small that when diminished by five or six samples to brokers and traders sufficient is not left for analysis or experiment.

"2. Samples should be sorted into different qualities, as this can be done more economically in India, and would find its return in the prices obtained.

"3. The botanical source should be accurately indicated, and specimens of leaves, flowers, and, when possible, fruits of the plants yielding them should accompany each sample.

"4. A first unfavourable report should not be taken as decisive, as subsequent trials and experiments might show a before unthought-of use."

A few curious facts appear from the tables of imports and exports.

Thus, with regard to gum Arabic in 1871-2, 120 tons were exported to Japan, or twice as much as to America during the same year, although during the two years previously none had been exported to the former country. Bissabôl, commonly known as East Indian myrrh, and which is imported chiefly from Aden, appears to be exported to China alone.

Gum Bdellium, which is also produced in Scinde, is imported from the Red Sea. It is not stated whether this be African or Indian Bdellium, although the botanical source is given as *Balsamodendron Mukul*, Hook. One of the uses to which it is put is to mix the decoction with plaster in building so as to give it durability.

Benzoin and Olibanum do not appear to be exported to any extent direct to Italy or Spain, and very little to France, although they must be used as incense to some extent in these countries.

Amongst the gums of the gum arabic class the more remarkable appear to be those of *Buchanania latifolia*, Roxb., or Chironji gum, which is said to be more adhesive than gum arabic, but otherwise resembling Bassorah gum; the Dhowra gum (*Conocarpus latifolius*, Roxb.), which is used in "cloth printing," and could be obtained in large quantities at a low price, but which is only partly soluble; Jumrasi gum (*Elæodendron paniculatum*, W. and A.), which yields a tenacious mucilage of a sherry colour; that of *Feronia elephantum*, Corr., said to form a portion of East Indian gum Arabic, and which is stated to be the best gum for using in the manufacture of ink, as it readily dissolves and leaves no residue; that of the mahogany tree (*Swietenia Mahogani*, L.), a beautiful silvery gum of superior quality, produced in great abundance; and a kind resembling Senegal gum, yielded in large quantity by one of the Myrabolans trees (*Terminalia belerica*, Roxb.). The gum of *Swietenia chloroxylon* (Roxb.) is said to have this remarkable peculiarity, that it becomes covered in an hour or two with a thick pellicle, the upper part of which becomes quite dry, and which when broken rapidly forms again. Among the Bassorin gums may be noticed that of *Cycas circinalis*, L., used to promote rapid suppuration in malignant ulcers; of *Macaranga tomentosa*, W., of a light crimson colour, used for taking impressions of leaves, coins, medallions, etc. When the gum is pure the impression is said to be as sharp as that of sulphur, while it is without its brittleness. Of the astringent gums may be noticed that of *Pterocarpus indicus*, Willd.; it has a somewhat disagreeable odour, but might be used in making ink.

The exudation of *Garcinia cambogia* is said to form, when dissolved in turpentine, a very beautiful yellow varnish for metal, etc., although it will not form an emulsion like true Camboge.

The resin of *Terminalia angustifolia*, W. and A., is of an agreeable scent, between benzoin and olibanum, and contains benzoic acid; it is used as incense or in powder as a cosmetic.

Among the resins the notice of piney resin gives some interesting particulars. It differs from copal in being soluble at once in turpentine and drying oils. The turpentine solution is turbid and milky, but by the addition of powdered charcoal and subsequent filtering, it yields a varnish which dries with a purity and whiteness not to be surpassed. Candles are made of it, which in burning diffuse an agreeable fragrance, and give a clear light with little smoke; they consume the wick without snuffing.

One curious substance called Pwai-ngyet, and which is usually considered to be a kind of black dammer, appears to be the nest of a kind of bee (*Trigona læviceps*). The insect collects different resins, and oleo-resins, such as wood oil, and makes its nest in hollows of trees, of cells which lack the geometric regularity of those of the honey bee. The nest has a remarkable entrance protruding from the tree of the shape of a trumpet flattened, the mouth being a foot long by three or four inches across; of this curious structure an illustration is given.

Canarium Bengalense, Roxb., is said to yield in quantity a very pure, clear amber-coloured resin, like copal, which fetches but a low price in the Calcutta bazaars.

Of natural varnishes that of *Melanorrhœa usitatissima*, Wall, is used by the Burmese as a lacquer, for gilding, as a writing fluid, and internally as an anthelmintic. It is soluble in alcohol, turpentine, and benzole. The pericarp of the marking nut, *Semecarpus Anacardium*, L., yields a resinous juice, said by Dr. Bridwood to be the black varnish of Sylhet. It is this which has lately been recommended as a marking ink. Either of these native varnishes properly diluted would probably make excellent ink for documents in which the permanence of colour is an object.

Some excellent turpentine is produced by *Pinus Khasyana*, Brandis, and *P. Massoniana*, Lieb. and Zucc., but their present prices can by no means compete with those in European commerce. An appendix to the report contains Dr. Birdwood's paper on the genus *Boswellia*, published in the Linnean Transactions in 1869, together with four plates of *B. Carterii*, *B. Frereana*, and *B. Bhaudajiana*.

BOOK RECEIVED.

Commentary on the British Pharmacopœia. By Walter G. Smith, M.D. Dub., etc. London, Smith, Elder and Co. 1875. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Graduation of Glass Measures.

Sir,—Allow me to draw the attention of your readers to a small matter, which, however, as it stands at present, is a source of inconvenience, and even of danger to life.

In common with many others it is my habit in prescribing mixtures containing active remedies, to direct that the medicine be taken out of a glass measure. But in two instances which have recently occurred to me each of the patients swallowed three tablespoonfuls instead of one, as directed. The cause of this I found to be the mode in which many of the graduated glass measures sold by pharmaceutists are inscribed. The word tablespoon is placed on the glass opposite to the line intended to indicate three tablespoonfuls. In one of the cases spoken of the medicine given to the patient consisted of chloral hydrate, and as the three tablespoonfuls were repeated after a short interval, somewhat alarming results followed. In the other case the medicine contained strychnia, and the mistake was discovered by the unexpected development of its constitutional effects.

All this it may be said was due to stupidity in not recognizing that each mark on the glass indicated a tablespoonful. But we must take people as we find them, and unless a change is made in the glasses spoken of it will be far better to trust to the actual tablespoon, variable as it is, than to the measures used when accuracy of the dose is vainly supposed to be insured.

Arthur Leared, M.D.

The Drug Trade and Late Hours.

Sir,—The glowing descriptions we have lately seen of the trade and its prospects induce me to trouble you with a little of my experience. The late work after shop hours is a serious drawback to the business and might be reduced very much without inconveniencing the public. I find on an average that three-fourths of the calls after shop is closed are for articles that might have been purchased during the day, such as Epsom salts, castor oil, pills, seidlitz powders, etc.

In such cases I remind the customers of the late hour and suggest their taking several doses, to save them the trouble of coming again at this time of night, and this plan has already brought some of the old and regular offenders into better habits.

If chemists in large towns would combine together and not serve anything after shop hours except new prescriptions, that would lessen the hours of labour very much for many assistants. Why should Mr. or Mrs. So-and-so make a regular habit of waiting until the servant comes to post, or is dressed for the evening, to send to the chemist's for the usual mixture, or pills, or night draught. Sometimes I find new prescriptions, written about 11 a.m., are kept at the house until 8 or 9 p.m. and then sent down to be made up, with a message to be sent directly.

When this happens I generally ask the messenger to wait or call again, as my porter has gone for the night and I have not anyone to send. Many of us are veritable slaves to our businesses, and it behoves us, as a matter of health and duty to ourselves, to make a protest against such excessive and unjust demands on our time and attention.

A clergyman, doctor, and chemist, are popularly supposed to be always at hand, and ready to render assistance in case of need.

The two first-mentioned receive that consideration and respect to which they are justly entitled by their position in society; but the chemist is only looked upon as a tradesman, and has the duties and responsibilities of a professional man, without either his position or any adequate remuneration.

I look upon the present time as a very trying period for principals and assistants, and think both are feeling the effects of "The Pharmacy Act" rather acutely just now, but hope the state of affairs will improve, and that we shall all be able to employ examined assistants at more remunerative salaries. At present the returns of many businesses are so small that keeping an assistant is out of the question, and taking everything into consideration, one cannot help recognizing the fact that the education required is too expensive for the business, if looked at in a commercial point of view. I do not wish to see our business made too exclusive or purely dispensing; what I maintain is that for such responsible and skilled labour as the preparation of medicines the public ought to pay a fair, reasonable price, and they should not expect powerful remedies dispensed at the same rate of profit as sundries sold retail.

The labourer is worthy of his hire, and to us time is money; a fact which, unfortunately, many of our customers do not seem to be aware of.

Frater.

Sir,—I am afraid that "Veritas," if he has not yet arrived at the age of forty, has been labouring under the great disadvantage of looking through a glass darkly, and at some time will have to awaken to stern reality. If, however, I am wrong in my surmises, and "Veritas" has passed the "shady side of forty," surely with such a nice little income as he must be possessed of, 'tis making "much ado about nothing." "Veritas" says: "A young man with £200 or £300 to commence with may confidently hope to retire on £500 per year by the time he is forty, and on £1,000 a year by the time he is fifty, and he is not nearly so likely to do that in either the hat, drapery, tea, or ironmongery trade; but there is one qualification necessary to accomplish this, he must be a man of business." Now, Sir, I ask did any one ever hear of such a Utopian idea? Can "Veritas" really mean what he writes, and does he hold it out as a stimulus to the 64 unsuccessful candidates who have presented themselves for examination since October to December last, or is it a sketch of imagination, or has he himself proved by practical illustration that such is the case? If the latter, I strongly recommend the Secretary of the Pharmaceutical Society to write him for a magnificent donation to the Benevolent Fund; but if the former, I am sadly afraid that those who are looking forward to the good times when they shall have reached the age of forty, and hoping to retire into private life, taking Shakespeare's advice, and "throwing physic to the dogs," will have found the old saying true, "that hope deferred maketh the heart sick."

Now, let us in the first place look at the case from a business point of view. If a person invested money at 5 per cent. per annum, to bring in an interest of £500 per year, he would have to invest £10,000, and if to bring in an interest of £1,000 per year, of course £20,000 would have to be invested. Now, will "Veritas" look through the advertising columns of the various trade journals and see what kind of a business can be bought for £300? Generally one with a return of about £400 yearly. But suppose a young man were especially fortunate, and happened to meet with one returning £600 per year, and that he takes it when he is twenty-three years old, and having very excellent business capacities, he manages the first five years to average £800 per year returns, and the next five years £1,000 per year, and the last seven years £1,200 per year (this, of course, would be a rather unusual case, but for the sake of making out a case, we will look at the bright side of the picture). He will then have arrived at the age of forty, and will have taken money to the amount of £17,400. This, of course, would average £1,024 per year. Well, what reasonable profit might we suppose to be made on that, say £500 (which I very much doubt in these days of mutual supply associations, co-operative stores, and Civil Service stores, could be made on that return), and out of that there is rent, rates, taxes, bad debts, education of children, and placing them to various trades, perhaps sickness, for none of us are proof against that; relief to oppressed brethren, the salary of assistants, the wages of servants, and many other expenses would, I think, leave little margin to save anything at all. How, then, is the £10,000 to be made in the seventeen years? Something might possibly be saved the first few years, but if the said young man thinks, with Scripture, that it is not well for man to live alone, he will soon find that his expenses increase and multiply. But "Veritas" says, work for ten years more, and you will be able to save what will bring in £1,000 yearly. Whatever "Veritas" thinks, my candid opinion is, that if his picture were a true one, we should not hear quite so much taunting about "ekeing out a miserable existence," the large number of applicants for the Benevolent Fund, the cry of the assistants that the prize is not worth the struggle, and the reason why chemists' assistants are not better remunerated, because the employers cannot afford to pay higher salaries. As to the idea of making less in either the tea, drapery, or ironmongery trade, the thought is not worth the paper it is written on, for though chemists as a rule hold as high a standard of respectability as any tradesmen, I think, that looking in a financial point, they are about the worst remunerated of any.

Look through the advertisements, and you will find it a perfect El Dorado where the returns are £1,000 yearly; but to reach £1,500 is the seventh heaven of bliss. Why, sir, 'tis making the trade into a perfect gold mine, and to hear of persons retiring on £1,000 per year when they have arrived at the age of fifty; if it were true I fancy that instead of being short of assistants we should be overstocked, and everybody would be working might and main to pass the Examinations, and get into business.

In conclusion, I do not wish to have said anything to hurt the feelings of "Veritas," but I trust with a careful examination of the subject, he will let such ideas pass for ever from his mind, like the "baseless fabric of a dream."

AMOR VERITATIS.

Sir,—Allow me, through the medium of your columns, to congratulate my fellow assistants upon the El Dorado into which we have entered unawares.

From the letter of "Veritas" in your last I hear for the first time the following satisfactory fact, that a business-like young man with about £300 may hope to retire from the drug trade at the age of 50 with an income of £1,000 a year. Of course "Veritas" is aware that to retire with £1,000 a year requires about £20,000 to have been saved, and assuming a young man to set up in business when 25, there must be an average annual saving of £800. Add to this £300 for expenses of living, and we have nett profits £1,100, which means returns of about £4,000.

Surely there must be an average number of business-like young men who enter the drug trade, but if a return could be obtained of the returns of drug businesses in Great Britain, would the result bear out the foregoing figures?

E. NUTHALL.

Bank Plain, Norwich.
January 19, 1875.

Errata.—The Genus Pilocarpus.—Page 583, col. i., line 21, *for* "originally defined by Vahl," *read* "defined by De Candolle." In foot-note to same column, *for* "Vahl, Eclog. i., p. 20," *read* "De Candolle, Prodromus, vol. i., pp. 7, 8."

A. D.—Straining is the only mode of making such an incompatible mixture present an elegant appearance, but that would not be justifiable. The prescriber ought to have been communicated with, if possible, before it was dispensed in the first instance.

E. J. C.—We know of nothing to prevent the widow of a chemist and druggist from taking an apprentice; but whether she would be able to fulfil the terms of the indenture would depend upon the nature of those terms.

J. E. Doo.—Your communication has been handed to the Secretary.

A. C. W.—The *Lotio Calcii Sulphurati* of the University College Hospital Pharmacopœia.

"Slaked Lime . . . . 4 ounces.
Sublimed Sulphur . . . . 4 ,,
Distilled Water . . . . . 35 ,,

Boil together, evaporate and filter to produce one pint of the solution."

"*A Puzzled Dispenser.*"—*Ung. Acidi Boracici Co.* (Gibbon or Rick). We are not acquainted with either of these formulæ, but think it probable that some such preparation as Professor Lister's Boracic Acid Ointment, described before, p. 439, is intended.

J. Wood.—About thirty.

W. Dale.—We think the sale would still be subject to the regulations pertaining to the sale of fireworks.

X. Y. Z. is referred to the regulations respecting anonymous communications.

J. Gerrard.—Try the formula given on p. 579.

H. B. Atkinson (Sheffield).—The report published was in all essential particulars consistent with the one sent by yourself. We do not agree with you in considering the latter a more detailed account, or that it would have given the public any further explanation than the report we published.

"*A Grower.*"—We know of no work which is specially devoted to the subject you mention.

"*A Student.*"—(1) It would be about 55 over proof. (2) A Table is given in Griffin's 'Chemical Testing of Wines and Spirits,' published by Griffin and Co., Long Acre.

Mr. J. Taylor.—We are obliged for the letter you have forwarded. It appears to contain only ignorant abuse that deserves no notice.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Pocklington, Messrs. Low and Co., Mr. J. C. Hunter Mr. Munro, "Veritas," "Spes."

ON THE CONSTRUCTION OF AN INTERNATIONAL PHARMACOPŒIA.*

BY FRANCIS SUTTON, F.C.S.

The purpose of this paper is not in the first instance to attempt any strict definition of the principles upon which an International Pharmacopœia should be constructed, but to open the question for discussion among English pharmaceutical chemists, to whom the matter has been hitherto somewhat of a novelty.

However the idea of a Universal Pharmacopœia may have originated in the first instance, it seems to have assumed a definite shape during the second meeting of the International Pharmaceutical Congress at Paris in 1867, and there and then the Pharmaceutical Society of Paris was formally commissioned to arrange such a work in manuscript, and submit it as a basis of operation to the next meeting of the Congress at Vienna in 1869. It was not, however, ready at that time owing to the considerable amount of labour and time required on such a work, then the sad Franco-German war still further delayed both that and the meeting of the Congress, so that five years passed away and brought the Congress of St. Petersburg in August last year. At that meeting the finished manuscript copy of the proposed work was presented to the Congress, together with a Preface written by M. Boudet, President of the French Commission, explaining the rules and principles by which they had been guided in the construction of the work. It would be too long to insert the whole of this Preface here, but important parts of it will be given further on.

The French Commission was composed of thirteen members, and included the names of the highest authorities in chemistry and pharmacy to be found in the Empire.

It would only seem right, whatever our opinions may be about either the necessity of or the mode of construction of such a Pharmacopœia, to acknowledge with thankfulness the labours of these gentlemen, and to assume that theirs has been no light task, but one which has required delicacy, tact, and judgment in their attempt to satisfy the claims of other nations than their own.

There being only one copy in existence at present of the proposed Pharmacopœia it is of course impossible to criticize it in detail, but as one of your representatives at the last meeting of the Congress, I had the opportunity in a slight degree of inspecting the work, and I now propose to give a short history of its contents.

The Codex of 1866 is tolerably well known to some of us, and it may perhaps hardly be necessary to say that the outline and general features of the new work are the same; but there are also great differences.

The Codex is a book of 830 printed pages, royal octavo size, while the proposed work consists only of 534 pages of manuscript, post quarto, many of which are not half filled.

The printed book would therefore be less than half the size of the Codex of 1866, and as will be seen from the list of contents, is shorn of many preparations of a trivial and local character contained in the Codex, such as syrups, electuaries, tisanes, broths, wines, beers, vinegars, etc.

It is evident that the Commission have largely consulted the British and American Pharmacopœias in the construction of the book, and have been guided by an earnest desire to make it as cosmopolitan in character as possible. Nevertheless, it would be unreasonable to expect the work to be entirely free from national tinges.

When this manuscript was presented to the St. Petersburg Congress, a special committee of the delegates was appointed, and a certain portion of the work allotted to each delegate according to his choice, upon which, with the assistance of pharmacists of his own nation, he might proceed to alter, amend or add to, as in their judgment might seem fit. The corrected work was to be returned to a standing committee in St. Petersburg in December 1874; there to be translated into Latin, and rough proofs printed or lithographed for distribution to the various governments and Societies represented at the Congress.

Before proceeding to any discussion on the merits of the compilation, it will be well to give the summary of contents:—

PART I.—PRELIMINARY MATTERS.

Tables of weights, measures, specific gravities, temperatures, alcoholic strengths, etc.

PART II.—MATERIA MEDICA.

Pharmacognostic history and description of natural products.

PART III.—THE PHARMACOPŒIA,

COMPRISING THE FOLLOWING PREPARATIONS.

(It will be noticed that these are placed alphabetically, according to the system of nomenclature adopted in the French Codex.)

Acetate of morphia.
Acetate of potassium.
Acetate of sodium.
Acid, acetic, glacial.
Acid, acetic, dilute.
Acid, arsenious.
Acid, benzoic, sublimed.
Acid, boracic, crystals.
Acid, hydrochloric, liquid.
Acid, chromic, crystals.
Acid, chromic, liquid.
Acid, citric.
Acid, hydrocyanic, medicinal.
Acid, nitric, fuming.
Acid, nitric, officinal.
Acid, phenic.
Acid, phosphoric, dilute.
Acid, sulphuric, alcoholized.
Acid, sulphuric, dilute.
Acid, sulphuric, pure.
Acid, tannic.
Acid, tartaric.
Acid, valerianic.
Aconitine.
Alcohol.
Alcohol, camphorated.
Alcoholic tinctures.
Ammonia, liquid.
Antimony, purified metal.
Silver, pure metal.
Arseniate of sodium, crystals.
Atropine.
Lard.
Lard, benzoated.
Benzoate of sodium.
Borate of sodium.
Balsam of opodeldoc.
Butter of cacao.
Butter of mace.
Bromine.
Bromide of potassium.
Cadmium.
Carbonate of ammonium.
Carbonate of calcium, precipitated.
Carbonate of magnesium.
Carbonate of lead.
Carbonate of potassium.
Carbonate, bi-, of potassium.
Carbonate of sodium.
Carbonate, bi-, of sodium.
Caustic, fused (potassa cum calce).
Charcoal, vegetable.
Calcium oxide.
Calcium oxide, hydrated.
Calcium oxide, hypochlorite.
Chloramide of mercury.
Chlorate of potassium.
Chlorhydrate of ammonium.
Chlorhydrate of morphia.
Chloroform.
Chloride of antimony, proto.
Chloride of barium.
Chloride of calcium.
Chloride of iron, per-.
Chloride of mercury, per-.
Chloride of mercury, per-, solution.
Chloride of mercury, proto-.
Chloride of gold.
Chloride of gold and sodium.
Chloride of zinc.
Citrate of magnesia.
Citrate of magnesia, effervescent.

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, February 3, 1875.

Codeine.
Collodion.
Collodion of cantharides.
Collodion, elastic.
Cyanide of potassium.
Decoction, Sydenham's.
Dextrine.
Digitaline crystals.
Lime water.
Phagadenic water.
Seidlitz water, artificial.
Camphorated eau de vie.
Cinnamon water, distilled.
Orange-flower water, distilled.
Cherry laurel water, distilled.
Magnesia water.
Sponges, prepared.
Plaster of acetate of copper.
Plaster of assafœtida.
Plaster of cantharides.
Plaster of cantharides, perpetual.
Plaster of hemlock.
Plaster of extract of hemlock.
Plaster of extract of digitalis
Plaster of extract of stramonium.
Plaster of extract of opium.
Plaster of dyachylon.
Plaster of mercury.
Plaster of oxide of iron.
Plaster of lead, brown.
Plaster of burgundy pitch.
Plaster of soap.
Plaster of soap, camphorated.
Plaster, simple.
Plaster of antimony (by incorporation).
Plaster of mullein.
Plaster, English blistering.
Plaster, blistering (mouches au Milan).
Species laxative of St. Germain.
Ether, acetic.
Ether, sulphuric.
Ether, sulphuric with alcohol.
Extract of aconite.
Extract of aconite, alcoholic.
Extract of aloes, aqueous.
Extract of belladonna, alcoholic.
Extract of belladonna, aqueous.
Extract of calabar bean.
Extract of colocynth, compound.
Extract of stramonium, alcoholic.
Extract of ipecacuanha, alcoholic.
Extract of digitalis, alcoholic.
Extract of henbane, alcoholic.
Extract of nux vomica, alcoholic.
Extract of opium.
Extract of cinchona.
Extract of cinchona, yellow, liquid.
Extract of cinchona calisaya, alcoholic.
Extract of rhatany.
Extract of rhubarb.
Extract of valerian.
Extract of male fern, ethereal.
Extract of euphorbium, ethereal.
Extracts, fluid.
Iron reduced by hydrogen.
Pyroxylin.
Gargle, astringent.
Glycerate of starch.
Glycerate of extract of belladonna.
Glycerate of tar.
Glycerate of iodide of potassium.
Glycerate of sulphur.
Glycerate of tannin.
Granules of arsenious acid.
Oil of belladonna.
Oil of hemlock.
Oil of henbane.
Oil, camphorated.
Oil of croton tiglium.
Oil, phosphorized.
Hypochlorite of lime solution.
Hypochlorite of soda solution.
Iodine.
Iodide of iron, proto-, normal solution.
Iodide of mercury, proto-
Iodide of mercury, per-.
Iodide of lead.
Iodide of potassium.
Kermes, mineral.
Lactate of iron.
Filings of iron.
Liniment of ammonia.
Liniment of lime.
Lohoch, white.
Lotion of ammonia, camphorated.
Magnesium oxide, calcined.
Honey, simple.
Mellate of mercury.
Mellate of red rose.
Mercury.
Morphia.
Mucilage of gum tragacanth.
Nitrate of silver, crystals.
Nitrate of silver, fused.
Nitrate of bismuth, sub-.
Nitrate of mercury, acid per-.
Nitrate of potash.
Ointment of ammonia.
Ointment, antipsoric.
Ointment, basilicon.
Ointment of belladonna.
Ointment of digitalis.
Ointment of henbane.
Ointment of hemlock.
Ointment of stramonium.
Ointment of camphor.
Ointment of cevadilla.
Ointment of chloroform.
Ointment of calomel.
Ointment of mercury (white precipitate).
Ointment of wax.
Ointment of wax, compound.
Ointment of wax, opiated.
Ointment of wax with lead.
Ointment, citrine.
Ointment, epispastic (green).
Ointment, epispastic (by incorporation).
Ointment, epispastic (euphorbium).
Ointment of tar.
Ointment of potassium iodide.
Ointment, mercurial, of equal parts.
Ointment of mace, compound
Ointment of mercury, red oxide.
Ointment of poplar.
Ointment, simple.
Ointment of sulphur.
Ointment of spermaceti (cold cream).
Ointment of antimony.
Ointment of styrax.
Ointment of turpentine.
Gold, metallic.
Oxalate of potassium, bi-.
Oxide of antimony.
Oxide of manganese.
Oxide of mercury, red.
Oxide of lead, fused.
Oxide of iron, red anhydrous.
Oxide of iron, red hydrated.
Oxide of zinc.
Oxymel, simple.
Oxymel of squills.
Paper plasters.
Permanganate of potassium.
Phosphate of calcium, tribasic.
Phosphate of sodium.
Phosphorus.
Pill of aloes.
Pill of aloes and gamboge.
Pill of colocynth, compound.
Pill of protocarbonate of iron.
Pill of protoiodide of iron.
Pill of henbane and valerian.
Pill of mercury, simple.
Pill of rhubarb, compound.
Lead, metallic.
Potassium hydrate, caustic.
Potion, effervescing.
Potion, laxative.
Potion purgative of citrate of magnesia.
Powder of belladonna leaves
Powder of hartshorn.
Powder, gazogene, alkaline.
Powder, gazogene, laxative.
Powder of protoiodide of iron.
Powder of ipecacuanha.
Powder of ipecacuanha, opiated.
Powder of linseed.
Powder of black mustard.
Powder of opium.
Pyrophosphate of iron, citro-ammoniacal.
Pyrophosphate of sodium.
Quinine.
Resin of jalap.
Resin of scammony.
Resin of mullein.
Santonine.
Soap, medicinal.
Soap, beef marrow.
Syrup of morphia hydrochlorate.
Syrup of codeia.
Syrup of extract of opium.
Syrup of iodide of iron.
Syrup of ipecacuanha.
Syrup of cinchona bark.
Syrup of cinchona bark, vinous.
Sodium hydrate, liquid.
Sulphur, flowers of, washed.
Sulphur, precipitated.
Strychnia.
Amber.
Cane sugar.
Milk sugar.
Sulphate of aluminium and potassium.
Sulphate of atropine, neutral.
Sulphate of cadmium.
Sulphate of copper.
Sulphate of iron crystals.
Sulphate of magnesium.
Sulphate of morphia.
Sulphate of quinine.
Sulphate of sodium.
Sulphate of strychnia.
Sulphate of zinc.
Sulphide of antimony.
Sulphide of potassium, impure.
Sulphide of sodium.
Sulphide of antimony, golden.
Tablets, or lozenges, of ipecacuanha.
Tablets, or lozenges, of kermes mineral.
Tablets, or lozenges, of peppermint.
Tablets, or lozenges, of bicarbonate of sodium.
Tablets, or lozenges, of sulphur.
Isinglass plaster (English court plaster).
Tartrate of potassium, acid.
Tartrate of potassium and antimony.
Tartrate of potassium, boro-.
Tartrate of potassium, neutral.
Tartrate of potassium and sodium.
Tincture of aloes, simple.
Tincture of aloes, compound.
Tincture of belladonna.
Tincture of stramonium.
Tincture of digitalis.
Tincture of henbane.
Tincture of cinchona calisaya.
Tincture of nux vomica.
Tincture of opium.
Tincture of opium, benzoated.
Tincture of rhubarb.
Tincture of rhubarb, aqueous.
Tincture of rhubarb, vinous.

Valerianate of atropine.
Valerianate of quinine.
Valerianate of zinc.
Veratrine.
Wine of gentian.
Wine of ipecacuanha.
Wine of opium with saffron.
Wine of cinchona.
Wine of opium, compound (black drop).
Vinegar of squills.
Zinc—metallic.

In the case of most of the well-known chemical preparations found in commerce methods of preparation are not given, but simply descriptions and tests.

I will now give some freely translated extracts from the Preface, which will help to show the aim of the compilers, although they may occur in a somewhat disjointed manner:—

"We have only comprised under the title of materia medica those substances or products the use of which in one or more European countries would justify their adoption in an International Pharmacopœia."

"The third division, namely the Pharmacopœia properly so called, raises numerous and delicate questions, such as are not likely to be found in the first and second divisions.

"It is not only necessary to make a judicious choice of formularies well-known and common to all nations, but to eliminate from a vast number of established preparations, more or less empirical or arbitrary in their nature, and which help to compose the special Pharmacopœias of European nations, a selection of remedies which shall meet the general wants of the healing art, and, at the same time, conform to the precise rules which should govern the science of Pharmacology."

"With regard to compound preparations, which result from mixtures more or less complicated, such as syrups, electuaries, pills, mixtures, ointments plasters, etc., it is evident that these compositions, in former times so complicated, irrational, and arbitrary, are now in national Pharmacopœias reduced to a more simple, logical, and scientific condition, and to maintain this principle should be the effort of every pharmaceutist."

The preface contains a long and energetic denunciation of quack medicines or secret preparations so much in vogue both in Europe and America, and puts forth the hope that an International Pharmacopœia, with well-known and approved medicines, will materially tend to diminish the use of these, in many cases, very questionable preparations.

The course adopted by the commission in framing the work is given as follows:—

"The members have first compared with the greatest care the various Pharmacopœias of Europe and America, comprising those of Germany, Great Britain, Austria, Belgium, Denmark, United States of America, France, Greece, Holland, Moldavia and Roumania, Norway and Sweden, and Switzerland.

"This preliminary study was followed by discussion, the result of which was that to each member of the commission was given a share of the work for elaboration; next the work of each particular collaborateur was discussed by the entire committee and definitively adopted for final submission to the judgment of the Société de Pharmacie.

"In the choice and compilation of the various formulæ, the Commission has given preference to those which are most simple, rational, and frequently used, without distinction of origin.

"The Commission, greatly valuing the prevalent ideas of the Codex of 1866, was naturally inclined to propose a number of matters and formulæ taken from the national Pharmacopœia, but it has made it the rule, as a matter of duty, on every occasion where there was a choice between a French and foreign formula almost equivalent, to give the preference to the latter.

"It must be remembered that the work of the Commission is essentially provisional; it is in a measure only a project offered to your appreciation, and the pharmaceutical authorities of each nation are fully at liberty to criticize or combat its propositions, and to endeavour to assert their own special ideas and the methods of their own national Pharmacopœias."

This paper having necessarily extended to considerable length, I will reserve any expression of opinion in detail till the close of the discussion, contenting myself at present by saying that while anxious to give all praise and credit to the compilers of the proposed book for their self-denying and arduous labours, there are still some considerable modifications to be made to adapt it to the tastes and wants of the present age, if it is to be more than in name a Universal Pharmacopœia.

[*The discussion on this paper is printed at p.* 631.]

NOTE ON A SPURIOUS SENNA.*

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

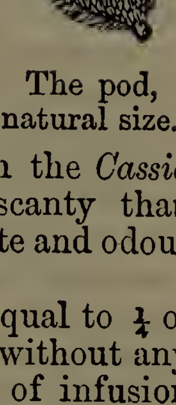
During the past month, a drug has been offered for sale in London, under the name of "fine senna," which evidently differs considerably in botanical characters from the true article, although in size and colour somewhat resembling the Tinnevelly variety. Of this "fine senna" I was informed, when I received a sample, that two bales only were in London, although no less than the enormous quantity of 200 tons was consigned to the agent here, and would probably arrive before long in this country. Hence it appeared probable that this senna might enter into commerce, and that its history and medicinal properties would therefore be worthy of investigation. With this view I examined the few leaves and pod that were first received, and found that they were evidently the produce of a leguminous plant, possibly belonging to the genus *Cassia*, but if so, certainly to a different section to that to which the officinal senna belongs. The genus *Cassia* being an extremely large one, I at once forwarded my specimen to Professor Oliver, who identified it as probably belonging to *Cassia brevipes*, D.C., a native of Costa Rica and Panama. A further supply of the leaves fortunately contained some flowers and young twigs, which were sufficient to enable me to confirm beyond a doubt Professor Oliver's opinion. The sub-genus *Chamæcrista* to which this plant belongs, contains herbs and shrubby plants with pinnate leaves and conspicuous stipules, the flowers being either solitary in the axils of the leaves, or sometimes subfasciculate on a very short common peduncle. There are 78 species in this sub-genus; but the small group of about 9, to which *Cassia brevipes* belongs, consists of plants which are so closely allied as to form an almost continuous series, the leaves being very similar throughout the group. Our plant is, however, distinguished from its con-

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, February 3, 1875.

geners by its short, very hairy pod, with the hairs golden yellow and not appressed.

The left-hand figure shows an entire leaf with a flower bud in the axil of the leaf. The right-hand upper figure shows the venation of a leaflet, and the small one below it represents a stipule.

The following is a description of the drug I have received:—The twigs above-mentioned have hairy stems, and the leaves are alternate, compound, with a very short petiole, bijugate, and the rachis ends in an extremely fine short hair-like point. The leaflets, which are so closely placed as to overlap each other, are entire, unequal at the base, about 1¼ inch long, somewhat elliptic in outline, the lower margin being less curved than the upper; they are mucronate at the apex. The most marked feature, however, consists in the venation. Three principal veins start from the base of the leaf, and diverging but slightly, proceed nearly to the apex of the leaf. Each of these three veins is branched in a pinnate manner at a very acute angle (about 7°), so that at a casual glance the leaf appears furcate-veined. The two lower leaflets on each leaf are smaller than the two upper ones. The pods are brownish, about twice as long as broad, and covered with yellowish erect hairs. The stipules are lanceolate, with a cordate base, and have numerous minute veins. The flowers are large and yellow, with rigid scarious sepals, and are solitary in the axils of the leaves.



The pod, natural size.

Thinking it probable, since it belonged to the same genus, it might perhaps have the same purgative properties as senna, I made two infusions, one of *Cassia brevipes*, and the other of Tinnevelly senna, each in the proportions directed in the British Pharmacopœia for infusion of senna. In appearance the two infusions were exceedingly different, that of senna being of a rich brown, and the other scarcely darker than almond oil. Both were neutral to test paper, and with acetate of lead, tincture of galls, and solution of perchloride of iron gave similar precipitates, those from the *Cassia brevipes* being rather paler and more scanty than those from the Tinnevelly senna. The taste and odour of both were similar.

Having tried a quantity of infusion equal to ¼ of an ounce of the leaflets, I found it to be without any effect whatever, while a similar quantity of infusion of Tinnevelly senna acted as a decided purgative.

This experiment, however, only proved that *Cassia brevipes*, D.C., is not purgative in ¼ of an ounce doses. I therefore tried the effect of a quantity of its infusion equal to ½ an ounce of the leaves, but with the same result as before. Hence I conclude that this new variety of senna is useless as a purgative, and can by no means replace or enter into competition with the official senna, even if it should be offered at a much lower price; and that should it, hereafter, occur mixed with ordinary senna, it must be looked upon as an adulteration.

[*The discussion on this paper is printed at p.* 634.]

NOTE ON SALICYLATE OF METHYL.*

BY JOHN WILLIAMS, F.C.S.

The recent discovery, by Kolbe, of a method of producing salicylic acid by the combination of carbonic anhydride and hydride of phenyl (carbolic acid), in the presence of caustic soda at an elevated temperature, is not only one of the most interesting discoveries from its theoretical importance, but also for many practical reasons. As an antiseptic the acid promises to be of great importance, and being free from unpleasant taste and quite devoid of smell, and, as far as we know, possessing no poisonous qualities, it will probably be employed for preserving meat, milk, etc., and possibly may be found possessed of valuable preservative properties which may be of value in pharmacy, *i.e.*, in the preservation of infusions, ointments, etc. Of course much will depend upon the price at which it can be produced. At present many practical difficulties in its manufacture have to be overcome, but when the process is better understood, and appropriate forms of apparatus have been devised for conducting the operation, it is expected that the acid will probably be produced at the cost of a few shillings per pound.

It has long been known that the essential oil of wintergreen (*Gaultheria procumbens*) consisted almost entirely of salicylate of methyl. In fact, until lately this oil was the best and cheapest source from which to prepare the acid. It is not much employed by English pharmacists, but in America it is a great favourite, many syrups and preparations of "elegant pharmacy" being flavoured with it.

I have lately prepared some of the salicylate from the artificial acid and find it quite identical in flavour with the natural oil. We thus have the curious fact that a product of the destructive distillation of coal and a product of the destructive distillation of wood combine together to form a natural product, another proof, perhaps, that the time must come when chemists will be able to prepare artificially such bodies as quinine, morphia, or strychnia.

The salicylate of methyl is easily produced by mixing salicylic acid, pure wood spirit (or methyl alcohol), and sulphuric acid together in a retort, and distilling in an oil bath, the temperature required being about 208° Cent.

We may anticipate that it may shortly be produced at a much cheaper rate than the natural oil can be supplied at, and will probably find many uses as a scent in soap-making and perfumery, as well as pharmacy.

[*The discussion on this paper is printed at p.* 634.]

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, February 3, 1875.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 6, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

WHAT MAY A DRUGGIST SAFELY SELL?

THE reports upon another page of the proceedings during the past week in the police courts at Hull and Leeds are worthy of the serious attention of all chemists and druggists. They both serve to remind our readers that respectable tradesmen are sometimes liable to the annoyance of being summoned before a magistrate, and to the loss of time and money, for doing only what has been done without let or hindrance literally for centuries. Setting aside for a moment the question whether the arguments put forward in the one case by the Inland Revenue authorities, and in the other by the public analyst of Leeds, are sound, there can be little doubt that preparations of the nature of the "morning tonic" and the "milk of sulphur" in question have been sold by chemists and druggists so long that the maxim "*consuetudo est altera lex*" may be fairly pleaded.

In the "morning tonic" case, which had been adjourned to allow time for the magistrate to consider his judgment, a decision has been arrived at that decides nothing in respect to what is the real position of the chemist and druggist in regard to the sale of such preparations. The magistrate has evaded the difficulty in which he evidently felt himself placed by respiting judgment for six months, with a pretty clear intimation that unless he is compelled by a superior court to deliver judgment the respite will be continued *sine die.*

Nevertheless, a perusal of the remarks made by the magistrate in conveying his determination leaves but little doubt that his opinion leant strongly towards a conviction; indeed, he said that in the facts before him there were grounds for believing that a breach of the letter of the law had taken place, as charged by the Inland Revenue authorities. But that such a breach lies in either of the points instanced by the worthy magistrate we utterly deny. For it cannot be seriously contended that there should be a parody of the "*bonâ fide* traveller" farce, and that the customers of chemists and druggists should be asked whether they are "sick, lame, or distempered" before they are supplied with a medicine which probably is required for somebody else; or that a drug becomes a dram if it be sold in a particular shaped bottle, or if it contain a certain percentage of spirit, or if it be labelled "to be taken occasionally." As to the magistrate's statement, that this last point was disposed of by Dr. KING's objection to a patient being allowed to take a glassful of "tonic" when he chose, we may remark that many medical practitioners would raise the same objection with respect to tincture of rhubarb, but we should be surprised to hear that the Inland Revenue authorities were prepared to claim that tincture of rhubarb was an excisable article on that ground.

In fact, to say that there had been a breach of the letter of the law, seems to us to have been singularly inappropriate. For there was unimpeachable evidence that the article was suitable for a medicine, and that it had been sold as a medicine and used as a medicine. On the other hand, there was nothing more than an expression of opinion that the "morning tonic" resembled some concoctions sold by the publican; but might not the same be said of Mistura Spiritus Vini Gallici, B.P.? In our opinion a justifiable ground for the conviction of a chemist and druggist for selling such a preparation could only be found in the breach of the spirit of the law, by offering facilities for the purchase of drams under the disguise of drugs. And we are glad to find that the Hull case, whether judged by the quantity sold or the fact that a purchaser had to call three times before he could obtain a bottle of it, appears to be free from any appearance of such facilities having been afforded. A cogent answer to the fears of the excise lest the chemist and druggist should compete with the publican is that although, as shown by Mr. SAVAGE last week, the Pharmacopœia of 1747 contained a Tinctura Amara almost identical with publicans' bitters no particular trade in it has been developed yet.

But we venture to go further, and to question the propriety of such a prosecution being commenced without a more intimate knowledge of what a chemist and druggist may or may not sell than is evinced by the prosecutor's admitted ignorance of any tinctures being prepared with spirit above proof. This inability to look beyond certain narrow limits probably led also to the arbitrary choice of representing the spirit strength of the tinctures as equal to so much per cent. of proof spirit. Such a use of a technical term is inevitably misleading, as is shown by the fact that in most reports of this case the word "proof" has been omitted as unimportant. It is obvious that a similar misunderstanding might seriously affect a magisterial decision.

An analogous limitation to preconceived opinions is manifest in the prosecution for the sale of "milk of sulphur," reported on p. 635. The public analyst, starting with the assumption that milk of sulphur is pure sulphur and nothing else, persisted through a long cross-examination in saying that "milk of sulphur" and "precipitated sulphur" were one and the same article, and that the presence of sulphate of lime in the former should be deemed an adulteration. Pharmacopœia formulæ, the opinions of eminent authorities, appeals to the custom of the trade during more than a century,—all were quoted without the slightest effect in the way of moving him from his opinion that when "milk of sulphur" is asked for, whether the customer desires it or not, the chemist and druggist should be compelled to supply precipitated sulphur under fear of a prosecution for adulteration. Of course such a theory could not stand, and at its first collision with practical experience, in the evidence of Mr. BROOKE, it fell to the ground, and with it the prosecution.

The merits of this case are not affected by the question whether the sale of the compound known as milk of sulphur should be favoured by pharmacists. We know there are some who are of opinion that it is the duty of the pharmacist who is asked for "milk of sulphur" to represent it as an impure article or even to substitute the precipitated sulphur without any explanation. But this only has the force of an opinion, and is powerless to affect those who are opposed to it, or to render them liable to legal penalties. In many cases the public prefer, perhaps in ignorance or prejudice, the smooth comparatively odourless milk of sulphur to the stronger smelling and more gritty pharmacopœial preparation. Like Dr. REDWOOD, we do not advocate the use of milk of sulphur, much less its substitution for precipitated sulphur, for this would undoubtedly partake of the nature of a fraud. But whilst the public ask for the compound preparation, and are frequently dissatisfied if they do not obtain it, it is absurd to stigmatize its sale as a breach of the Adulteration Act.

There is an unsatisfactory feature in the initiation of this prosecution which we think is fairly open to censure. Whilst we appreciate the frankness with which the town-clerk withdrew the summons directly he became aware of the true facts of the case, we do not think his apology a sufficient one. It is not much consolation to a respectable tradesman who has had his reputation for fair trading impugned in a police court to be told by the responsible person that his subordinate officers had acted without proper consultation. But we fear that such cases are not at all singular.

We are glad to see that the action taken by the local chemists' associations, in providing for the defence in both these cases, serves well to illustrate the practical value of such societies. The trade at large are indebted to them for the example they have set, and we have also to thank them for their prompt communication of the particulars of the cases.

In conclusion, we would call attention to the fact that the absence of the alkali from soda water is mentioned in the certificate of a public analyst produced in a prosecution at Wolverhampton, although we do not gather from the report whether it had any influence in ensuring a conviction.

THE *Gardener's Chronicle* notices one of those curious mistakes which sometimes occur in attempts to affect a faithful translation of a phrase from one language into another. In this case a French scientific journal, speaking of Owens College, Manchester, calls it "Collége de Saint-Ouen."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 3rd, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Frazer, Greenish, Hampson, Mackay, Owen, Radley, Rimmington, Robbins, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, and Williams.

The minutes of the previous meeting were read and confirmed.

THE MANCHESTER SCHOOL OF PHARMACY.

The SECRETARY read a letter from the Secretary of the Manchester Chemists and Druggists' Association, enclosing the following resolution :—

"That the Council of the Manchester Chemists and Druggists' Association and School of Pharmacy desire to express their warmest thanks to the Council of the Pharmaceutical Society for the grant of £50 in aid of the expenses of the Manchester School of Pharmacy, and trust that the continued efforts of those interested in the School may justify the assistance which has been given to it."

THE BOARD OF EXAMINERS FOR 1875.

The SECRETARY read a letter from the Privy Council Office, approving the appointment of the Examiners whose names had been submitted to the Privy Council, in December.

RETIRING MEMBERS OF COUNCIL.

The lot being taken in the usual manner for the seven members of Council who should retire in May next, the following names were drawn :—

Bottle	Frazer	Hampson
Mackay	Rimmington	Robbins
Stoddart		

The following, who remained in by lot last year, now retire by rotation :—

Atherton	Baynes	Betty
Brown	Greenish	Radley
Savage		

The following remain in office for another year :—

Hills	Owen	Sandford
Schacht	Shaw	Sutton
Williams		

Mr. George Spratt Taylor was appointed Superintendent of the Preliminary Examination to be held in London in April next.

The following being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society :—

Gordon, John.......................... Aberdeen.
McIntyre, Ewen, jun. .... Edinburgh.
Mackay, George Duncan......... Edinburgh.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected Members of the Society :—

Frazer, Samuel McCall .... Glasgow.
McIntyre, Ewen, jun. .... Edinburgh.
Mackay, George Duncan......... Edinburgh.

Chemists and Druggists.

The following Registered Chemists and Druggists were elected Members of the Society :—

Brown, Alfred James .... Greenwich.
Burn, James .... Flintham.
Foster, James .... Carlisle.
Wright, Edwin Percy .... London.

ASSOCIATES.

The following having passed their respective examinations were elected "Associates in Business" of the Society:—

Minor.

Almgill, John ....Yeadon.
Blacklock, John ....Haslingden.
Holmes, Charles Joseph ....London.
McMillan, James ....Dundee.
McNaught, Archibald ....Greenock.
Nockolds, Stephen William......London.
Pearson, Charles Frederick......Liverpool.
Pidd, Arthur Joseph ....Manchester.
Rees, Samuel Lawrence ... .Hayle.
Robinson, Richard Atkinson ...London.
Symington, Thomas ....Edinburgh.
Wilson, Thomas ....Nottingham.

Modified.

Appleyard, William ....Bradford.
Archer, James ....Lechlade.
Atkinson, Robert John ....Lincoln.
Barge, John ....Plymouth.
Drane, William......................Putney.
Evans, Joseph James Ogilvie ...Teignmouth.
Hannah, John ....Abergele.
Hartley, Stephen ....Harrow-on-the-Hill.
Kirk, Snowden ....Poplar.
Ross, William ....Galashiels.
Scrase, Richard......................London.
Snell, Charles Henry ....London.
Stephen, John Wilson ....Macduff.
Wavell, Edward ....London.
Whittaker, John William ......Rochdale.

The following having passed their respective examinations were elected "Associates" of the Society:—

Minor.

Alexander, Alexander ....Aberdeen.
Bell, Thomas ....Harrogate.
Blackwell, Josiah ....St. Austell.
Cattell, Thomas Bellamy.........Coventry.
Chapman, Walter ....Newstead Grange.
Couper, Charles James............Edinburgh.
Davidson, Alexander ....Insch.
Eminson, Thomas..................London.
Forth, William Pelcher ....Ashford.
Green, Charles Henry ....Hastings.
Haysworth, William Stone ......Preston.
Howard, Robert ....Clitheroe.
Jerrett, Edward.. ....Salisbury.
Kirk, John Robert ....Leeds.
Myott, Frederick ....Oldham.
Newton, Alfred Henry.............Kenilworth.
Price, Charles William.............Abergavenny.
Reade, Joseph George Edward London.
Stephens, George Thomas ......Hereford.
Storie, Robert.........................Edinburgh.
Thomas, Harry Alma ....London.

Modified.

Bingham, Robert ....Hull.
Dodds, John Henderson ....Walsall.
Jackson, William Frazer.........London.
Logan, Francis ....Pembroke Dock.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination were elected "Apprentices or Students" of the Society:—

Adams, John..........................Glasgow.
Alden, Ebenezer Wenham ......London.
Anderson, Edward ....Limber.
Best, John William ....Darlington.
Bilton, John Walter...............Newcastle-under-Lyne.
Bletsoe, Francis Ferriman ......Nottingham.
Boa, Peter ....Stranraer.
Booth, Thomas ....Bolton.
Brayne, John William Ward ...Newmills.
Briggs, William.......................Lancaster.
Broad, Thomas Benjamin ......Macclesfield.
Brook, Charles Mytton ....Saltaire.
Brown, John Jarvey...............Glasgow.
Chapman, Leonard Parker ......Rochdale.
Collins, Robert Enos ....Boston.
Crow, William ....Berwick-on-Tweed.
Dawson, Edward ....New Cross.
Dean, Thomas William ....Linton.
Fry, Henry ....Leicester.
Futcher, Alfred James............Sandown.
Glen, Robert ....Greenock.
Green, Thomas ....Hemel Hempstead.
Holmes, James William ....Norton Malton.
Logsdail, Henry ....Lincoln.
McAlley, Robert ....Edinburgh.
McDougall, Rea Ireland ....Edinburgh.
Marshall, John David ....Boston.
Newbury, Samuel..................Dorking.
Nichols, Frederic Bulstrode......Chelsea.
Ogilvie, William ....Huntly.
Phillips, James Arthur ....Penge.
Railton, William ....Penrith.
Ray, William Frederic............Westerham.
Sandell, John Tyack ....Wellington.
Shrivell, Fredk. Wm. Edward...Hadlow.
Southgate, Wilfrid Burnham ...Hull.
Strachan, John ....St. John's Wood.
Sutcliffe, George Hargreaves ...Bacup.
Swindlehurst, Thomas Newton Preston.
Thornley, Frederick...............Devizes.
Vaughan, John.......................Newtown.
Waddell, Andrew Morrison ...Tollington Park.
Waldie, Robert.......................Innerleithen.
Walker, Robert .... Royston.
Ward, Henry Singleton ....Preston.
Warren, Richard W. ....Leicester.
Watson, Henry Gervase ...... .Sheffield.
Watson, Robert John ....Market Rasen.
Watt, George William... .... ..Huntly.
Weary, China Thomas........... Stoke.
Widdowson, William ....Nottingham.
Wildgoose, John Gratton ......Boston.
Wilkinson, John... ....St. John's Wood.
Wilks, Cuthbert Sympson ......Lincoln.

The following names were restored to the Register:—

Edward, William Wales ... ..Drumnor House, Rhynie, Aberdeen.
Jones, Hugh Lloyd ....227, Brownlow Hill, Liverpool.
Priestman, William ....2, Wellington Street, Waterloo Town, Bethnal Green.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts were ordered to be paid.

BENEVOLENT FUND.

This Committee made the following recommendation, which was agreed to:—

That £10 be granted to the widow of a registered chemist and druggist, formerly in business at Notting Hill, having four children dependent upon her.

LIBRARY, MUSEUM, AND LABORATORY.

The Committee recommended the purchase of 'Becker's Scientific London' for the library. The attendance in the library during the month preceding the meeting of the Committee had been on the average during the day 12; evening, 9·4. The curator of the museum had reported that the average attendance of students in the museum had been during the day, 10; evening, 3; of ticket-holders, in the day, 3; evening, 1. Professor

Attfield had reported that there had been 68 entries in the laboratory since the commencement of the session, 48 students now being at work.

Mr. SCHACHT drew attention to the inconvenience arising from the rule that only two volumes at a time could be had from the library, especially in cases of works in three or four vols. In such cases he thought the rule might be relaxed.

Mr. GREENISH said it was rather an important question, and he should prefer it being referred to the Committee for consideration before any decision were come to.

Mr. WILLIAMS thought it was very satisfactory to find that so many persons availed themselves of the privilege of using the library. Seeing the Secretary of the North British Branch present he should be glad to hear from him any information as to the attendance in the rooms, library, etc., in Edinburgh.

Mr. MACKAY said he should be very happy to afford any information in his power, but the fact was these matters were attended to systematically down in the north, and statistics collected which were embodied in an annual report. Hitherto this report, though it had been regularly published in the Journal, had not, he feared, received much attention, but as the North British Branch was now coming into some prominence he had no doubt it would be read with more interest. The report would be presented at the end of the session, and would give, he believed, all the information desired.

Mr. SCHACHT asked if it would not be desirable to extend to associates the privilege, or rather the right, of having books from the library. It appeared to him that they were exactly the class of persons whom they desired to assist in this way, and they sometimes found a difficulty at present in obtaining books.

Mr. GREENISH remarked that associates could, he understood, obtain books at present.

Mr. MACKAY said that not only members and associates but registered apprentices also enjoyed the privilege of getting books from the library of the North British Branch.

Mr. SCHACHT said there was a great mistake on the part of himself or his informant, or else on the part of the librarian, if it were the fact that associates could obtain books.

Mr. ROBBINS believed the rule was that associates must apply for books through a member, which sometimes caused them inconvenience.

Mr. WILLIAMS observed that the great difficulty with regard to associates was that some of them so frequently changed their addresses.

After some further conversation the report of the Committee was adopted, and a resolution passed referring the questions brought forward by Mr. Schacht to the Committee.

HOUSE.

This Committee had met to consider what arrangements could be made for the School of Pharmacy Students' Association. Professor Attfield had attended the meeting. It was decided to give the Association permission to use the old Council room for its meetings on Thursday evenings, with the understanding that the Society would be able to use the room if occasion required. Professor Attfield had made a report as to the security of the premises against fire, but the consideration of this had been deferred for consultation with the surveyor.

The report and recommendations of the Committee were adopted.

BELL MEMORIAL SCHOLARSHIP FUND.

A letter from Mr. Daniel Hanbury was read, enclosing a cheque for half-a-year's dividend on the stock invested for the Bell Memorial, and pointing out that in consequence of the death of the late Mr. Waugh the Fund now stands in the names of two trustees only.

Mr. SANDFORD thought it would be well if the stock were transferred to the Society, to be held on the same trusts as its other funded property.

It was decided to consult Mr. Hanbury as to the expediency of adopting this course before any steps were taken.

REPORT OF EXAMINATIONS.

January, 1875.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major	3	0	3
Minor	16	8	8
Preliminary	150	64	86
Total	169	72	97

Preliminary: Six Certificates were received in lieu of this Examination:—

1 College of Preceptors.
1 Law Society of the United Kingdom.
1 Society of Apothecaries.
2 University of Cambridge.
1 ,, ,, Oxford.

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major	3	3	0
Minor	3	1	2
Modified	1	1	0
Preliminary	22	13	9
Total	29	18	11

Mr. GREENISH asked if the Secretary could give the relative proportion of candidates who were rejected in London and Edinburgh, because it had been stated that in the latter place young men passed much more easily than in London.

Mr. MACKAY said there could be no objection to the Secretary giving any information in his power upon the subject, but he was glad to say that whatever might be the results, there was now such a reciprocity of communication between the two Examining Boards that there could not be any but the most trifling difference in the two examinations.

Mr. STODDART said he knew of one instance in which a young man who had failed in London went to Edinburgh a month or so afterwards, he believed, and passed. On asking him how it was, he said that the extreme kindness of the Examiners in Scotland encouraged him to give better answers than he could in London. It was evident the young man could not have learned much in the interval.

Mr. WILLIAMS remarked that he understood the rule to be that three months must elapse before a candidate who had failed again presented himself.

Mr. MACKAY said the list of candidates was sent up to London ten days previous to the Examination, for the purpose of being certified, so that no one could come up until the proper time had elapsed.

The VICE-PRESIDENT, as one of the deputation which went to Scotland, desired to bear testimony to the consideration shown to candidates by the Board there, and which he believed was also shown in London. With regard, however, to the Scotch Board drawing out the knowledge of the candidates better than their London colleagues, he might mention one fact which occurred during his presence. A candidate on being asked the very first question, instead of answering, asked leave to be allowed to retire. He (Mr. Bottle) spoke to the young man, who said he was so nervous that he could not answer, and could not, in fact, write his own name, though subsequent inquiry showed that he had written his name on the examination paper in a clear, round hand. He was recommended to retire for a short time and return, but the candidate did not make his appearance again.

Mr. HAMPSON said if it were the fact that a greater proportion passed in Edinburgh in a given time than in London, there must be some reason for it, though what the reason was he could not say. He knew it was the anxious desire both of the Council and of both the Examining Boards that there should be perfect uniformity in the examinations in the two places. Of course the two Boards being constituted of different elements could not be exactly the same, but he was sure the intention was to make the examinations of equal value.

Mr. FRAZER observed that not only was there a difference in the Boards, but also in the candidates. It might be that the cautious Scotch lads took care not to present themselves before they were competent, while the more impulsive English rushed in without caring much for the results.

Mr. SUTTON said he was much grieved to find that at present the degrees of B. Sc. and D. Sc. could be obtained in Edinburgh much more easily than in London. He should be very sorry if any cue were taken from that with regard to the Society's examinations, but he did not think such was the case.

Mr. HAMPSON remarked that statistics, to be of any value, must cover a somewhat prolonged period; it would be quite useless to take the figures for one month for comparison.

Mr. MACKAY said there could not possibly be any difference with regard to the Preliminary, because the questions were printed in London, and only arrived in Scotland by post on the morning of the examination. Therefore, whatever might be the result of the statistics, there could be nothing to cause any difference in the results except in the capacity of the candidates. In the case of the Major and Minor Examinations, it was of course impossible to dictate exactly what questions should be put; but in order that the two examinations in practical chemistry should be assimilated as closely as possible, he had written to the London Board for the various articles used in the laboratory since the change in the examinations in October last, so as to assimilate as much as possible the course pursued by the Board in Edinburgh with that in London.

Mr. BAYNES said this was a most serious question, and he was sorry to find that in his own neighbourhood it exercised a kind of terrorism over the young men, some of whom seemed to be losing their heads over it. He should be sorry if any invidious comparisons were made between Edinburgh and London, but comparing London with London, he found that the percentage of failures had enormously increased.

The PRESIDENT suggested that this state of things was the result of the rule allowing young men under twenty-one years of age to come up for examination. It was already beginning to improve, for at the last examination about 50 per cent. passed, instead of 20 or 30 per cent. as had happened on some previous occasions.

Mr. BAYNES said he excluded altogether the last six months, because there was then an exceptional state of things which would not occur again. He expected to see a gradual improvement take place, but there must never be a race between England and Scotland as to which should pluck most candidates.

The PRESIDENT said such a thing as that could certainly not occur now, because there was constant communication between the two boards who were extremely anxious to carry out a uniform examination.

STATISTICS OF THE SOCIETY.

The REGISTRAR presented a Report showing the present numerical strength of the Society, an analysis of the examinations during 1874, and a statement of the subscriptions to and grants from the Benevolent Fund.

Mr. WILLIAMS said this ought not to pass without an expression of thanks to the Registrar for the care he had displayed in preparing this Report, which he considered reflected great credit on the officials who had been engaged upon it.

Mr. SAVAGE suggested that the consideration of this Report should be deferred.

The SECRETARY said he had no idea of bringing it forward for discussion on the present occasion.

The Report was received and ordered to be entered on the minutes, but not to be published until it had been considered at the next meeting of Council.

PARLIAMENTARY.

This Committee had met, and considered the decision of the magistrate in the Hull "Morning Tonic" case, as reported in the newspapers. The committee were of opinion that the matter should be allowed to drop. (The decision of the magistrate is reported at p. 639).

The Solicitor had reported that Mr. J. C. Swan, of the Household Stores Association, Albert Square, Manchester, who had been proceeded against for using the title of a chemist and druggist, in breach of the Pharmacy Act, had submitted to pay into court a penalty of £5 and costs, at the rate of 20*s.* per month.

THE CONVERSAZIONE.

Mr. WILLIAMS said a motion had been put into his hands that a conversazione be held on Wednesday, the 19th May, and that application be made for the use of the South Kensington Museum on that occasion; but he really thought it was worth serious consideration whether they should hold the Conversazione this year or not. It was a very expensive affair, though it was always very successful, at any rate, so far as the numbers attending it were concerned. He thought there was plenty of time yet for its consideration, and instead of moving the resolution he would give notice of it for the next meeting.

The PRESIDENT thought this would be a good plan, and suggested that the conversazione might be held alternately at South Kensington and on their own premises.

Mr. BETTY said it would facilitate the discussion next month, if the matter were referred to a committee to consider the details in the meantime, and he would, therefore move that it be referred to the Finance Committee.

This was seconded by Mr. Schacht, and carried.

The SECRETARY asked what he should do in the case of a former member who refused to pay his subscription, and who, when applied to to return his diploma, refused to do so.

The PRESIDENT thought the better plan would be to place the case in the hands of their solicitor.

EXAMINATIONS IN EDINBURGH.

January 28th, 1875.

Present: Messrs. Ainslie, Buchanan, Gilmour, Kemp, Kinninmont, Noble, and Young.

Professor Maclagan was present on behalf of the Privy Council during the practical portion of the Major Examination on the 27th.

MAJOR EXAMINATION.

Three candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists. Their names are as follows:—

*Gordon, John ....Aberdeen.
Mackay, George Duncan..........Edinburgh.
McIntyre, Ewen, jun. ....Edinburgh.

MINOR EXAMINATION.

Three candidates were examined. *Two* failed. The following *one* passed, and was declared qualified to be registered as a Chemist and Druggist:—

Price, Charles William............Abergavenny.

MODIFIED EXAMINATION.

The under-mentioned was examined, and declared qualified to be registered as a Chemist and Druggist:—

Scaife, Samuel ....Manchester.

* Passed in the First Division.

Preliminary Examination.

Erratum.

Page 589, col. 1, line 13 from top, *for* "Doe, James Emile, Atherstone," *read* "Doo, James, Atherstone."

BENEVOLENT FUND.

Subscriptions Received during January, 1875.

	£	s.	d.
"A Friend"	1	1	0
Alexander, John, 81, Athol Street, Liverpool	0	10	6
Atkinson, Stephen, Doncaster	0	10	6
Baigent, W. H., Shefford, Beds	0	10	6
Baker, Frank, Harnet Street, Sandwich	0	10	6
Bancks, Alfred, Guisborough	0	10	6
Beattie, Walter, Greenbank, Lasswade	0	3	8
Bennett, John W., Leigh, Lancs.	0	5	0
Betts, William, 19, North Cross Street, Gosport	0	5	0
Bingley, F. B., 12, High Street, Guildford	0	10	6
Blayney, Joseph J., Deardengate, Haslingden	0	5	0
Booth, John, Heckmondwike	1	1	0
Bray, James, Romford	1	1	0
Broadbent, James, East Bierley, Yorks.	0	10	0
Brown, W. S., 113, Market Street, Manchester	1	1	0
Burdwood, J., 30, Frankfort Street, Plymouth	0	5	0
Busby, H. H., High Street, Guildford	0	10	6
Butt, Edward N., 13, Curzon Street, W.	2	2	0
Carteighe, Michael, 172, New Bond Street, W.	1	1	0
"C. H."	0	5	0
Cheverton, George, The Broadway, Tunbridge Wells	0	10	6
Chubb, James C., 102, St. John Street, E.C.	1	1	0
Clark, Robert, Prospect House, Devizes	0	10	6
Cockton, John, Maryport	0	5	0
Coldwell, David B., 86, Queen's Road, Peckham	0	10	6
Cole, Alfred C., Lee	1	1	0
Collins, Edward de Tedney, The Close, Lichfield	0	5	0
Critten, Robert P., High Street, Southwold	0	5	0
Dinneford and Co., 172, New Bond Street, W.	2	2	0
Drake, W., Wyke, near Bradford	0	3	0
Ellis, Bartlett, Banff	0	10	6
Ellis, William, High Street, Burnham	0	5	0
Evans, Joseph J. O., 1, Victoria Road, Teignmouth	0	5	0
Evison, William, 4, Upper Cobden Place, Claypit Lane, Leeds	0	10	6
Fisher and Haselden, 18, Conduit Street, W.	1	1	0
Fitch, Robert Owen, 200, Well Street, South Hackney	0	10	6
Fowls, Jabez, 45, Kensington Road, Southport (1874 and 1875)	2	2	0
Fox, Charles Edward, 109, Bethnal Green Road, E.	1	1	0
Fox, William, 109, Bethnal Green Road, E.	1	1	0
Goodwin, John, Lower Clapton	1	1	0
Gostling, T. P., Diss	0	10	6
Goucher, John, 43, High Street, Shrewsbury	0	10	6
Grisbrook, Edward, 17, High Street, Windsor	0	5	0
Groves, Henry, Florence	1	1	0
Groves, Thomas B., 80, St. Mary Street, Weymouth	0	10	6
Gwatkin, James Thomas, 49, Grand Parade, Brighton	0	10	6
Haddock, B., 19, North Street, Wolverhampton	0	10	6
Ham, John, Nether Stowey	1	1	0
Hammond, William H., 13, Whitefriar Gate, Hull	0	5	0
Hannah, John, Market Street, Abergele	0	5	0
Harding, R. O., Belvedere, Bath	0	10	6
Harrington, A., Needham Market	0	10	6
Harvie, John, Stirling Street, Airdrie	0	5	0
Heanley, Marshall, Market Place, Peterborough	0	10	6
Heath, Frederick D., 1, Nelson Terrace, Southend	0	5	0
Heathcoat, Thomas, 30, Downs Park Road, Hackney, E.	0	10	6
Hodsoll, T. W. H., 17, Cross Street, Hoxton, N.	1	1	0
Hopkin, William K., 16, Cross Street, Hatton Garden	1	1	0
Howard, George, 15, Royal Hill, Greenwich	1	1	0
Humby, Lewis W., Warminster	0	5	0
Humpage, Benjamin, 6, Albert Place, Turnham Green	0	10	6
Hunter, Frederick N., 39, Sadler Street, Durham	0	10	6
Ingall, Joseph, Ashford, Kent	1	1	0
Iredale, Thomas, 129, North Street, Leeds	0	5	0
Jackson, Thomas, 43, Great Ducie Street, Manchester	0	10	6
James, James T., 15, Princes Street, Hanover Square, W.	0	10	6
Jefferies, Henry, 23, High Street, Guildford	1	1	0
Jefferson, Thomas, Church Street, Lower Edmonton	0	10	6
Jessop, Jonathan, 11, Corn Market, Halifax	0	10	6
Jones, Alfred Maddox, King Street, Brynmawr	0	10	6
Jones, Henry Stevens, 139, Fulham Road, S.W.	0	5	0
Jones, Michael, Chester Street, Flint	0	10	6
Jones, Owen, Hengoed, Llanfwrog	0	10	0
Jones, Thomas, 87, High Street, Putney, S.W.	0	5	0
Keightley, Joseph, High Street, Tunstall	0	10	6
Kernot, Doctor, 5, Elphinstone Road, Hastings	0	10	6
Lewis, Thomas, 47, Bedford Street, Strand, W.C.	0	10	6
Logan, Francis, Market Street, Lichfield	0	10	6
Loveridge, T. P., Swineshead	0	5	0
Macintosh, Archibald, 21, Montague Street, Rothesay	0	5	0
Manley, William Frederick, 35, Camden Grove, Peckham	0	10	6
Manning, Thomas D., Yeovil	1	1	0
Martin, E. W., High Street, Guildford	0	10	6
Martindale, William, 10, New Cavendish Street	0	5	0
Matthews, Ernest, Royston	0	10	6
Millidge, Thomas E., Tonbridge	0	10	6
Milne, Patrick, 70, Keptie Street, Arbroath	1	1	0
Milton, Thomas, Sen., South Parade, Chew Magna	0	5	0
Murdoch Brothers, 131, Sauchiehall Street, Glasgow (1874)	0	10	6
Muskett, C., Diss	0	5	0
Orpe, Thomas M., 329, Old Kent Road	0	10	6
Palmer, F. W., High Street, Ramsey, Hunts	0	5	0
Parsons, William, St. Mary Street, Portsmouth	0	10	6
Payne, Sidney, Wallingford	1	1	0
Peacock, George, 4, Napier Road, Kensington, W.	0	5	0
Peel, Alfred, 87, High Street, Putney	0	5	0
Philpotts, Joseph, Blakeney, Gloucestershire	0	10	6
Plummer, George, 185, High Street, Peckham	1	1	0
Powell, Edward, Winchester	1	1	0
Power, Edward, Walton-on-Thames	0	10	6
Pratt, Richard M., Otley	0	10	6
Prime, Thomas R., 2, Westow Hill Terrace, Upper Norwood	0	9	0
Prince, Arthur G., Longton, Staffordshire	0	10	6
Rastrick, John A., 22, Common, Woolwich	0	10	6
Rimmington, F. M., 6, Ivegate, Bradford	1	1	0
Ringrose, George, 123, St. George's Street, E.	0	10	6
Roach, Herbert William, 8, St. James's Street	0	10	6
Roach, Pope, 8, St. James's Street	1	1	0
Robinson, J. M., Beverley	0	5	0
Robinson, J. Scott, 1, Eversfield Place, St. Leonard's	0	5	0
Robson, Thomas, 4, Victoria Road, Brighton	0	10	6
Rutter, Edmund Y., 5, Bonchurch Road North, Kensington	2	2	0
Savage, W. D. and Son, Brighton	1	1	0
Savory and Moore, 143, New Bond Street, W.	10	10	0
Scholefield, Herbert, Ravensthorpe *via* Normanton	0	10	6
Scrase, Richard, 161, New Cross Road, S.E.	0	5	0
Scruton, Peter D., Collingham, near Newark	0	5	0
Seaman, J. Saunders, Marlow	0	5	0
Shaw, Alexander H., Lower Hillgate, Stockport	1	1	0
Shephard, Thomas F., All Saints Row, W.	0	10	6
Shepherd, G. P., High Street, Guildford	1	1	0
Simpson, Henry, 5, Hanover Place, Regent's Park	0	10	6
Skoulding, William, Wymondham	0	5	0
Smart, John, 1, Harcourt Place, St. Nicholas Cliff, Scarborough	0	10	6
Spencer, Charles, Gravesend	1	1	0
Squire, James, 35A, Peascod Street, Windsor	0	5	0
Stannard, F. J., 15, Broadgreen, Croydon	0	5	0
Sutherland, Daniel D., Fore Street, Totnes	0	10	6
Thompson, George A., 7, Poultry	0	5	0
Thompson, Thomas, Guildford	0	5	0
Thrower, E. A., Diss	0	10	6
Turner, George, Honiton	0	10	6
Wallis, George, 13, Victoria Gardens, Ladbroke Road, Notting Hill, W.	0	5	0
Wallis, J. T. W., 78, Essex Road, Islington	0	5	0
Wells, F. T. Percy, 368, Cold Harbour Lane, S.W.	1	1	0
White, Edward A., High Street, Mayfield, Sussex	0	5	0
White, John D., 7, Guildhall Square, Carmarthen	0	10	6
Wiggins, Henry, Oak House, Blue Anchor Road, S.E.	0	10	6
Wilkinson, Thomas, 270, Regent Street, W.	1	1	0
Williams, John, 16, Cross Street, Hatton Garden	1	1	0
Wilson, C. F., 22, Liverpool Road, Stoke-on-Trent	0	5	0
Wilson, Thomas, Thornton-in-Craven	1	1	0
Wisken, Robert, 15, Crown Street, Erith	0	2	6

Donation.

	£	s.	d.
Baigent, William H., Shefford, Beds (third donation)	5	5	0

PHARMACEUTICAL MEETING.

Wednesday, February, 3, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed. The following Donations to the Library and Museum were announced, and the thanks of the Society were awarded to the donors :—

To the Library :—'Report by Dr. M. C. Cooke on the Gums, Resins, Oleo-Resins, and Resinous Products in the India Museum, or produced in India,' and 'The Flora of British India,' by Dr. Hooker, parts 1 and 2, from the India Museum ; 'How to Work with the Microscope,' by Dr. Beale, fourth edition, 'Bioplasm, an Introduction to the Study of Physiology and Medicine,' by Dr. Beale, and 'Protoplasm, or Matter and Life,' by Dr. Beale, third edition, from the author ; 'Address delivered at the Twelfth Annual Meeting of the Scottish Arboricultural Society,' by Dr. Cleghorn, from the author ; 'St. George's Hospital Pharmacopœia, 1768,' from Mr. R. C. Buckley ; Tarifa Farmacéutica,' from the Sociedad de Farmacia

Argentina; 'On Ergot,' by W. Carruthers, F.R.S., from the author; 'On Winter Cough,' by Horace Dobell, M.D., third edition, from the author; 'Commentary on the British Pharmacopœia,' by Dr. Walter G. Smith, from the author; 'Papers on Leprosy,' by J. C. Lisboa.

To the Museum:—Specimen of Alabandine from Mr. Thomas; specimen of Crystals of Mercuric Iodide, from Mr. C. J. Boorne; specimens of *Plantago Isphagula*, *Juniperus oxycedrus*, *Sinapis juncea*, and *Ipomœa purga*, from Mr. D. Hanbury; specimens of *Gentiana verna*, *G. amarella*, *G. campestris*, and *Antennaria dioica*, from Mr. G. C. Druce; specimens of Anhydrous Phenol and Kosin, from Messrs. Corbyn and Co.; specimen of the fruit of Driâs, from M. Derode, Paris; specimen of the fruits of *Barosma betulina*, from Mr. J. M. Broad; specimen of a new variety of Senna, from the Curator; specimen of False Brazilian Ipecacuanha, from Mr. Allchin; specimen of artificial Salicylic Acid, from Messrs. Domeier and Co.

Mr. Greenish presented, on behalf of Professor Dragendorff, of Dorpat, a number of treatises describing the result of various investigations carried on in the laboratory of the Pharmaceutical Institute, at Dorpat. Mr. Greenish said it had been stated in that room that students did not remain in the Society's School of Pharmacy sufficiently long to undertake original research; their period of study rarely exceeding one session. In the University of Dorpat, original investigations were undertaken by the students during their second session, and the results of those investigations were embodied in theses similar to those now presented upon the application of the students for the degree of "magister" of pharmacy. These theses formed the basis of those exhaustive scientific works which are now issued from the press of Germany. He would be glad to see the highest honours of the Pharmaceutical Society of Great Britain become the reward of original research rather than the result of an examination. He hoped that at some future time there would exist a College of Pharmacy in this country which would grant degrees as the reward of original research.

A paper was then read on—

The Construction of an International Pharmacopœia.

BY FRANCIS SUTTON, F.C.S.

The paper is printed at p. 621, and gave rise to the following discussion:—

Mr. G. S. Taylor asked whether the International Pharmacopœia was intended to supersede existing national Pharmacopœias.

Mr. Sutton said that it was supposed to represent every possible Pharmacopœia which could be produced. It would be a Codex Universel, but though it might be achieved some day it would be many years before that would take place. The product of the French Commission was now before the meeting for discussion, but it would be at least twenty years before the work could be brought to fruition. The principle upon which such a work should be carried out was not a thing upon which that society could decide then. It was a question which must crop up from year to year, and all that the society could do would be to consent to the nomination of a commission for the purpose of preparing an International Pharmacopœia. Pharmaceutists in England had no vote in the construction of the National Pharmacopœia, though he had no doubt that a time would come when they would be associated with medical men in such works, as in foreign countries, where the government deputed pharmaceutists to act in conjunction with medical men in constructing the Pharmacopœias. The present position of English pharmaceutists in this respect was an anomaly.

The President thanked Mr. Sutton for his paper. The subject which he had brought forward was the compilation of an International Pharmacopœia. Whether the work was to be done by English Pharmaceutists or any other persons was another question. With reference to the anomaly referred to by Mr. Sutton, as the British Pharmacopœia was in the hands of the Medical Council by Act of Parliament, until the law in that particular was altered, it must remain so. It would be better now for those present to confine their attention to the subject of the paper which had just been read. He thought he might answer for the pharmaceutists of England that they would do all they could to carry out any International Pharmacopœia which would be useful. It would be many years, as Mr. Sutton had said, before a Universal Pharmacopœia could be adopted; but the communication between the various countries of Europe was now so rapid that it was very desirable that the pharmaceutists of those different countries should agree to the adoption of the same standards of strength for certain preparations, such as tincture of opium and hydrocyanic acid. Only eight years ago there were three different pharmacopœias even in this kingdom, and Mr. Squire put the case very plainly before them in his comparison of the London, Dublin, and Edinburgh Pharmacopœias. They were indebted to him also in this respect, for his "Companion to the Pharmacopœia." If they looked to the last edition they would see, in the case of tincture of opium, for instance, the various differences of strength of that preparation in England, Vienna, Germany, and other places. This showed the advisability of having such a common thing as tincture of opium of one uniform strength. At present, English Pharmacists must help the Pharmacopœia authorities and be as conservative as possible holding to all that was right.

Professor Attfield said that he agreed with the President that it would be undesirable for the discussion to branch off into any question as to who should construct their National Pharmacopœia, though that subject was a very important one. Mr. Taylor had asked Mr. Sutton whether it was proposed that the International Pharmacopœia should supersede all other Pharmacopœias; a question which all chemists and druggists who were interested in the advancement of pharmacy had been asking one another ever since the idea of an International Pharmacopœia had been brought forward. What really were now the aims and objects of the proposed International Pharmacopœia? Did the Congress desire to produce one Pharmacopœia for the whole world; or was the proposed International Pharmacopœia to be a sort of book of reference which a pharmacist would have upon his shelf to consult at any moment, in order to see the extent to which medicines in other countries differed in strength and mode of preparation from those which he was in the habit of using under the authority of his own Pharmacopœia? If neither, then what position would it occupy? The committee entrusted with the preparation of a manuscript International Pharmacopœia had stated most clearly at St. Petersburg what shape they hoped the book would take. The president of the committee wrote a report which was presented to the Congress as coming from the Paris Society of Pharmacy, a translation of which report would be found in the *Pharmaceutical Journal* of September 26th, 1874. In that document was put forward, in unmistakeable language, the desire of the committee on this question. They say, respecting the vote in favour of an International Pharmacopœia at the Congress of 1867, "Did it not show that the moment had come for pharmacists to establish, for medicines and their formulæ, the unity and universality which existed for other sciences, and to transform all the national Pharmacopœias into a universal Pharmacopœia, as they had already transformed collections of recipes or particular formulæ into national Pharmacopœias?" There could be no mistake about that language, and the committee went on to support that view by pointing to the universality of chemical laws and physical laws, and by suggesting that "in all European countries the principles of science and pharmacology are the same." He thought that there could be no question that the desire and aim of the authors of the manuscript Pharmacopœia were to produce such a work as should, at all events ultimately, in future editions, after pharmacists had had for a time "the free exercise of their National Pharmacopœias," supersede all others.

Mr. SUTTON and Mr GREENISH expressed dissent from that view of the intention of the committee.

Professor ATTFIELD said that there might have been a subsequent change of front, but the report most distinctly showed that the committee entertained the idea of "transforming all the National Pharmacopœias into a Universal Pharmacopœia;" and based the idea on the fact that the laws of chemistry and pharmacy, and of science generally, were everywhere the same. In his opinion no Pharmacopœia could ever take up that universal position; for pharmacy, whatever it might become, never could be an exact science. From his knowledge of natural laws he was unable to suppose that one Pharmacopœia could ever become universal. There were differences of climate, of temperature, moisture, and other conditions, which so affected drugs on the one hand and man on the other as to naturally prevent the production of such a work. He would, nevertheless, most cordially support the hope that they might have, sooner or later, a so-called Universal—or, as it had since been termed, International—Pharmacopœia. The indirect good effect of such a book would be immense. With regard to the construction of such a work there could be little or no question about substances which came under the name of definite chemical bodies, and it would be necessary only for them to be mentioned, and, perhaps, their formulæ given, together with a few words of description and some tests relating to purity. With regard to preparations of definite chemical substances and of definite drugs, he could understand that there were many such galenicals which would not differ materially in strength in different countries, and respecting which it would be desirable that one common formula should be selected by the compilers for use in all countries. He agreed with Mr. Sutton that they should thank the committee for their very arduous labours in comparing the different Pharmacopœias with each other, and for their endeavours to produce formulæ which should fairly represent the less important preparations which were used in all countries. But there was a third class of galenicals which were very active, and respecting which great differences of strength prevailed. It was in these that he should hope to see some little deviation from what he understood to be the proposed principles of the construction of the International Pharmacopœia. To make the work useful for the pharmaceutists of all countries, he should like to see the formulæ of such powerful preparations placed side by side, so as to enable pharmacists to compare strength, etc., at a glance, and, perhaps also, by way of preparing pharmacists for some closer approximation of strength in those articles in the future editions. But, before any very close approximation could be made, there must be an interregnum during which they should have for the whole of Europe a book, a portion of which, the portion relating to active galenicals, should resemble the book Mr. Squire produced from the three Pharmacopœias which formerly prevailed in this kingdom, and which doubtless much facilitated the construction of the British Pharmacopœia.

Mr. G. S. TAYLOR asked whether any opinion had been obtained from the British Medical Council with reference to an International Pharmacopœia.

Mr. SUTTON replied in the negative.

Mr. TAYLOR said that he quite agreed with Professor Attfield that there were great and serious difficulties in the way of this International Pharmacopœia; but they had met with difficulties before, and overcome them. If it was desirable that they should have an International Pharmacopœia, he did not see why they should not get over these difficulties as well as others.

Mr. GREENISH said much misapprehension existed in the minds of British pharmacists with regard to one point in connection with the proposed International Pharmacopœia, it being sometimes thought that it was intended to replace all local or national Pharmacopœias. He was not so much surprised at this when he considered that the subject has only recently been brought prominently under their notice. It might be well to commence with the first International Pharmaceutical Congress, which took place in Brussels in 1865. At that congress Great Britain was not represented, and there did not exist in the Society's library any report of its proceedings. The second congress took place in Paris in 1867, when the International Pharmacopœia first assumed a definite shape, and a committee was appointed to draw up a scheme for a Universal Codex. Of the proceedings of this congress, likewise, they had no official report, but in the 'Compte Rendu des Congrès Pharmaceutiques, 1867,' M. Boudet says:—"This Pharmacopœia would not exclude in any way the national Pharmacopœias. It would be a common ground containing the formulæ of medicines which can be used by all nations; and these forms, accepted and consecrated by their assent, would constitute the universal basis of therapeutics." The next congress was that of Vienna, in 1869, where, quoting from the report of the British delegates—for there did not exist in the library an official report of that meeting—he found, "That the Pharmaceutical Society of Paris was engaged in preparing a small work which would contain remedies most generally used in all countries, especially the more powerful, as acidum hydrocyanicum, tr. opii, etc." The next or fourth congress was that of St. Petersburg last year, where Mr. Sutton and himself attended as delegates from that society. On that occasion, in the discussion on this Pharmacopœia, they expressed their opinion that it was "very desirable that in all active medicinal preparations there should be an effort made to establish uniformity of strength," and in their report it was distinctly stated "that each country should form its own Pharmacopœia, but that the congress wished that these separate Pharmacopœias should be based on the principles of the International Pharmacopœia." These principles given at length in the report might be briefly mentioned here,—the metrical system, uniformity of nomenclature, simplicity in names and preparations, the minimum of the active principle of narcotic drugs permitted, and the maximum of impurity in a chemical preparation where absolute purity is not necessary. In the report furnished by Mr. Waldheim, who was president of the St. Petersburg Congress, to the Austrian Pharmaceutical Society, he stated that "the International Pharmacopœia is not intended to exclude national Pharmacopœias." Again, referring to the official report from the St. Petersburg Congress, it was there stated, "The International Pharmacopœia does not exclude the Pharmacopœias of the several countries, yet it is desirable that in the formation of new Pharmacopœias the general principles and directions of the International Pharmacopœia should be adhered to unaltered." It was therefore evident that the International Pharmacopœia was not intended to supersede the Pharmacopœias of the several countries, but would be a condensed Pharmacopœia embodying certain principles which he had just mentioned, and aiming at uniformity in preparations of recognised activity in all nations.

Professor REDWOOD said he had long entertained the opinion that there was a great absence of anything like a clear and uniform idea among those with whom the proposition for producing an International Pharmacopœia had originated, as to what was really the purpose and what would be the utility of such a work, and also what were the best means by which it could be carried out. No doubt the original idea of an International Pharmacopœia was the accomplishment between different civilized nations of that which had already been accomplished between the three parts of this kingdom. We had amalgamated our three national Pharmacopœias into one, and it had been thought, by some probably somewhat visionary speculators, that it would be equally practicable to amalgamate all European and other Pharmacopœias into one work. That opinion, however, as Mr. Greenish had shown, had been put very much out of sight. The bare proposition to supersede all local Pharmacopœias would be likely to set all medical and pharmaceutical authorities, or most of them, against the project. It was therefore thought to be better that they should ostensibly look only to the supplementing of local Pharmacopœias by doing for them what Mr. Squire did for the three Pharmacopœias of the United Kingdom before they were amalgamated. However, the question as to the intention of those who were promoting an International Pharmacopœia still cropped up whenever the subject was discussed. Having heard from those who had come fresh from the congress at St. Petersburg what form the work was to assume, he must confess that he felt disappointed with reference to that point. Mr. Sutton's paper was not calculated to enlighten them much upon the subject. It contained simply an alphabetical catalogue of the names of certain medicines which had been taken from Pharmacopœias from different parts of the world; and he presumed that that list contained the names of all the substances whose formulæ were to be included in the International Pharmacopœia. If so, what was to be the utility of such a work, and what good purpose could it answer? The list was either too much or too little. If, as had been stated by Professor Attfield, it was to supply to pharmacists in different parts of the world the means of interpreting prescriptions written by medical men of other countries, it utterly failed. If, on the other hand, it was intended as a selection of the best medicines used everywhere, it equally failed in that respect, for it did not contain one-tenth part of the necessary medicines employed in this country. The same remark would apply to the medicines of France and other countries. Therefore what possible benefit could result from its publication? He could conceive that some benefits would result from a work which bore the character of an International Pharmacopœia, if it were possible to have a work which would describe the principal and most active medicines which were used in every country, and, if, at the same time, it were possible to induce the medical and pharmaceutical authorities in those countries to adopt one uniform standard with reference to every medicine which bore a specific name. This brought him to what appeared to him to be the only useful and practicable first step towards such an end. Probably one half or three-quarters of the substances which were included in the present list—such as acetate of morphia and acetate of potassium—were needless in such a book. The real object of the work was to instruct those who were dispensing medicines as to the meaning of the terms that were used in ordering them. No doubt could arise in the case of definite chemical compounds such as he had mentioned. What pharmacists needed was to have a definite idea of what was meant by such terms as were applied to galenical medicines, the composition of which was not universally known. The first useful step, therefore, would be to establish something like an international copyright in certain names and formulæ. They must not attempt to apply it, in the first instance, to all galenical compounds; but they might take at first a few of the more active and important, and, when not of a uniform strength, dangerous medicines, such as tincture of opium and hydrocyanic acid, to which the president had referred. A certain list of such preparations might be taken, and if the authorities in different countries could agree to a uniform standard of strength and composition, some good would be effected; and then there should be a law that the names of these articles should be copyright, so that they should apply only to such substances as conformed to the international standard. A dozen substances might be taken to begin with, and the list could be extended from time to time; and in that way they might ultimately attain an agreement between various countries as to the composition of a large number of the more important preparations. As to the establishment of an nternational Pharmacopœia, to supersede all local ones, he agreed with Professor Attfield in believing that it would never be accomplished.

Dr. Farre said that he had come to the meeting under the impression that it was proposed to supersede the existing National Pharmacopœias by a general European Pharmacopœia. He was, however, glad to find that such was not the case. As Professor Attfield had pointed out, although the laws of chemistry and physics were universal, still human constitutions were not alike in all countries, nor the character of disease. Europe embraced an area extending through 35 degrees of latitude, and the medicines and mode of treatment which would be suitable for the inhabitants of the north might not be suited to the inhabitants of the sunny region of the Mediterranean and the half-Moorish people of the south of Spain. He was glad to hear the remarks of Professor Redwood, and he thought it extremely important that there should be some international agreement as to the strength of the more active medicines, such as tincture of opium and hydrocyanic acid. But when he saw such names in the list as phagadenic water and balsam of opodeldoc, he thought that they were dreadfully going back to names which had been long ago given up. He could not help protesting against the use of the Latin language as that in which the International Pharmacopœia should be written. Those persons who were best acquainted with Latin knew perfectly well that it was absolutely impossible to express with accuracy and minuteness, in a dead language, those details and processes which were employed in pharmacy. They had thought when the British Pharmacopœia was drawn up that they had moved a step forward in using the English language. Most of the European Pharmacopœias adopted their own vernacular. As Professor Redwood had pointed out, the greater part of the list of names contained in the paper would be useless in an international work. They need not include definite salts. They needed only to give variable galenical preparations. He noticed that in the list there were no infusions or decoctions, and only two liniments, and a hundred other common preparations were omitted without mention.

Mr. Williams called attention to the curious fact that the list contained no fewer than 33 ointments, and 20 plasters. Again he observed digitalin crystals as one of the ingredients of the work. That was an article which had been prepared by a very clever French pharmacist, but it was not in common use, being rather a luxury, or very special preparation, though the time might come when it would be generally recognized. Altogether the things which were suggested as the ingredients of an International Pharmacopœia were so out of proportion to all that they could suppose to be at present really universal, that the suggestion was at any rate premature.

Mr. Umney said that he noted the absence of ammonio-citrate of iron, ammonio-citrate of quinine, tartrate of iron, and other medicines of that class, which were used extensively throughout Europe.

Mr. Williams added that if the list was to be regarded as containing what French pharmacists considered necessary in an International Pharmacopœia, English pharmacists might congratulate themselves upon being far in advance of the French.

Mr. W. Schacht said that he thought that it would be very desirable to have a universal Pharmacopœia in the sense which Professor Redwood had explained; and he recommended the use of the Latin language in such a work, as it was the only language which would be understood throughout Europe.

Mr. Mackay said that he thought this question was hardly ripe enough for any action to be taken. He coincided with what had fallen from Dr. Farre. If there was to be a Universal Pharmacopœia it must be a very different thing from the list of which Mr. Williams had spoken. That list appeared to him to be the most outrageous and irrational he had ever heard of. As to the language, he thought that Latin ought not to be used. Every country ought to have the Pharmacopœia so plain that those who ran might read. He did not for a single moment mean to argue that it was not a right and proper thing for young pharmacists to be well acquainted with Latin, but he thought it desirable that each country should have such an important work in its vernacular language.

The President again thanked Mr. Sutton for his paper, for it had given rise to a discussion which would set them all thinking. He would suggest to Mr. Sutton and Mr. Greenish, their representatives at the Congress at St. Petersburg, that if they could get the Congress to alter their tincture of opium to that of this country it would be a great advantage, as far as English pharmacists were concerned, and would be a step in the right direction.

Mr. Greenish, in reply to Professor Redwood, said that the formulæ contained in the compilation of the Paris Commission had not been at any time considered by the Congress. The Congress confined itself to the discussion of the principles which should be adopted in the drawing up of an International Pharmacopœia.

Mr. Sutton said that there was no doubt that such a discussion as the present might come on from year to year as an annual thing; but he believed that the idea in the minds of those present who were concerned in the construction of the Pharmacopœia was, that they should simply assimilate those things about the strength of which they were now at variance, such as hydrocyanic acid and other active preparations. Mr. Greenish and himself had talked with pharmacists of several nationalities, and they said that they themselves could only see their way clearly to making a pharmacopœia which would comprise the more powerful preparations, such as those of mercury and so on, and that they regarded anything further as beyond the question.

The next paper read was a—

Note on a Spurious Senna.

BY E. M. HOLMES.

The paper is printed at p. 623, and gave rise to the following discussion:—

The President asked whether the senna described in the paper was already in the market.

Mr. Holmes replied that he understood two bales were in London, and were being offered for sale as fine senna.

The President said that that fact showed the importance of bringing such a subject as this immediately before the Society.

Professor Bentley said that a specimen of this senna had been given to him by one of his pupils, who had received it from a friend living in the country, but how the latter obtained it he was unable to learn. The specimen now described by Mr. Holmes was so unlike the real drug that, he believed, that not even a junior apprentice could be deceived. He thought that there must be some mistake when they were told that the enormous quantity of 200 tons of this spurious senna was on its way to this country; for, supposing the number of pharmacists in this country was 20,000, it would allow over 20 lbs. to each. He did not recollect the quantity of Alexandrian senna annually imported, but the annual importation of East Indian or Arabian senna was only about 100 tons—that is, one-half the quantity now stated to be on its road of the present spurious senna. Professor Bentley said that whoever contemplated sending or importing so large an amount must entertain a very strong opinion of the gullibility and ignorance of English pharmacists, and clearly had no idea how the study of botany had progressed since the establishment of the School of Pharmacy of the Pharmaceutical Society. The best mode of distinguishing the leaflets of the spurious senna from those of the official kinds was by the venation, as described by Mr. Holmes. He did not believe that any wholesale house would be deceived by this senna, and therefore he had no fear of its being sold to any extent in this country in place of the ordinary varieties of senna; the only way in which any amount could be got rid of would be by mixing it with true senna; but even then it could be readily picked out. Professor Bentley suggested to Mr. Holmes that as he had tried this senna and found it not to possess any marked purgative properties, whether it would not be better, to avoid any chance of its being used in place of senna, to describe it as "A New Substitution for Senna," rather than "A New Variety of Senna," which might mislead.

Mr. Holmes said that he had not been able to trace where the senna came from; but there were two bales of it in London. As to the 200 tons, his information was that that quantity would be imported into London, and not that it had already arrived.

Mr. Hanbury said that he had taken a little trouble to find out whether the article which Mr. Holmes described was used for any purpose in any part of the world; but he had been unable to find any mention of its use.

Mr. Holmes said, with regard to the name, that he had called it a variety of senna, because it belonged to the same genus.

Absolute Phenol and Kosin.

Mr. Moss called attention to a specimen of absolute phenol which was exhibited on the table. He said that it was stated to be absolutely pure carbolic acid, and that statement alone would be sufficient to make it interesting. But the chief points of interest with regard to it lay in its physical characters. It was a very coarse powder, made up of very small white crystals, and it might be manipulated as easily as any ordinary crystalline powder, such as common table salt, for example. It was also said to be non-deliquescent, and he had kept it in paper for two or three weeks without finding any trace of dampness in it. Whether it was absolutely non-deliquescent he was unable to say. He thought it highly probable that the claims which had recently been made for using salicylic acid as an antiseptic dressing might be set aside in favour of this pulverulent and faintly fragrant carbolic acid. The chief claims of salicylic acid were its being a fine powder, and having no smell. With regard to kosin he merely adverted to it on account of the paper which had recently appeared in the *Pharmaceutical Journal*. That paper was an abstract of an article written by Professors Flückiger and Buri. In that paper they described kosin as occurring in crystals some millimetres long, and having a sulphur yellow colour. The present specimen of kosin was not in crystals, and it was not of such a yellow colour as had been described. He drew attention to that fact because it was such a specimen as would be offered in trade, and chemists might question its pureness in consequence of its not answering to the description given by Professor Flückiger.

In reply to the President,

Mr. Moss added that kosin was just coming into use.

Salicylic Acid.

Mr. Williams said that Mr. Moss had introduced the subject of salicylic acid, and that was a very important question just now, and was attracting a great deal of interest both in England and on the Continent. It was originally produced from salicyl, as its name indicated, and it was afterwards made from the oil of wintergreen. It had lately been discovered that it might be produced artificially from carbolic acid by the action of carbonic acid in the presence of sodium, or rather, as lately proved, in the presence of caustic soda in proper proportions and at a high temperature—that of 260 C. Half of the carbolic acid passed over, and the other half became converted into salicylate of sodium. This compound was decomposed by an acid, and readily yielded salicylic acid. It was hoped that this substance would in time be produced cheaply and in abundance, and that it would be of great value. He had on the table a specimen of salicylate of methyl produced with artificial salicylic acid. This was not an imitation of the substance, but was the very substance itself. It was really the artificial oil of wintergreen. In this respect it differed from the artificial oil of almonds, for that substance had no chemical identity with the natural oil. This sample of salicylate of methyl was another example of the artificial production of a natural product. Mr. Williams then read a note on the subject, which is printed at p. 624.

Dr. PAUL said that he had come to the meeting for the purpose of putting on the table, on behalf of Messrs. Domeier, a sample of salicylic acid which was prepared in Germany, and it was only half an hour ago that he learned that Mr. Williams intended to put on the table a sample of his own preparation. Much attention was now given to the preparation of this substance artificially. He was glad to see that English manufacturing chemists were not behind the time in following up a new discovery.

Mr. SUTTON said that whilst on the Continent last year he met Professor Kolbe, whose name had been mentioned in connection with this subject, who told him that he had no doubt that by and by they should be able to reproduce by artificial means anything that could be brought forward as a natural product. Of course that was a very strong statement, but he was very glad to see that so far as they had already gone they had this evidence of its truth.

The meeting was then adjourned to the 3rd of March.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The fifth meeting of this Association, session 1874-75, was held in the Library, on Wednesday evening, January 13th; the President, Mr. F. Reynolds, in the chair.

Upon the usual routine business being concluded, the Secretary (Mr. S. Taylor), in a short paper introduced the subject of the "Metric System of Weights and Measures," which prompted a tolerably animated discussion, sustained by the President, several of the members, and a few of the Associates.

The feeling of the meeting was strongly in favour of the system on account of its simplicity, uniformity, and capability of being universally adopted; but the difficulties attending its introduction into this country were also freely admitted. It was suggested by Mr. Geo. Ward, F.C.S., and approved of generally, that if the Pharmacopœia Committee in their next issue of that work would give the quantities of the different formulæ in both the imperial and metric systems of weights and measures, it would greatly facilitate the adoption of the latter by pharmacists, and its introduction into the long-talked-of International Pharmacopœia. A vote of thanks to the Secretary, proposed by Mr. Brown, and seconded by Mr. Jefferson, brought the proceedings to a close.

The sixth meeting was held on Wednesday evening, January 27th, in one of the lecture rooms of the Leeds College of Science, for the convenience of the lecturer, Dr. Thorpe, F.R.S.E., Professor of Chemistry in that college, who read the paper of the evening, entitled "Thomas Graham, his Life and Chemical Work." In opening his lecture, Dr. Thorpe said that those of his hearers who were familiar with Glasgow, would remember seeing in one of its squares, a statue inscribed, "Thomas Graham, born 1805, died 1869," in the execution of which the sculptor had very happily caught the natural expression of the great chemist who by his scientific investigation had contributed so much to the prosperity of that thriving city. The lecturer then rapidly sketched Graham's early life; mentioned his commencing his university studies at the age of fourteen; his attendance at the lectures of Professor Thompson, with whom he was a favourite pupil; the effect of his mother's influence, who fostered his scientific inclinations, as opposed to his father's, who wished him to enter the ministry; his commencing in Glasgow as a teacher; his seven years at the Andersonian Institute, during which he wrote his 'Manual of Chemistry' (used as a standard text-book in Germany); and his call to London as successor to Turner. He then spoke of his selection as first President of the Chemical Society, as also of the Cavendish Society, whose papers have so much enriched chemical literature, and which latter honourable position he occupied till his death; of his appointment in 1854 to the Mastership of the Mint, the practical duties connected with which he conscientiously discharged, notwithstanding the interruption thereby to his literary and scientific pursuits, to which he again returned on relinquishing the office; and of his death, which occurred on the 16th of September, 1869, at the age of sixty-four.

Dr. Thorpe on the present occasion confined himself to one, perhaps the principal subject, of Graham's investigations, namely, that of the diffusion of gases. He first noticed the different theories of the density of the atmosphere; how from an altitude of forty-five miles, as calculated by Wollaston, its diffusibility, as it becomes further removed from the influence of the earth's attraction, has been calculated by recent investigators, and especially by the German, Clausius, to be universal. Its chemical components (not combined but simply mixed) were then given, whilst its uniformity was accounted for on the principle of diffusion. This principle was illustrated by connecting a flask of hydrogen gas with a flask of carbon-dioxide by means of a long tube, placing the flask containing the heavy dioxide at the bottom, and allowing the gases to mix by diffusion; that the mixture had taken place was shown by testing shortly afterwards the interior of the upper flask with lime water, when a white precipitate of calcic carbonate was immediately formed. He next proceeded to explain and illustrate by means of a series of beautiful experiments the diffusion of gases through solids and liquids, mentioning at the outset the accidental discovery by Priestley of the intrusion of coal gas into his tube, whilst experimenting upon steam at an open fire; and in the end impugned the efficacy of S drain pipes and sink traps as preventives against the entrance of sewer gas into houses. The experiments of Graham to discover the rates of the escape of gases, from which was deduced the law that their diffusibility is represented by the inverse square root of their density, were fully expounded. After this the lecturer proceeded to notice the existence of hydrogen in meteoric iron, and the great power of absorbing that gas possessed by the metal palladium, the latter being shown by decomposing water by a galvanic battery, using a palladium point to absorb the disengaged hydrogen, and the whole being reflected on to a blank wall by means of an oxy-hydrogen lantern.

The lecture was listened to by an appreciative though small audience, and at its close a hearty vote of thanks was accorded to Dr. Thorpe.

Parliamentary and Law Proceedings.

IMPORTANT CHARGE OF DRUG ADULTERATION IN LEEDS.

THE SALE OF MILK OF SULPHUR.

On Wednesday, 3rd February, at the Leeds Borough Police-court, before Mr. Bruce, the stipendiary magistrate, John Hellowell, druggist, West-street, Leeds, was summoned for selling on the 19th January as unadulterated half a pound of milk of sulphur, the same being adulterated with sulphate of lime to the extent of 53 per cent. The Town Clerk prosecuted, and Mr. Simpson appeared for the defendant. From the evidence of James Handford, assistant nuisance inspector, it appeared that on the day in question he purchased the above quantity of milk of sulphur at the defendant's shop. Having received the packet he told Mr. Hellowell that it had been bought that it might be analysed to ascertain whether it was adulterated or not. The defendant replied, "I have no doubt it is adulterated, but it is the kind of milk of sulphur that is sold at the shops." Witness afterwards gave part of the packet to Mr. Fairley, the borough analyst. Both the witness Handford and Inspector Newhouse, Superintendent of the Sanitary Department, who was formally called, said they knew there was another commodity called precipitate of sulphur, but neither knew the chemical differences.

Thomas Fairley, borough analyst for Leeds, was examined by the Town Clerk. He produced his report with regard to the milk of sulphur in question. He said the compound was prepared by boiling or heating together sulphur and lime in water. The result of this operation was that the sulphur and lime entered into solution in the water, and by the addition of an acid the sulphur was separated in the form of a powder. If the acid used was sulphuric acid, sulphate of lime was precipitated. If the acid was hydrochloric acid the lime remained in solution, and the sulphur was precipitated unmixed with sulphate of lime. This was according to the instructions given in the Pharmacopœia.

The Town Clerk: What does lime do? Why do you call it adulteration when there is lime?—Because lime is not sulphur.

Does it add to the weight of the material?—It does.

Then if a certain quantity of sulphur was prescribed, and you bought a corresponding dose of this milk of sulphur, you would not have the prescribed quantity of sulphur, but of sulphur mixed with lime?—Yes.

Cross-examined by Mr. Simpson.

Are the constituents mentioned in your report the constituents produced by the ordinary process of making milk of sulphur?—The ordinary process would make milk of sulphur in a fine state.

Is not milk of sulphur omitted from the new Pharmacopœia?—No; it is called by a different name.

Under what name is milk of sulphur denominated in the new Pharmacopœia? If it is included, point out to me where it is?—Precipitated sulphur is included, and I contend that they are the same. They are prepared in the same way by the use of an acid.

Do you mean to tell me, as a chemist, that milk of sulphur and precipitated sulphur are the same thing?—They are.

Was there a time when they were denominated differently?—I cannot answer that of my own knowledge.

Have you read the old Pharmacopœias?—I have read some of them.

In the descriptions in the old Pharmacopœias are there not two distinct substances, one milk of sulphur and the other precipitate of sulphur?—There may be. I don't remember.

But you have read the books?—I don't remember all I have read.

Is it a fact that before the new Pharmacopœia and the new Pharmacy Act, as well as since, there were two such distinct substances sold and used?—There are two distinct substances sold.

And used?—Yes; no doubt they must be used. They are distinct as trade names, but not chemically.

What are they called?—One is called milk of sulphur, and the other is called precipitated sulphur.

And they are two distinct commodities?—Both are sold for sulphur.

Are they two distinct commodities?—In trade they are.

Then so far as you know they are two distinct commodities?—So far as I have heard.

Then if they are, what is their distinction?—I do not know what you mean.

What is the distinction between the two, if they are distinct commodities?—I have not admitted that they are distinct commodities.

Don't you know, as a fact, that they are—that you can go into any shop and ask for precipitate of sulphur or for milk of sulphur, and get either?—I know that that is a custom of the trade, but I am not giving my own opinion when I say so.

Never mind the opinion. There is a custom to provide two commodities called by these different names?—When I say it is a custom in the trade, I should say it is not a universal custom. There are persons who, for the very purpose on which I am now proceeding here, decline to sell milk of sulphur.

Let us know simply what the facts are. I understand you to say that the trade, although not universally, do supply these two distinct commodities, one known as milk of sulphur and the other as precipitated sulphur.

The Town Clerk: The witness does not say so.

Mr. Simpson: Is it true that immense quantities of sulphur are sold as milk of sulphur?—Half of the milk of sulphur is not sulphur. I cannot see that you can call it sulphur when half of it is lime.

What is your knowledge of the trade practice?—My knowledge of the trade is very limited indeed. I know it from conversation simply with persons in the trade, and from observation, and from reading the Pharmacopœia.

Are there not two distinct technical terms for these two commodities?—I do not call them technical terms.

Mr. Simpson repeated the question.—You contend that there are two commodities—

Never mind the contention. The Town Clerk is responsible for that. You are here simply as an impartial official, acting for the public. Are there not two distinct technical terms for these commodities?—There are two separate names with their corresponding Latin equivalents.

Is not lac sulphuris distinctly and separately described in the Pharmacopœia?—It is not there at all. It is the old alchemist's name.

A copy of an old Pharmacopœia was produced, and Mr. Simpson read from it the description of lac sulphuris, or milk of sulphur, stating that it was prepared by boiling sulphur with lime or potash, precipitating by sulphuric acid, and washing the precipitate.

Witness: You have given two different methods of preparing it. The use of bicarbonate of potash would give as a result exactly the same substance as now sold under the name of precipitated sulphur.

You have noticed in that formula I have read that sulphuric acid is used?—Yes.

What would become of the lime after its use?—The lime would become sulphate of lime.

Then what would the potash form?—Sulphate of potash.

How is sulphur præcipitatum made? By using lime and hydrochloric acid?—Yes.

The sulphur is mixed with the lime as in the other case. Can you tell me what the lime does with the sulphur?—It forms a soluble compound.

In both cases that is done?—In the case of sulphur præcipitatum the muriatic or hydrochloric acid forms a soluble compound with the lime.

Then that can be washed away, leaving the sulphur?—Yes, pure sulphur.

Can you tell me why milk of sulphur is so called?—I believe it is so named from its state of mechanical division.

Would not the presence of sulphate of lime in the milk of sulphur prepared by the use of lime make it mix more readily?—Yes, exactly.

Whilst you can scarcely mix sulphur præcipitatum at all?—It is more difficult to mix.

It tends to float on the top?—Yes; but by the use of appropriate means—

Never mind appropriate means. I am talking of the ordinary case of a poor old woman preparing a glassful of it?—In the one case it would require more trouble in mixing it.

Is it not a fact that lac sulphuris makes the water quite milky; the lime present would do that, I presume?—Yes. The same as ordinary plaster of Paris would.

Don't you think, to take the ordinary mode of interpretation, that that is why it is called milk of sulphur, because it presents the appearance of milk?—I don't think that is the reason. Allow me to add that precipitated sulphur is also milky.

Have you known considerable difference of opinion amongst medical men as to whether milk of sulphur or sulphur præcipitatum is the better for the purpose of medicine?—There may be.

You know Dr. Redwood?—Yes.

He is a very eminent man?—Yes.

Have you read his opinion on this subject?—I may have.

Do you know that there has been a strong controversy in the Pharmaceutical Society as to whether milk of sulphur should be maintained as a distinct article of produce?—I believe there has been a controversy.

And that chemists have spoken on each side?—I don't know that chemists have meddled with it.

Is Dr. Redwood not a chemist?—He is more than a chemist.

Perhaps better than a chemist. Is he not a pharmaceutist as well? Was Mr. Morson an eminent chemist?—I decline to say.

You would decline to say whether you have known him as an eminent chemist?—I have seen his advertisements. That is all I know about him.

Have you known him at all?—I have told you. I decline to give an opinion on the qualifications of other persons.

In the debate to which I have referred on this very subject, one of the most eminent speakers said he was far from being prepared to advocate the use of milk of sulphur in preference to precipitated sulphur. But when the presence of a large quantity of lime in the former preparation was brought forward as an imputation against pharmaceutists of selling an adulterated article, he must take exception to such a charge. The same speaker proceeds to say that it was quite possible, but by no means certain, that the pure sulphur would answer the medicinal purpose better?—I should say that it would certainly answer the purpose better.

Having given you this statement as that of Dr. Redwood, will you say, as a matter of fact, that in your experience sulphur præcipitatum would be better than lac sulphuris?—Do you mean within my own experience?

Perhaps you are not a medical man at all?—I have a certain knowledge of medicine. I teach medical students.

Have you any actual knowledge from experience of the effect on the human frame of lac sulphuris as distinguished from that of sulphur præcipitatum?—The only knowledge from experience would be in my own body, and I don't remember having taken it.

The Town Clerk: Then you have none?—No.

Mr. Simpson: Dr. Redwood says it is quite possible, but by no means certain, that pure sulphur would answer the purpose better?—That is Dr. Redwood's opinion, I believe.

But you have no means of forming an opinion. You have never taken it, you state?—Milk of sulphur owes its properties to the sulphur.

Mr. Simpson again read from the opinion already quoted, "When you ask for milk of sulphur you get two things, and it may be the combination is a very good thing. As he had said with regard to another preparation, it was sometimes found that an admixture of foreign matter was far from hindering the action of the remedy, but sometimes rather promoted its efficacy"?—That is merely a general opinion.

No matter; do you agree with me?—I should rather give my opinion the other way.

Mr. Bruce: If lime, mixed with sulphur, were best, would it not be a better way to buy the ingredients separately and mix them?

Mr. Simpson: If you could do it. But if you ask for milk of sulphur you get a combination well known to every chemist in England.

Can you say whether the mixture of this sulphate of lime with the sulphur promotes or affects its efficacy?—I should say it does not promote its efficacy.

Have you any reason for that from experience?—I have only my chemical knowledge.

Have you any knowledge by experience of its effects?—Not of its effects on the human body.

Mr. Simpson (again reading): "They had been accustomed to take a certain quantity of milk of sulphur and expect a certain action from it. It mixed with liquids much better than precipitated sulphur, and he believed that a large number of the public, for this and other reasons, liked it better." There are two distinct commodities—as distinct as you and I—and that being so, I want to know whether you think the ingredient added to the sulphur in this case was likely to do harm. Do you agree with Dr. Redwood on that point?—Before I answer that, it must be decided absolutely whether——

Can you answer the question, Whether the sulphate of lime, mixed with the sulphur, is likely or not to do harm to the person taking it?—I believe it is likely to injure the person receiving it, because if a certain quantity of sulphur is prescribed, and if one half of what is bought for it is lime, then only one-half of the proper quantity of sulphur is received.

Do you agree with Mr. Morson when he says in his general review of what the medical opinion of the country is on the subject, that milk of sulphur does not profess to be pure sulphur?—I believe sulphur in any form is pure sulphur, or ought to be, whether lac sulphuris or sulphur præcipitatum.

Do you agree with Mr. Morson that milk of sulphur does not profess to be pure sulphur?—I believe it to be pure sulphur.

Does milk of sulphur profess to be pure sulphur?—I don't know what you mean.

Mr. Bruce: Would any ordinary medical man or chemist, going into a shop and asking for milk of sulphur, expect to get pure sulphur?—I may say that one medical man has complained to me that——

Mr. Simpson: Answer the Bench. Would a chemist buying milk of sulphur expect to get pure sulphur?—Some chemists would.

And some would not?—Some would not, perhaps. Milk of sulphur may be either pure or not, according as it is made.

Do you know as a fact that many chemists, having tried to substitute the use of precipitated sulphur for milk of sulphur, have failed?—I don't know.

Is it not difficult to substitute it in use even when the difference is explained to the public?—I don't know.

Mr. Simpson (again reading): "Dr. Redwood said, the principle as to pure sulphur was quite correct, if they sold it under the name of precipitated sulphur, but what he contended for was that the two things were quite different. Milk of sulphur was sulphur precipitated with sulphate of lime," and that is the opinion of the most eminent men.—He is not the most eminent man.

Mr. Simpson: Well, he is one of them. He is a great authority in the Pharmaceutical Society.

The Town Clerk: But the witness may not know that.

Do you agree with him, that the two things are quite different, milk of sulphur and sulphur præcipitatum?—I agree that they may or may not be different, according to the way in which they are prepared.

Dr. Redwood says that milk of sulphur is sulphate of lime precipitated with sulphuric acid. Do you agree with that?—That is so according to one of the processes in the old Pharmacopœia.

He says it has long been in general use, and that he did not consider it an adulteration to sell under a distinctive name a preparation which had been found advantageous. —That is his opinion, and I don't agree with it.

He adds that for the same reason complaints might be made of a great many things in the Pharmacopœia, because they have additions made to the original substance, and then that they bear the name of the additions. Do you agree with that; do you know as a fact, but I suppose you won't, that many persons can take milk of sulphur who cannot take precipitated sulphur ?—No, I don't.

I am afraid that you were not at the special meeting of the Pharmaceutical Society, called to discuss this subject. Are you a member ?—No, I am not a member of the Pharmaceutical Society. It is a trade society of chemists who make and compound medicines.

Do you know Mr. Wood, an eminent chemist ?—No.

Do you agree with him or any other person that frequently milk of sulphur can be taken by persons who cannot take precipitated sulphur ?—I have no means of agreeing with that.

Do you agree with Mr. Morson that milk of sulphur is literally a mixture of sulphur and sulphate of lime, and that the sub-division of the sulphur by means of the lime influences its action ; that if any one asked for pure sulphur he would get precipitated sulphur ; but that milk of sulphur was a different thing, which people had a right to get if they wished it, and that he would recommend everybody in the trade to keep both articles, so that either might be had when wanted. You don't agree with that, I suppose ?—No.

Are you a member of the Society of Public Analysts ? —Yes.

Has this question been discussed by that society as to which was the better of the two, milk of sulphur or sulphur præcipitatum ?—It has not been discussed at any of the meetings I have attended.

Did you not attend a meeting, on the 12th December, under the presidency of Dr. Redwood, the very gentleman I have referred to, at Cannon Street Hotel, London ?—No, I was not there.

Do you know Dr. Stevenson ?—Yes. I have met him once.

Is he not a chemist of some position ?—He is a medical officer of health.

Then are you not aware that at this meeting on the 1st December the question of the use of lac sulphuris was considerably discussed ? I suppose you take in the *Chemical News?*—I do ; but I may have omitted that discussion. I have not read it there. I should have made it my business to consult the report if I had thought it was there.

Do you agree with Dr. Stevenson that milk of sulphur is a recognised substance known to chemists as distinct from the substance known as precipitated sulphur. having long been prepared in a different manner ?—They are prepared in very much the same manner.

Do you admit that milk of sulphur is a recognised substance ?—Recognised by whom ?

Don't analyse that word. I mean generally recognised ?—Yes, recognised in the trade.

And known to chemists as distinct from the substance. known as precipitated sulphur. Do you agree with that? —No. I don't agree with that.

Then well known to whom, if it is recognised ?—I don't know what you mean.

You say it is a recognised substance ; known to whom? —Known to persons in the trade.

Are there two things known as milk of sulphur and the other as sulphur præcipitatum ?—They are two distinct names, and both mean sulphur.

Are they not two distinct things ?—They are both sulphur.

Are they not two distinct things ?—I don't hold them to be distinct.

Are there not two distinct things generally recognised under the terms milk of sulphur and precipitated sulphur ? —I don't call them distinct.

Are they not two things ?—They are both sulphur ; no matter, if you ask me till Doomsday. I cannot call them distinct.

You have told me already that milk of sulphur was a recognised substance. Don't you know that it is used for animals as well as for human beings?—Many of our medicines are.

Mr. Simpson : That is no answer to my question.

Witness : If you say it is so used, I don't dispute it.

Do you know it of your own knowledge ?—I think it is very likely.

Mr Bruce : Was there an antiquated preparation called milk of sulphur, made in the way first described ?—Yes ; and it is there in the old Pharmacopœia.

And that old preparation was omitted from the new Pharmacopœia?—Yes.

And in its stead was substituted sulphur præcipitatum ?

Mr. Simpson : No, sir. Sulphur præcipitatum existed before.

Mr. Bruce : Was the sulphur præcipitatum substituted for the old milk of sulphur ?—The milk of sulphur was dropped out.

This concluded the evidence in support of the summons.

Mr. Simpson then addressed the court in opening the case for the defence. He said, the Pharmacy Act had no relation at all to this question. The question was whether this drug—milk of sulphur—was adulterated, and the issue raised by Mr. Fairley was that milk of sulphur should never be sold again ; that no longer should we have this preparation, but that on all occasions sulphur præcipitatum should take its place.

Mr. Bruce : He says that a milk of sulphur can be made which would keep within the legal line.

Mr. Simpson : But how does that help the matter ?

Mr. Bruce : One of them leaves a large foreign ad mixture, and the other does not.

Mr. Simpson : That may be so, but *cui bono* if a man wants pure sulphur let him ask for sulphur præcipitatum. Assuming that milk of sulphur is producible by two different processes, if he goes for milk of sulphur and wants sulphur pure, he must designate by which of the two processes he wants it. If he wants sulphur alone, why ask for milk of sulphur ? For the prosecution to make out their case, they must prove that the officer Handford did not get what he asked for. There were five kinds of sulphur : sulphur nigrum, sulphur rotundum, lac sulphuris, sulphur sublimatum, and sulphur præcipitatum. Lac sulphuris, or milk of sulphur, had never been known in the trade as pure sulphur, and any person going into a shop and asking for it ought to know that the practice in the whole of the trade was to supply a certain compound. The question was whether the thing which the man had asked for, and which was supplied, answered to the denomination of milk of sulphur. According to Mr. Fairley, one process of making milk of sulphur ended in sulphur præcipitatum, and he said the two articles were identical, but in cross-examination he had been forced to admit that in the trade milk of sulphur was recognised as an independent thing. Sulphate of lime, which formed part of the compound milk of sulphur, was rather beneficial than otherwise, because it was well known by chemists that sulphate of lime had a disintegrating effect on the sulphur, and in the human body it caused the sulphur to act, and produced the laxative consequences which were intended. He had to do, not with Mr. Fairley's opinions, but with what the public required. Was he to be told that when a man went into a chemist's shop and asked for milk of sulphur, he did not want it prepared with sulphate of lime ? And was it to be that milk of sulphur prepared with lime and sulphuric acid was to be blotted out of the Pharmacopœia ? Milk of sulphur was not a pure drug. It was not sulphur. It was a combination and a preparation. On behalf of his client, who was supported in his defence by the Chemists' Association of the town, he contended that milk of sulphur was a known commodity, which was made in a certain way, and sold in a certain state, and that therefore when a person asked for it, he got the article which was sold as milk of sulphur ; and as far as the defendant was concerned, he supplied his customer with the article which was asked for, for sulphur præcipitatum was not lac sulphuris. The Act under which the prosecution had been instituted was not intended to apply to such simple things as that, which really had no injurious consequences to the health of the community.

Thomas Brooke was then called as a witness for the defence. He said he was a partner of the firm of Hirst, Brooke, and Hirst, manufacturing chemists, Leeds. During his 20 years' experience milk of sulphur had been known in the trade as an article prepared by mixing together lime, flowers of sulphur and water, and precipitating with sulphuric acid. He had never known any prepared with bicarbonate of potash, nor had he ever known milk of sulphur without the presence of sulphate of lime. Under the term "milk of sulphur" sulphur would not be sold without sulphate of lime in it. Precipitated sulphur was known in the trade as a distinct thing, the difference being that it was pure sulphur, and milk of sulphur was not pure sulphur. When they wanted milk of sulphur, his firm ordered it in that name or as lac sulphuris from the maker, getting an article prepared with lime and precipitated with sulphuric acid. So far as the public use of it was concerned, there was a preference for milk of sulphur over the precipitated sulphur; in fact, there were cases in which the latter had been tendered and the customers had brought it back and would not have it, but wished for the milk of sulphur, because it would mix better with water. He had not the slightest reason to form an opinion that milk of sulphur had any deleterious effect when taken as a medicine.

The Town Clerk: Is not this milk of sulphur sold largely for manufacturing and trade purposes?—Not that I am aware of.

The Town Clerk stated that with the evidence before the court he should not be justified in seeking for a conviction, and in justification of himself he had to say that the information had been laid by the officers of the Corporation without any previous consultation with him, and that he had never heard of the case until that morning. He mentioned that, because he should have wished to have had an opportunity of advising upon the case, and he hoped a similar error would not be made again.

Mr. Bruce said that after hearing Mr. Brooke's evidence and the comments of Mr. Simpson, he thought the Town Clerk had exercised a wise discretion in withdrawing from the prosecution.

The summons was then withdrawn.

Mr. Simpson asked for costs, which were allowed.

THE SALE OF "MORNING TONICS" BY CHEMISTS.

On Tuesday, at the Hull Police Court, Mr. Travis, the stipendiary magistrate, gave judgment in the case of Mr. William Stanning, chemist, who was summoned for a breach of the Excise laws. Mr. Travis's finding was as follows:—

The defendant in this case is a chemist, who is charged on the part of the Board of Inland Revenue, under the 6 Geo. 4, c. 81, s. 26, with dealing in or selling or retailing spirits without taking out the required licence entitling him to do so, the penalty for such an offence being £50. By a subsequent statute, 23 & 24 Vict., c. 114, s. 148, the word "spirits" shall include and mean all mixtures and compounds, preparations or commodities, into the manufacture of which spirits enter as the basis or principal ingredient. The Acts to which I have just referred must, however, be read in conjunction with another Act passed in the 16th Geo. 2, intituled "An Act for repealing certain duties on spirituous liquors, and on licences for retailing the same, and for laying duties on spirituous liquors, and on licences to retail the said liquors," by which (chap. 8, sec. 12) it is provided that that Act shall "not extend to any physicians, apothecaries, surgeons, or chemists as to any spirits or spirituous liquors which they may use in the preparation or making up of medicines for sick, lame, or distempered persons only." The 16th Geo. 2, c. 8, was repealed by the 30 & 31 Vict. c. 59, except only the part of the proviso of sec. 12 which I have just read. The defence set up by the defendant in this case must (to be available) be that he is protected by the proviso referred to, and that the spirits which he is charged with selling unlawfully were used by him in the preparation or making up of a medicine for sick, lame, or distempered persons only. The evidence shows that on Oct. 1, 1874, Mr. Claridge, an officer of Excise at Hull, went to defendant's shop in Cogan Street, and there saw the defendant. Claridge asked for a bottle of "pick-me-up," and was told defendant had none made, and on calling again defendant said he had not got it filtered, but defendant went into an adjoining room, out of Claridge's sight, and after being absent a little while, brought a bottle from the room and gave it to Claridge, charging him 3*s.* 6*d.* for it. Claridge did not say anything about size, and knew nothing about there being three sizes of bottles varying in price from 1*s.* to 2*s.* 6*d.* and 3*s.* 6*d.* The bottle was of the kind generally used for hock, and would hold a *reputed* quart, but it was not quite full. The contents of the bottle, on being analysed, were found to contain 67 per cent. of proof spirit, only 3 per cent. of solids, and ash 2 per cent. The flavour appears, according to Mr. Harkness, who analysed it, to be derived from gentian, orange peel, and probably a little quassia. The same witness states that it is similar in every respect to the public-house bitters. On the part of the defence it has been stated that the "pick-me-up" contains ten or twelve ingredients, but I have no evidence before me as to the actual contents of the bottle of "pick-me-up" bought by Mr. Claridge and afterwards analysed, as the defendant's son was away from home for twelve months prior to the latter end of September, 1874, and states that there was no "pick-me-up" made between his return and October 1st, though he says what there was in stock, kept in a large carboy, was similar in taste to that sold to Mr. Claridge; but Mr. Harkness' opinion as to the identity with the Hull "pick-me-up" and public-house bitters would not be altered unless he knew the exact quantities of the ingredients, as there might be only a trace of some of them. Mr. Harkness also states that the "pick-me-ups" are sold as medicines, and that the chief constituents of medical "pick-me-ups," are gentian and quassia, and that they contain 10 per cent. of solid matter, while the Hull "pick-me-up" contains only 3 per cent. The son of defendant says that none of the tonic or "pick-me-up" was made in September, after his return, and before October 1st; and he states that it is three weeks or a month after being made, and is not in a fit medicinal state before that time. If this be correct it is difficult to understand the course pursued by the defendant, who told Claridge the first time he called that he had none, and the second time that it was not filtered; for the son swears distinctly that the tonic is not in a fit medicinal state for three weeks after being made, whereas Claridge got it after a trifling delay, when, if only just made, it could not be, according to the son, in a fit state to be taken as a medicine. The label has on it "Morning Tonic." It is also stated on it that a small glassful may be taken at any time, and intimates that its being mixed with sherry will make it more palatable. The defendant has called several medical witnesses, against whose testimony no objection can be taken so far as it goes, but it may be well questioned whether it bears sufficiently upon the points at issue to have the value that, coming from such gentlemen, it might otherwise be entitled to. Drs. King, Gibson, and Walton, would none of them prescribe the tonic, assuming it to contain what is alleged, as they prefer using more simple remedies, but if made up of all the ingredients named they would call it a medicinal preparation—and one of them said a very nasty one, though he had not tried it when mixed with wine, as mentioned on the label. A good deal of evidence was given to show that certain tinctures are much stronger than the Hull "pick-me-up," but it was also shown that their use was carefully regulated, and it was attempted (I think in vain) to be shown that the label on the tonic was much the same as the directions of a physician, that a medicine should be taken occasionally. Dr. King however disposed of this entirely by the expression of disapproval of the permission of the label to take a small wineglassful of tonic at any time a patient liked, while Dr. Gibson states that a small glass is a little over a dose, and taken once a day would not be hurtful, but taken three times a day it would be deleterious from the drying nature of the tonic, and we may presume—though Dr. Gibson was not asked on that point—that the effect could hardly be expected to be more beneficial (in a medicinal point of view) if taken with wine to make it more palatable. The evidence of most respectable parties was adduced to show that they had used the tonic as a medicine and derived benefit from it, but this does not show that it is a medical preparation within the proviso in the 16th Geo. II. c. 8, sec. 12, but is equally consistent with its being a compound in which "spirits" enter as the principal ingredient, the sale of which is prohibited except where a licence is obtained. This is in truth all that was really proved by the evidence for the defendant. To obtain an exemption from the penalty fixed by the statute under which this charge is made the defendant must be shown to come clearly within the proviso of the 16 Geo. 2, which confines the cases for exemption within narrow limits and to those cases only, and the *onus probandi* lies upon a defendant. While each case must (of necessity) be adjudicated upon on its own facts, and it may be fairly asked, from the evidence adduced, can it be said the defendant has shown that the spirit of which the "pick-me-up" was—to the extent of 67 per cent.—composed, were used in the preparation or making up of medicines for sick, lame, or distempered persons only? Did the defendant use any means to discover for whom or for what purpose it was required, or that it was required by those to whom only the proviso applied? Did he believe that Mr. Claridge was sick, lame, or distempered? Why did he think it requisite, without asking any question, to give the largest sized bottle? the only reason that can be inferred for doing so being that the 3*s.* 6*d.* bottle is the cheapest to the purchaser, and that defendant on that account only gave him it instead of a smaller bottle? Is the label consistent with the sale of a carefully prepared medicinal compound for sick persons only? On the other side, it may be fairly urged that if the sale of this compound is an infringement of the 6th Geo. 4, c. 81, it is singular that some intimation of the views of the Inland Revenue authorities should not have been made during several years the defendant admits he has been in the habit of selling the "pick-me-up," unaware that any objection, legal or otherwise, could be taken to his doing so. It may also be fairly contended that the very fact that medical gentlemen of high standing have come forward and stated that the "pick-me-up" in their opinion may be termed a medicinal preparation, might well account for the defendant taking a similar view, and have led him to a somewhat hasty conclusion that being in one sense a medicinal preparation it necessarily becomes exempt from the operation of the 6th Geo. c. 81. Other causes might be adduced, tending to show the *bona fides* of the defendant in the course he pursued in this case, but still, looking at the whole of the evidence carefully, I am of opinion that public-house bitters and the pick-me-up of Mr. Stanning are *ejusdem generis*, and partially identical; and further that though in the construction of a very stringent Act of Parliament evidently intended to confine the exemptions to the narrowest possible limits (demanded by necessity and humanity), there are upon the facts before me many grounds for insisting that a breach of the letter of the law, as charged by the Inland Revenue authorities, has taken place. I should be extremely reluctant, unless required to do so by legal authority, to carry out such a conclusion, as I cannot think that this is a case that ought to be pressed against the defendant; nor do I think it is one where it would be satisfactory or just to inflict a fine, especially the heavy fine named in the Act of Parliament under which this charge is made. Under the circumstances, the position of the respective parties having been duly considered, and having gone into the matter fully, the defendant will not be liable for anything beyond his own costs, and I trust the ends of justice will be considered to be fully met by my respiting judgment for six months, and also that such respite may be practically *sine die.*

The Sale of Soda-water.

At the Wolverhampton Borough Court, on Tuesday, Jan. 26, Thomas Smith, soda-water manufacturer, was charged with having sold six bottles of soda-water as pure although subsequently found to be adulterated.

Mr. E. W. T. Jones, the borough analyst was called and said that the soda-water in question was handed to him by the inspector, and after examining it, he gave the following certificate:—"The title under which this sample was sold is quite a misnomer; it is an anomalous specimen altogether, containing no carbonate of soda, and hence devoid of the valuable properties peculiar to genuine soda-water. Carbonate of lime is present in considerable quantity, and it shows traces of copper. I consider it is an adulterated article and injurious to health."—In reply to the Bench, witness said lime salts and copper were injurious to health.—In cross-examination witness stated that he also analysed a sample of ginger beer purchased from the defendant, and he found that to be genuine. If the defendant used pump water, or any kind of hard water, in the manufacture of his soda-water, that would account for the large excess of lime and salts, and if he used tap-water for his ginger beer, that would account for it being free from such adulteration as alluded to. If the vessel used for the charging of the water with the gas were a brass one, that would account for the presence of copper.

In defence, it was stated that the defendant used hard water because he believed it made better soda-water, and was not aware that it contained such an excess of lime-salts as Mr. Jones had stated. After what had been stated he would take care in future not to use hard water, and also to use a silvered vessel.

A penalty of 40s. and costs was imposed.—*Midland Counties Evening Express.*

J. P. R.—Apply to the Secretary, 17, Bloomsbury Square, for a copy of the Regulations of the Board of Examiners.

X. X. X. is referred to the rule respecting anonymous communications.

"*Theta*" (who should have sent his name and address).—By section 15 of the Pharmacy Act, 1868, it is unlawful for any person who is not a duly registered pharmaceutical chemist or chemist and druggist to sell, or keep an open shop for the retailing, dispensing, or compounding of poisons, or to take, use, or exhibit or use the title of chemist and druggist, or chemist or druggist.

A. P. S.—"No licence is required for the sale of quinine wine, if made according to the recipe in the British Pharmacopœia, and not sold as a proprietary or patent medicine." See *Pharm. Journ.*, Oct. 26, 1872, p. 327.

T. H. Fletcher.—(1) Lime made into a paste with water. (2) Apply to the Publishers, Messrs. J. & A. Churchill, 11, New Burlington Street, W.

Communications, Letters, etc., have been received from Messrs. Barnes, Stiles, Gallois, Jains, Whitfield, Leay, Chipperfield, Fitch, Shakespeare, Prosser, Woodland, Professor Kolbe, W. B., G. R. B., K. B., A. B., Magister, Arsenic Test, A Working Man.

In consequence of the space taken up by the official and legal reports, we are compelled to defer the publication of several communications.

FURTHER NOTE ON THE BOTANICAL SOURCE OF JABORANDI.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

In the 65th fasciculus of Martius' great work, the 'Flora Brasiliensis,' containing the *Rutaceæ*, by Engler, —only recently published and received in this country during the present week,—three new species of *Pilocarpus* with pinnate leaves are mentioned, viz.:—*P. Selloanus*, Engl., *P. grandiflorus*, Engl., and *P. macrocarpus*, Engl. Of these, the description of *P. Selloanus* answers to the smooth variety of the Jaborandi of Pernambuco much more nearly than that of *P. pennatifolius*, Lem.

From the following analysis of the pinnate-leaved species copied from the above work, it will be noticed that the author separates the species with smooth leaves from those with hairy leaves; hence, if this arrangement be accepted, the hairy variety of the Pernambuco Jaborandi must belong to a distinct species:—

B.—Leaves imparipinnate, 2-6 jugate.
- *a.* Leaves smooth on both sides.
  - *P. Selloanus*, Engl.; leaves 2–3 jugate. Pedicels slender, six times longer than the buds; ovary smooth.
  - *P. grandiflorus*, Engl.; leaves 6 jugate. Pedicels thick, scarcely longer than the buds; ovary densely ferruginous-pilose.
- *b.* Leaves shortly pilose beneath, especially on the nerves.
  - *P. pennatifolius*, Lem.; leaves 1–3 jugate. Leaflets linear; oblong midrib; and lateral veins prominent beneath.
  - *P. Goudotianus*, Tulasne; leaves 1 jugate and unifoliate. Leaves large, obovate or lanceolate-oblong, midrib only rather prominent beneath.
  - *P. macrocarpus*, Engl.; not sufficiently known.

The following is a translation of the diagnosis of *P. Selloanus*:—

"*Stem* covered with thin purple bark, leafy towards the apex. *Leaves* imparipinnate. *Petiole* of leaf semiterete, flattened a little above, quite glabrous. *Leaflets* trijugate, oblong, distinct, nearly equal, obtuse, margin reflexed, membranaceous or subcoriaceous, greyish green, quite glabrous on both sides, pellucid punctate; midrib sulcate above, very prominent beneath; lateral nerves rather prominent beneath; petiole of leaflets short. *Raceme* terminal, nearly three times longer than the leaves, terete, purple, quite glabrous, with slender pedicels horizontally patent and slightly hairy, six times longer than the buds and furnished at the middle and base with two minute ciliolate bracts. *Calyx* very short, with broad rounded lobes, which are ciliolate. *Petals* coriaceous, lanceolate, acute, furnished with a prominent midrib, inflexed at the upper margin and at the apiculus. *Stamens* shorter than the petals. *Ovary* depressed, globose, very smooth, half included in the disk, and crowned with a short, rather thick style."

The figure represents the leaves as being slightly emarginate. In the *greyish green* leaves, *slender* peduncle and pedicels, and smooth fruit, *P. Selloanus* agrees with the Jaborandi plant; but the pedicels of *P. Selloanus* are longer and hairy; this, however, future specimens of Jaborandi may perhaps prove to be of no importance.

P. pennatifolius, Lem., is described as having *bright green* leaves, hairy on the veins beneath, and a thick peduncle with short thick pedicels. So far, therefore, as the most recent researches on this genus have made known the species, Jaborandi must be said to approximate more nearly to *P. Selloanus* than to *P. pennatifolius*, Lem.

COD LIVER OIL WITH QUININE.

BY M. H. STILES.

Twelve years ago, in a paper read before the Pharmaceutical Society, Dr. Attfield called attention to the fact that the natural alkaloids combine with oleic acid to form oleates which are soluble in oil.* Although he particularly instanced quinine, and suggested that the oleate of quinine would be a convenient medium for the preparation of "cod liver oil and quinine," I do not think the method has been adopted to any considerable extent.

I lately had occasion to prepare some cod liver oil with quinine. I employed what I believe to be the usual process, precipitating the alkaloid with ammonia, and, after washing and drying, dissolving it in pure ether, then mixing this ethereal solution with the oil. The customer, a lady, quickly returned it, having a very strong objection to the taste of the ether.

I therefore tried the plan of preparing the oleate and dissolving that in the cod liver oil, and found it perfectly satisfactory.

The preparation may be made as follows:—

Take of Sulphate of Quinine	60 grains.
Diluted Sulphuric Acid . .	1 fluid dram.
Solution of Ammonia	a sufficiency.
Distilled Water	a sufficiency.
Purified Oleic Acid	1 fluid ounce.
Cod Liver Oil	29 fluid ounces.

Dissolve the quinine in the diluted sulphuric acid mixed with 4 oz. of water, add a slight excess of ammonia, stir well, transfer the whole to a calico filter, and after carefully washing the precipitate, press it between folds of bibulous paper and dry it by the heat of a water-bath. Dissolve the quinine thus obtained in the oleic acid by the aid of a gentle heat, mix the solution whilst warm with 5oz. of cod liver oil also warm, strain through cotton wool or filter through paper if necessary, then add the remainder of the oil. The product should measure 30 fl. oz.; each table-spoonful (fl. ℥ss) contains oleate of quinine equal to one grain of sulphate.

The above preparation has the characteristic taste of quinine and cod liver oil, the oleic acid from its small amount not being perceptible.

A sample prepared two months ago has kept well, being quite clear, and as free from deposit and objectionable odour as on the day it was made.

Whilst writing on this subject, I may remark that I am surprised more attention has not been given to the production of ointments and oleaginous liniments containing the oleates of aconitia and atropia. I believe that these preparations would be more certain and uniform in their effects, and therefore more reliable, than the corresponding liniments of the Pharmacopœia.

Hull, January 28th, 1875.

---

* *Pharm. Journ.*, second series, vol. iv., p. 388.

THE EMPLOYMENT OF COAL OILS IN THE PREPARATION OF ALKALOIDS, ETC.*

BY G. BOIRAUX AND E. LÉGER.

On the occasion of presenting a report on crystallized aconitine and digitalin to the French Academy of Medicine some time since, M. Boudet called attention to the fact that the industrial preparation of alkaloids had almost entirely passed from the hands of French manufacturers. This he attributed to the heavy duties payable upon alcohol in France, and suggested that either there should be a remission of the duty upon spirit used for such purposes or that an attempt should be made to prepare the alkaloids without the intervention of alcohol. M. Boiraux was hence induced to make numerous experiments, in the course of which he found that the oils obtained by the destructive distillation of coal are good solvents of a great number of alkaloids, and that they have the advantage over alcohol of having but little action upon the extractive, and giving at once nearly colourless solutions of the alkaloids; consequently it becomes unnecessary to have recourse for purification to repeated re-crystallizations and animal charcoal.

The sudden death of M. Boiraux just at the conclusion of his investigation prevented him from publishing his results, but his friend, M. Léger, who had assisted in many of the experiments, has described from M. Boiraux's notes the details of the processes for preparing several of the alkaloids. In a foot-note the Editor of the *Répertoire de Pharmacie* states that the MS. was accompanied by some remarkable specimens of the products of these processes.

The bodies which dissolve in coal oils are not all susceptible of being deposited in a crystalline form upon the evaporation of that solvent; and it is better to pass even those which do possess that property into an acid liquor, and afterwards precipitate. Certain fatty and resinous matters are thus removed, and the product is perfectly white. A certain number of alkaloids, such as strychnine and cinchonine, are insoluble or only slightly soluble in coal oil, and the solubility varies according to the nature of the oil employed. In the preparation of quinine sulphate, the heavy oils, *i.e.*, those which pass over the last in distillation, are exclusively employed, they having a solvent power much superior to the lighter products, which was found to be due solely to the presenc of phenol. This fact having been ascertained, it suggested whether the addition of carbolic acid to ordinary coal oil would accomplish the solution of the bodies insoluble in coal oil alone. The experiment was successful; coal oil mixed with five per cent. of carbolic acid dissolves strychnine and cinchonine in considerable quantity in the cold, but does not affect morphia.

The solvents employed in the investigations were—(1) the oils boiling between 50° and 100° C., and known in commerce as benzol; (2) that portion of the oil which passes over between 80° and 120°; (3) the preceding, with the addition of 5 per cent. of carbolic acid.

It is important that the vegetable substances or precipitates be carefully dried before submitting them to the action of the oil, because coal oil does not soften, and consequently cannot dissolve a substance already impregnated with water.

Atropine.—For the preparation of this alkaloid the authors recommend the use of an aqueous extract of the dry leaves and benzol as a solvent.

Aqueous Extract of Belladonna . .	500 grams.
Soapmakers' Ley	125 „
Benzol.	4 litres.
Distilled Water	q. s.

The extract is placed in a porcelain capsule surrounded by cold water, and the caustic soda added gradually, the whole being well stirred so as to thoroughly mix the extract with the alkaline liquor. Soon after this addition the matter liquefies and becomes heated, and it is to avoid this effect as much as possible that the capsule is kept cool. Sufficient distilled water is added to bring the extract to the consistence of a thick syrup, and it is then poured, a portion at a time, stirring well after each addition, into a vessel having a capacity of 3 litres and containing 2 litres of benzol. After standing for a quarter of an hour the liquor separates into two perfectly distinct layers; the benzol charged with the atropine being at the top, and the solution of the extract underneath. The first layer is decanted, and the solution of the extract is poured, with the same precautions, into another vessel containing the remainder of the benzol. The two layers of benzol, containing all the atropine, are united; then shaken with a mixture of 5 grams of sulphuric acid in 75 grams of distilled water, and allowed to stand, the liquor being afterwards separated by filtration. The benzol is then shaken a second time with 2 grams of sulphuric acid in 25 grams of water. The two aqueous solutions, which contain all the atropine in the state of sulphate, are then united and introduced into a flask, and the caustic soda added drop by drop until a precipitate is no longer produced. It is well shaken during ten minutes with 100 grams of well rectified benzol. A large proportion of the atropine set free by the soda passes into the benzol, which is decanted off, and the alkaline liquor agitated with 50 grams of fresh benzol. This removes the whole of the remaining atropine, the alkaline liquor becoming limpid. The reaction may be facilitated by placing the mixture in a water-bath at a temperature not exceeding 30° C. By these different treatments the whole of the atropine from 500 grams of extract is obtained in 150 grams of liquid. This is filtered through white paper, and evaporated in a small glass retort, by means of a water-bath, to one half; the residue poured into a capsule soon deposits the atropine in long, perfectly white, silky needles. When the crystallization takes place over a large surface, handsome stellate groups are formed.

The extract of belladonna employed is prepared by macerating the entire leaves in cold water during two days, straining and washing the residue with more water until the water passes colourless; the liquor is then evaporated in the usual manner. Expression of the substance and the employment of heat are avoided so as to remove the least possible quantity of mucilaginous matter, which otherwise during the treatment of the extract with benzol forms a sort of gelatinous emulsion which is very persistent. It is important that the consistence of the mixture of extract and alkali should neither be too thin nor too thick. The alkaline extract should be poured into the benzol in a thin stream. The authors also caution against the rinsing of the last of the extract from the containing vessel into the benzol by means of water, as the addition of a small quantity of water will emulsify the whole mass. The quantity of atropine obtained from 500 grams of extract is about 3 grams. As 1 gram of pure atropine is

* *Répertoire de Pharmacie*, vol. ii, p. 377.

soluble in 50 grams of cold benzol, it might appear that the quantity of benzol used (4 litres) is excessive, but it is that which has been found best to prevent the emulsion, and also desirable because of the large proportion of insoluble matter through which the atropine is diffused. The benzol may be used for successive operations without rectification.

Santonin.—One kilogram of whole semen contra is boiled during half an hour in a copper vessel with 5 litres of water and 250 grams of lime, then thrown upon a strainer, and strongly pressed. A second decoction is made with 3 litres of water and 150 grams of lime, and a third with 2 litres of water and 100 grams of lime, after which the semen contra is exhausted. The united products form a liquid coloured strongly yellow by a resin peculiar to the semen contra, and rendered turbid by the lime in suspension. This liquid is rendered freely acid by the addition of sulphuric acid, and then allowed to settle during twenty-four hours, after which time the precipitate, which consists of santonin and sulphate of lime, and weighs after desiccation about 500 grams, is collected on a filter. The calcareous precipitate, finely pulverized, is now placed in a vessel with a litre of coal oil and heated in a water-bath, with occasional agitation, during half an hour, to a temperature of about 80° C.; the whole is then thrown upon a filter, and the marc is washed with half a litre of coal oil, also previously heated. The liquid being coloured yellow by the resin, it is again placed in the water-bath with 20 grams of powdered animal black, by which it is completely decolorized in about a quarter of an hour. The apparatus is then removed from the fire, and after letting the vessel stand in the water-bath some time, for the animal black to deposit, the liquor is poured upon a filter sufficiently large to allow of its rapid filtration and to prevent the deposition of the santonin upon the filter. Upon the cooling of the solution nearly all the santonin is deposited in colourless crystals. By concentration of the mother liquor the remainder of the product may be obtained, but it is preferable to preserve the oil for subsequent operations.

The slaked lime employed is obtained by treating caustic lime with the quantity of water strictly necessary to produce the hydrate CaHO. Lime is the only alkali that can be used for the purpose; soda and potash have so energetic an action that the semen contra is completely dissolved. Lime has the further advantage of forming with the sulphuric acid an insoluble salt, which, carrying down the resinous matter and santonin, furnishes a fine powder that is easily treated. The semen contra must be used whole; for when used in powder it swells up and forms a magma that it is impossible to liquefy. The object of letting the decoction stand twenty-four hours after it has been treated with sulphuric acid, is to give time for the santonin to deposit, because the santoninate of lime is not immediately decomposed by acids.

Pure santonin is only slightly soluble in cold coal oil, but when mixed with the resin its solubility is considerably increased. If the yellow solution of santonin at first obtained be distilled until reduced to 150 grams, the crystals are several days in forming. But if animal black be added it seizes the resin, and the result is that the santonin is deposited as the temperature rises, until when it approaches 50° or 60° C. the liquid forms a mass. This induces the authors to think that in the semen contra a part of the santonin is combined with the resin; but only a part, because the direct treatment of the semen contra with coal oil removes a small quantity of santonin.

Veratrine and Delphinine.—To prepare veratrine 500 grams of powdered sabadilla seeds are moistened with diluted soap makers' ley, and kept during two days in a closed vessel, then dried in a stove. The product is next treated with boiling coal oil in a displacement apparatus until a litre and a half of percolate is obtained. This is placed in a tubulated retort with a solution of 5 grams of tartaric acid in a litre and a half of water, and distilled over a sand bath until there remain only about 500 or 600 grams of a nearly colourless liquid containing the veratrine in the state of tartrate, surmounted by a small quantity of fixed oil that has escaped the action of the caustic soda. After cooling, the liquor is filtered through moistened paper, and then precipitated with ammonia. The veratrine is deposited perfectly white as a very abundant magma containing much water; it is drained and then dried.

By this process, ten grams of pure veratrine are obtained from a kilogram of seeds.

Delphinine is easily prepared by operating in exactly the same way upon staphisagria seeds.

In moistening the powder with the alkaline liquor it is preferable simply to stir the mixture with a wooden spatula and not with a pestle, as it agglomerates and becomes excessively hard in drying, and thus requires a second pulverization. The caustic soda forms with the fixed oil present in sabadilla in considerable proportion a soap insoluble in benzine; any excess is converted in the air into carbonate and, efflorescing, facilitates the desiccation of the powder. Besides combining with the fatty matter it assists in separating the veratrine from its combination in the seeds.

In distilling equal volumes of coal oil and water at first coal oil alone passes over, water passing over in increasing proportions as the temperature rises. When all the oil has been distilled off about one half of the water remains in the retort.

(To be continued.)

RIVERS POLLUTION COMMISSION.

(*Continued from p.* 608.)

Pollution by Baryta Mines.—Sulphate of baryta is frequently associated with galena in lead mines, but as this compound is insoluble in water it does not possess the poisonous attributes belonging to all the soluble salts of baryta. Sulphate of baryta is a nearly worthless mineral (its chief use being for the adulteration of white paint), and is never mined for its own sake, but carbonate of baryta has important applications in chemical industry. Carbonate of baryta is, in respect of running water, one of the most dangerous minerals mined in this country; fortunately, however, injury to water can in this case result only from gross carelessness; but if carbonate of baryta be stamped or ground with galena or other ore, the preservation of neighbouring streams from poisonous pollution would be much more difficult.

Pollution by China Clay Works.—Generally speaking the effluent water from clay pits is polluted only by suspended matters, and these, after complete subsidence in settling pits, leave the water sometimes even purer than before its use for clay washing. Unfortunately, however, the effluent water from clay works is rarely allowed to subside completely. Thus the white stream from the Gazelan works still retained in 100,000 parts, 251·6 parts of suspended matter, which is, however, innocuous to animal life.

River Pollution arising from Metal Manufactures.—At the outset of the investigations, it appeared probable that the extensive manufacturing operations carried on in Great Britain in connexion with the metal trades, inclusive of metallurgy, would present numerous instances in which refuse of various kinds would be cast into running water. The Commission has, however, now arrived at the conviction that, with the exception of the pollution caused by one or two metal trades, the rivers of this country suffer in an insignificant degree from operations of this character, in comparison with the frightful damage which is inflicted upon them by the sewage of towns and by the drainage from factories devoted to the various branches of industry connected with textile fabrics. This comparative harmlessness of most of the metal trades arises; firstly, from the circumstance that most of them are carried on with but a very slight use of water; and secondly, because waste products arising from metals rarely contain organic matters, which by their fermentation and putrefaction so seriously affect not only the water but also the air.

The metallurgical operations, or the processes for extracting the metals from their ores, carried on in Great Britain are, almost without exception, chemical operations by the dry or hot method, in other words, smelting operations; the extraction of nickel from its ores being the only notable exception, consequently their prosecution has very little effect upon rivers and streams.

The chief if not the only nickel work in Great Britain is the large factory of Messrs. Evans and Askin in Birmingham. The ores of nickel, most of which also contain cobalt, are imported to these works from all parts of the world. Some of these ores contain the metal in the form of sulphuret, others in that of arsenuret, and others again as oxide. Some regulus or concentrated sulphuret of nickel, obtained by a preliminary smelting, is also imported. These ores and regulus are mixed together and melted in reverberatory furnaces. The earthy portions are converted into slag, which is run off and used for repairing roads. The metallic portion is worked up to a regulus containing from 50 to 60 per cent. of nickel and cobalt. This regulus is first roasted and then dissolved in acids, and the different constituents are separated and utilized. The nickel and cobalt are separately precipitated with milk of lime, and the residual solution of chloride of calcium is allowed to run into the neighbouring canal. The Commission was informed that this was the only liquid refuse from these works. The other waste products are utilized or sold as marketable commodities. The arsenic contained in such portions of the ores as are arsenical is transformed into arsenious acid in the roasting operation, and is discharged into the air amongst the products of combustion. The analysis of a sample of the only waste liquor issuing from these works proved that it contained no copper, nickel, or cobalt; it consisted of solution of chloride of calcium. The inspection of these nickel works left no doubt that the processes of manufacture can be, and are easily carried out, without offence to running water; but it was also evident that the reckless or careless prosecution of the nickel metallurgy might give rise to river pollution of considerable intensity.

Pollution by Iron and Steel Wire, Tin Plate, and Galvanizing Works.—Of all forms of river pollution arising from industries connected with the working of metals, that produced by the discharges from iron and steel wire, tin-plate, and galvanizing works is the most intense, noxious, and notorious. In all these operations iron, either in the form of wire or sheet, is steeped or "pickled," as it is technically termed, in dilute sulphuric or muriatic acid; there is thus formed a solution of sulphate of iron (green vitriol) in the one case, and of chloride of iron (muriate of iron) in the other. Muriatic acid seems to be selected chiefly because it is slightly cheaper in some localities. The dilute acid is employed to dissolve oxide of iron from the surface of the metal, and as it requires to be of considerable strength to effect this, there is always left in the bath, when it is practically exhausted, a large proportion of free acid. There is also in solution a larger proportion of sulphate or muriate of iron; the first a product of some value, and easily disposed of, the second a compound of considerable repute as a disinfectant, but for which there is only a variable and uncertain market. It is the general practice, however, in these works to discharge the waste contents of the acid baths suddenly into rivers or sewers, rendering the water of the former unfit for many manufacturing purposes, and for the support of fish life, greatly damaging the brickwork of sewers by the corrosive action of the free acid, and in some cases rendering their contents unsuitable for irrigation without previous purification with lime. In some cases, too, considerable inconvenience is caused by the corrosive action of the acid water upon the interior of steam boilers.

Pollution by German Silver and Electro-plate Works.—The metal known as German silver or nickel silver is an alloy of copper, nickel, and zinc, or it may be described as brass alloyed with nickel, which latter metal is distinguished by the whiteness of its alloys, those containing a considerable proportion of nickel almost rivalling silver itself in lustre and absence of colour. The alloy is, however, essentially base metal, and it is easily corroded by dilute mineral acids and even by vinegar. To protect its surface from such action, it is usually coated electrolytically with a film of metallic silver or gold. Hence the manufacture of German silver is usually combined with that of electro-plating. One of the largest factories of this description is that of Messrs. Elkington and Co., at Birmingham. German silver articles, before being finished or electro-plated, are pickled for a short time, sometimes in dilute nitric acid and sometimes in dilute sulphuric acid. After long use these acids become more or less saturated by the metallic constituents of the alloy; but as the metallic salts thus formed are valuable, they are never thrown away in well-regulated factories. The only metalliferous discharge from such factories is the water in which the articles are washed after their removal from the pickling vats. Samples of this water in which articles from the nitric acid bath and from the sulphuric acid bath had been washed were submitted to analysis, the results showing that several of them were of a highly polluting character; but the more concentrated, containing as they do considerable quantities of valuable metallic salts, are never allowed to escape from well-regulated works, whilst the waste water used for washing the pickled articles contains but moderate proportions of polluting materials, and may be admitted into the sewers of towns with impunity.

Remedies.

In considering the subject of the proper remedies for the evils described in this report, the Commission deals first with the abuses of running water arising from mining operations which fall naturally under three categories: (1) Injury to river channels caused by the casting of solid rubbish into them; (2) Pollution of water by suspended matters; (3) Pollution of water by dissolved matters.

The injury to river channels caused by the casting of solid rubbish into them, the Commission thinks can be very easily prevented by an enactment forbidding it under adequate penalties. It is quite true that there are many lead mines, some tin mines, and some coal pits which now find an easier discharge for their useless quarry stuff, waste shales, and skimpings owing to the neighbourhood of a convenient river channel, than they will have if this doorway of escape for these waste materials be closed. But, as the Report very properly points out, the fact that the mine owner has to incur considerable expense in order to find standing room for his waste products, is not to be regarded as an injury inflicted on the property which he possesses; it is merely proof that the property he holds is not quite so valuable as he may have supposed that it was. He has no right to encroach either on his neighbour's land or on the river channel which affects his neighbour's land, simply because it would be extremely convenient for him to do so. It is incumbent on him to bear the expense, whatever it may be, which is required in order to prevent the injury which at present he inflicts on either. If land is to be had only at a distance, he must elect between the cost of building his waste material higher on his own land, and the expense of carrying it that distance.

Pollution of Water by Suspended Matters.—Soon after commencing the inquiries into the mining operations carried on in this country, it became evident that the standard of purity recommended to be enforced in former reports could not be enforced against polluting liquids from mines without inflicting undue hardship upon these branches of industry.

The extraction of the ores of lead, tin, zinc, and manganese from their rocky matrix, necessitates, in most cases, the stamping and crushing of both ore and rock to an almost impalpable powder, which must then be submitted to the action of a copious stream of water in order to separate as much as possible of the valuable ore from the worthless rocky matter with which it is mixed. The suspended matters carried forward by the water in such operations frequently require a very long time to subside, whilst their character is such as to render the filtration of the water practically impossible, owing to the rapid choking of the filters by the fine suspended particles.

The only other available method of purification is subsidence; but, unfortunately, the finer portions of the suspended matter often subside with such extreme slowness as to render it very difficult for miners to comply with the standard which prescribes that in 100,000 parts of the discharged water there shall not be more than three parts of mineral matter in suspension. To test this point an extensive series of experiments was made upon the turbid waste waters collected as they flowed from the dressing floors of various mines. These samples, after vigorous shaking, were placed in glass cylinders one foot deep, and the time required for complete subsidence was noted. It was found that the effluent water from tin mines could be purified so as to bring it within the limits of pollution allowed by the suggested standards, by the simple process of allowing it to rest for six hours in a settling pond before discharging it into the river. The muddy water flowing from iron mines, coal pits, and coal washing floors requires a much longer interval of time, varying from 44 hours to 22 days. The length of time required for the similar clarification of the foul water from lead mines varies from 44 hours to as much as 61 days. Mines of this description could not therefore be brought within the limits prescribed by the suggested standard relating to mineral matters in suspension without inflicting great expense upon iron, coal, and lead miners, and consequent serious injury on those branches of mining industry.

Having arrived at this conclusion it became important to ascertain how far a reasonable amount of subsidence would suffice to mitigate the great evils at present complained of in mining districts. With this end in view a fresh series of experiments was instituted, in which samples of mud, collected from the beds of various streams, were submitted to fractional subsidence.

The results of these experiments point to a very simple and inexpensive, though unavoidably imperfect, remedy for the chief form of mining pollution.

It would seriously interfere with the mining industry of this country if a standard relating to suspended mineral matter, so stringent as that which has been found easily practicable in other branches of industry, were enforced against discharges from mines. Whilst the Commission believes, however, that subsidence as complete as desirable could not practically be applied to such discharges, their inquiries show that a very moderate amount of settlement, say six hours, would remove a very large proportion of the noxious matters from the water.

For the realization of this salutary result, however, it is absolutely necessary that the subsidence of six hours should be of a *bonâ fide* character. Little of the advantage just recorded would be gained if a stream, however slow, were allowed to flow through the settling ponds. Subsidence is enormously hindered by even the slightest movement of the body of water in which it is taking place; and hence it is that, although in numerous cases subsidence ponds are provided in connexion with dressing floors, ostensibly for the purpose of preventing river pollution, in no single instance has the result been satisfactory, owing to the universal neglect of this precaution.

Efficiently to carry out the remedy recommended, it will be necessary to provide storage for at least as much muddy water as is produced in eighteen hours. This storage should be divided into three ponds, two of which should be alternately used, whilst the deposit in the third is being drained, dug out, and removed to a position from which it cannot be washed into the neighbouring streams. The alternating ponds should be used in the following manner:—The muddy water to be run into pond No. 1 for six hours, the exit being completely closed; and the stream then turned into pond No. 2 for the same length of time. After five hours of perfect rest the discharge of pond No. 1 may be commenced by lowering a wide sill, so as to allow the surface water to the depth of, say three inches, to flow away. The sill is to be gradually lowered so as to complete the discharge within an hour, and care must be taken that it is not so far depressed as to permit the escape of any of the deposited mud. The sill being again raised, the pond is ready to receive a second charge of muddy water, whilst the contents of pond No. 2 are undergoing subsidence. The ponds may be of any depth, but in order to insure adequate subsidence of their contents, the depth of water run off in discharging them ought not to exceed five feet.

Only in a very few of the largest establishments does the quantity of water passing through the slime pits of any mine amount to 400,000 gallons daily; a quantity which would need for its treatment in the manner as recommended three subsidence tanks capable of holding 100,000 gallons each; or, if eight feet deep, with five feet of available depth for subsidence, each 100 feet long and forty feet wide. The three tanks required in these maximum examples would thus not much exceed one quarter of an acre in total area.

(*To be continued.*)

THE PREPARATION AND CHARACTER OF ELATERIN.*

BY FREDERICK B. POWER, PH.G.

A handsome specimen of elaterium was obtained, which a preliminary examination showed to be free from the adulterations sometimes present, and to contain no substances foreign to the drug itself. Fifty grains were exhausted with boiling alcohol, the resulting solution thrown upon a filter, the filter washed with a little boiling alcohol, and the filtrate evaporated by a gentle heat; while still warm, it was poured into a warm dilute solution of potassium hydrate, whereby most of the resin was retained in solution, whilst the elaterin gradually precipitated, upon cooling, in small crystalline crusts or grains.

The amount of elaterium dissolved by the boiling alcohol was sixty per cent., and seven grains of elaterin were obtained, which still required to be purified from the adhering green resin that clings to it with considerable pertinacity, and interferes, both by retarding crystallization and diminishing the beauty and purity of the product.

The impure elaterin was collected, thrown upon a filter, washed with cold water, and redissolved in boiling alcohol. The solution still possessed a greenish hue, and was agi-

* From the *American Journal of Pharmacy* for January.

tated with petroleum benzin, which absorbed the resin, and upon the separation and evaporation of the liquids, the elaterin, in beautiful colourless needle-shaped crystals, and the remainder of the resin were obtained separately.

The advantage of benzin for the removal of this resin is very apparent, since the use of ether, which has been previously suggested and employed for the accomplishment of this purpose, is much less preferable in point of economy; it also dissolves a portion of the elaterin, and thereby causes a considerable loss, while by the use of benzin no appreciable amount of elaterin is dissolved. It is believed that, by taking advantage of this fact, treating the elaterium first with water to remove the inert substances soluble therein, treating the residue with boiling alcohol, and subsequently with benzin, the green resin may be completely removed without resorting to the use of the alkaline solution, thereby considerably modifying the usual process and rendering the preparation much more expeditious. The amount of material at the writer's disposal would not admit of any extended experiments in this direction.

A small portion of elaterium was boiled for two hours with dilute sulphuric acid (one part of acid to ten of water), which almost entirely dissolved it, forming a nearly colourless solution, and frothing quite strongly upon agitation, while a few resinous flocks remained insoluble, which, upon separation, were soluble in alcohol, with a yellowish-red coloration.

The filtered acid solution in behaviour to an alkaline solution of cupric oxide and caustic potash, gave evidence of the presence of glucose, although the failure to obtain this result with elaterin induces the writer to believe that *pure elaterin* is not a glucoside, and that in instances where a reduction of the cupric oxide takes place, it may be attributed to the impurities which may be present.

According to Zwenger (*vide* Gmelin's 'Handbook of Chemistry,' vol. xvii., page 365), "Elaterin is insoluble in dilute acids and alkalies, and does not precipitate alcoholic solutions of metallic salts, although aqueous solutions of metallic salts precipitate elaterin from its alcoholic solution in the same manner as water. It dissolves in oil of vitriol with dark red colour, and is precipitated from its solution as a brown substance by water."

The writer observed the following behaviour toward reagents:—If a crystal of elaterin be placed on a porcelain plate with a drop of concentrated sulphuric acid, a deep red colour is instantly produced, which is one of its most delicate tests; if a small fragment of potassium bichromate be then added, it changes to a deep brown, and ultimately to a light green. As salicin and other substances, however, produce a red coloration with sulphuric acid, this test alone cannot be relied upon, unless attended by other and confirmatory results. Its solution in concentrated sulphuric acid becomes carbonized upon the application of heat. With hydrochloric acid no change of colour takes place, either in the cold or upon heating, and it is apparently insoluble in that liquid.

If a drop of strong nitric acid be added to elaterin upon a porcelain plate, no change of colour takes place, except after standing for several hours, when a pinkish tinge is observed; but upon heating it with that liquid a red coloration is soon produced, with the evolution of nitric oxide vapours, and upon the addition of water white flocks separate.

Elaterin undergoes no change of colour with chlorinated alkalies. An alcoholic solution of elaterin is not precipitated by an alcoholic solution of tannic acid or barium chloride. When heated, it melts, giving off white fumes, which are neutral in their action upon litmus, and burns with a smoky flame, leaving a garnet-coloured, resinous ash.

A prescription was recently received for one grain of elaterin, to be dissolved in a fluidrachm of water, for hypodermic injection; but being wholly insoluble in water, no practical method could suggest itself to the mind of the writer whereby such an application could be obtained.

CINCHONA, OR CHINCHONA?

In his recently published 'Memoir of the Lady Ana de Osorio, Countess of Chinchon,' Mr. Clements R. Markham has revived the discussion of a question which, so far as preponderance of practice can determine anything, might now be supposed to have been satisfactorily settled. It is whether the orthography "Chinchona" or "Cinchona" should obtain for this now famous genus. Reserving for a future opportunity a criticism of Mr. Markham's book, we briefly indicate here his views upon this subject.

There can be no doubt that Linnæus, in naming the genus, sought to connect with it the name of the lady who is reputed to have first made the healing virtues of the bark known to Europe. Whether he was well acquainted with the lady's name is not so clear. Mr. Markham thinks he was not, but that he received his knowledge of the Countess of Chinchon through a French source, and was thus misled into calling the genus *Cinchona* in the 'Genera Plantarum' of 1742. He further thinks that Linnæus showed his uncertainty by the orthography *Cinhona* which occurred in the edition of 1764, but that he died before the error was pointed out and corrected. Mr. Markham sums up his arguments by stating that all authorities agree that "Chinchona" is correct, and that consequently "Cinchona," "Cinhona," and other forms are wrong; that the object sought of commemorating the services of the Countess is defeated by the mutilation of her name; that in much of the most important literature of the subject the word is spelt "Chinchona," and lastly that "the correct spelling should be universally adopted because it is right." He also quotes the following botanical authorities, who have explored the native forests of the genus, as spelling the word correctly:—Pavon, Ruiz, Tafalla, Mutis, Zea, Caldas, Seemann, and Spruce. Finally, with a chivalric admiration of the "illustrious and beautiful lady, Ana de Osorio," which is manifest throughout the book, Mr. Markham pleads that the correct spelling may be retained as the only way by which the "memory of her who made known to the world the inestimable value of quina bark" may be preserved.

On the other hand it has been contended that Linnæus purposely omitted the *h* for the sake of euphony, and that the law of priority must obtain; that botanical names are means, not ends, and their use as means once established it is all but impossible to alter them. Further that "Cinchona" has been so universally adopted that great inconvenience and confusion would result from any attempt to substitute "Chinchona" for it.

Apropos to this discussion, Mr. Hanbury has taken the opportunity of investigating the introduction by Linnæus of the genus *Cinchona*, and has pointed out that the misspelling of the name of the Countess occurs in several authors much earlier than Linnæus. He also proves that Mr. Markham is far from correct in asserting that the Spanish botanists, one and all, support the mode of spelling he (Mr. M.) advocates; but that, on the contrary, Mutis, as well as Ruiz and Pavon, follow the orthography of Linnæus. Mr. Hanbury's strictures are contained in the *Athenæum* of Jan. 30, and are as follows:—

"In connection with Mr. Markham's proposal in his 'Memoir of Lady Ana de Osorio,' reviewed in the *Athenæum* of the 23rd of January, that botanists should abandon Linnæus's word *Cinchona* (Sinkona) in favour of *Chinchona* (Tshin-tshona), and, as I presume, that doctors, pharmacists, and chemists should do the same, and that the reform should extend to the words *Cinchonine*, *Cinchonidine*, and *Cinchonicine*, as well as to any other derivations from the word *Cinchona*, may I be allowed a few remarks on the origin of the Linnæan name, and on some of the arguments used by Mr. Markham to support his case?

"It may be at once conceded that *Chinchona* is a word which better commemorates the Countess of Chinchon than does *Cinchona*.

"But let us trace the introduction of the genus Cinchona by Linnæus, and for this purpose let us have recourse to the actual volumes which formed part of the library of the great botanist, and are, many of them, enriched with his MS. notes. They are now in the possession of the Linnean Society of London.

"In an interleaved copy of the 'Systema Naturæ,' published in 1740, there occurs in the section 'Pentandria Monogynia" a memorandum in Linnæus's hand, after the genus Genipa,—'*Quinquina Cond.*' This is the first allusion to the tree discovered by La Condamine, and on which Linnæus founded the genus.

"In 1742 appeared the second edition (*aucta et emendata*) of the 'Genera Plantarum,' and on one of the two pages of Addenda (p. 527) is the following sentence:—'In Pentandria monogynia post Genipam, Num. 168-1021, Cinchona. Quinquina *Condamin* Act. Gall. 1738.' In the 'Ordo Generum,' the name is again printed Cinchona, and so likewise in the index.

"In the fourth edition of the 'Systema Naturæ,' published at Paris in 1744, we read at p. 30,—'Cinchona. *Quinquina.* Cond. Le Quinquina,' and the same spelling is adopted in the editions of 1748 and 1756. Again in the fifth edition of the 'Genera Plantarum,'—'*ab auctore reformata et aucta,*' which appeared at Stockholm in 1754, the spelling of the controverted word is again (p. 79) Cinchona, and so it is in the 'Species Plantarum,' of which the first edition was printed in the previous year (1753).

"From these quotations, it may be fairly assumed that Linnæus fully meant to use the word Cinchona, and that its occurrence as '*Cinhona*' in one solitary instance in the sixth edition of his 'Genera,' 1764, was a mere typographical error, and not, as Mr. Markham seems to think, a proof that he desired to spell the word correctly.

"'It was still more unfortunate,' says Mr. Markham, 'that Linnæus died before the error was pointed out and corrected. This was done by the Spanish botanists, Ruiz and Pavon, who landed in Peru in 1778, the very year of Linnæus's death. They explored the forests of Huanuco and Loxa, discovered many new species of *Chinchonæ*, and are among the highest authorities on the subject. They strongly advocated the correct spelling. . . . The botanist Mutis, with his disciples Zea and Caldas, were engaged in the study of the *Chinchonæ* of New Granada, the former residing in South America, chiefly at Bogota, from 1783, until his death in 1808. They also spelt the word correctly. . . .'

"That Linnæus could not have been ignorant of the correct spelling at a much earlier date than that mentioned seems probable from the following circumstance:—In 1758, J. Ch. P. Petersen read at Upsala an academic dissertation, 'De Cortice Peruviano,' Linnæus presiding. In this production, which was afterwards printed, the name of the Spanish Viceroy appears (more than once) as 'Comes del Chinchon,' while the bark is spoken of as 'Chinchona,' and never as Cinchona ('quamvis nonnulli Chinchonam in scorbuto esse magni ponderis remedium . . . .' p. 10).

"As to Mutis, Mr. Markham overlooks the fact that that botanist was residing at Bogota, not merely in 1783, but in 1763, under which latter date he wrote thence to Linnæus; and that a correspondence was kept up between them for eighteen years. Some of Mutis's letters are fortunately extant, and form part of the Linnæan collections at Burlington House. As they throw some light on the subject, I have made from them a few extracts. Translations of the letters may be found in Sir J. E. Smith's 'Selection of the Correspondence of Linnæus,' London, 1821.

"24th Sept., 1764. (Mutis to Linnæus). 'Verum ne plane ineptissimæ hæ literæ tibi viderentur, iconem et flores quosdam Chinchonæ adjungere duxi. An descriptioni suæ figuram ullam addiderit Celeberrimus de la Condamine, vel an plantam siccam examinasse tibi licuerit, necne, cum nullam notam in descriptione Chinchonæ editionis Holmiæ 54 videam, non plane mihi constat.' [The drawing and specimens here alluded to, still exist in the Linnean herbarium.]

"3 Oct., 1767.—(The same to the same.) '. . . sane præter ultimas lineas, in quibus nunciabatur, te Cinchonam accepisse; quasque in Civitate Bogotensi, antequam illinc longissimæ peregrinationi paratus decederem, summa jucunditate legisse contigit. . .'

"15 May, 1770.—In this letter the name of the plant occurs four times, and is always written after the fashion of Linnæus with one *h*. Appended to the letter, Mutis sends a botanical description of a plant which he calls *Cinchona Gironensis.*

"6 June, 1773.—Mutis here acknowledges the receipt from Linnæus of certain works of the latter, and expresses his pleasure at the honourable mention of himself by Linnæus under the head of Cinchona; and he also refers to a small present which he transmits by Don Ruiz-Pavon, who is going to Upsala.

"8 Feb., 1777.—This letter contains notes on some plants sent by Mutis to Linnæus, one of them being entered as *Cinchona Bogotensis.*

"12 Sept., 1778.—A long letter of condolence from Mutis to the younger Linnæus. It contains the following passage:—'Maxime disto a solo natali Cinchonæ officinalis a me detectæ, cujus viciniis crescit etiam Mutisia.'

"In none of these letters is there a hint of disapprobation of the name Cinchona, which it will be noticed that Mutis adopts, immediately he finds it used by Linnæus.

"Mr. Markham asserts that the error was pointed out by Ruiz and Pavon. But surely he cannot be conversant with the 'Quinologia' of Ruiz, published at Madrid in 1792, or with the 'Suplemento,' which appeared, under the joint authorship of Ruiz and Pavon, nine years later, in neither of which works is the name of Linnæus's genus written otherwise than Cinchona. Mr. Markham must be also unaware that in the 'Flora Peruviana et Chilensis' of Ruiz and Pavon, the name in dispute is uniformly written Cinchona, and never Chinchona. Pavon, indeed in his later years is stated by Howard to have pleaded for the word Chinchona. This was done in his 'Nueva Quinologia,' a work written between 1821 and 1826, but which never saw the light until 1862, when it was edited in an abridged form by Mr. Howard.

"But the error in the name of the Spanish viceroy originated long before the time of Linnæus. Sebastiano Bado, the author of 'Anastasis Corticis Peruviæ' (Genoa, 1663), and one of the principal authorities for the early history of Peruvian bark, writes '*Cinchon*' for Chinchon. Morton, in his 'Pyretologia,' 1692, mentions the Count's name in the same inaccurate manner. So does La Condamine in 1738, and Geoffroy in 1741. By some of these writers Linnæus was misled, and was afterwards, perhaps, fortified in his error by the rules he had laid down about the immutability of generic names.

"That one of these rules was supposed to apply to the case in question, is evident from the remark of Ruiz,—'Linneo parece que debió haber expresado el titulo de los Condes de *Chinchon* en su género, dandole el nombre de *Chinchona* y no el de *Cinchona*, con el que tambien le nombro yo, atendiendo al Canon 243, de su Filosofía Botánica en que dice, *Nomen genericum dignum alio, licet aptiore, permutare non licet.*' *

"Though the Canons of Linnæus may no longer command the implicit obedience that they were once thought to deserve, it cannot be denied that there is a general reluctance among botanists to alter the Linnean names, and this is particularly the case in the present instance, where the alteration advocated would require to be followed in innumerable writings on pharmacy and chemistry. 'In our science,' wrote Dr. J. E. Smith, in 1807 ('Introduction to Botany'), 'the names established throughout the works of Linnæus are become current

"* It seems that Linnæus ought to have indicated the title of the Counts of Chinchon, by giving to his genus the name Chinchona, and not Cinchona, which latter, however, I adopt, in accordance with Canon 243 of the 'Philosophia Botanica,' which says *Nomen genericum*, etc."

coin, nor can they be altered without great inconvenience. Perhaps, if he had foreseen the future authority and popularity of his writings, he might himself have improved upon many which he adopted out of deference to his predecessors, and it is in some cases to be regretted that he has not sufficiently done so.' "

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The Annual Supper of this society was held on Wednesday evening, the 27th January, at the Maypole Hotel, Mr. Fitzhugh, President, in the chair; Mr. Lewis in the vice-chair.

After the usual loyal toasts, the Chairman proposed "The Pharmaceutical Society of Great Britain," and alluded to the improvements in the prospects and condition of pharmacy and its followers, educationally, since its establishment. Referring to the examinations, the speaker regretted the effect of so large a number of failures, both in the Preliminary and Minor examinations, as producing inconvenience to the trade throughout the country. He was of opinion, however, that the failures showed the necessity of examination and that the inconvenience must be cheerfully endured for the good to be hereafter derived. In coupling the name of Mr. Atherton, a member of the Council, with the toast, the Chairman thought they had cause to congratulate themselves that the chemists of Nottingham had a representative who had to such an extent their confidence and regard.

Mr. J. H. Atherton, in responding, stated that he feared in some parts of the provinces, the Pharmaceutical Society, its Examiners, and even the Council had incurred undeserved unpopularity on account of the extraordinary number of rejected candidates at the Preliminary and Minor examinations during the past year. He need not say how unjust such censure was. He believed the board of examiners to be composed of thoroughly honest and impartial men, who did their utmost to carry out their important duties without fear or favour. They must remember that last year was an exceptional one, the fear of a more stringent examination had no doubt been the cause of the great rush of candidates to try their luck (for with the majority he believed that was the proper expression) and with the result they knew so well. He had little doubt in his own mind that had candidates relied more on themselves and less on the fallacious system commonly called "cram," the proportion of failures would have been considerably diminished. What could be expected of young men who postponed all preparation for examination until the last moment, relying on the reputed success of certain professional teachers to impart the information in two months by means of condensed notes and ingenious aids to memory? Even supposing they passed the examination, the information was useless to them afterwards. The bearing of these failures on the trade at large was important, and was not so black as was generally thought. There would be for some time a difficulty in obtaining assistants; this would have to be met by the employment and training of unskilled labour; many of the operations of the laboratory and shop could be done by such persons after a little training. The speaker thought this would be an advantage, as in some country places assistants and apprentices were little better than porters. The reduction in the number of assistants and apprentices must cause, ultimately, a reduction in the number of chemists and druggists, and it did not require a very vivid imagination to foresee—what all desired to see,—better trade, better class of men, better prices, and so on, until pharmacy attained its proper educational and social condition. The failures in the Preliminary examination appeared to be the most serious, and the speaker thought a change was required in some way, for if the advent of apprentices was checked too much the trade would be very much inconvenienced. From personal observation, he was quite certain that the chief failures were amongst those who had allowed too long a period to elapse after leaving school,—a strong argument against binding apprentices before they have passed the examination. After calling the attention of the meeting to the provisions of the benevolent fund, Mr. Atherton concluded by making an appeal on behalf of the fund.

Mr. Williams, Hon. Sec., proposed the "Medical Profession," and alluded humorously to the increase of the patent medicine trade.

Mr. Atherton proposed "Success to the Nottingham and Notts Chemists' Association," and alluded to the want of activity most of the local associations exhibited, and urged upon those present the almost absolute necessity of such organizations. Pharmacy at the present time was in a transition state, and it behoved all interested in its progress to do something to help it onwards. At the present time it was the aim of local associations to provide efficient instruction for young men at as cheap rates as possible, and to do all in their power to encourage study and mutual improvement amongst them; but this was only a temporary condition, it was not certainly their intention to help to push men into the trade cheaply. The future of such societies was much more ambitious than their operation at the present time indicated. They must aim at providing thoroughly practical instruction by experienced pharmacists, and charge accordingly; there was no reason why a fee of two or three guineas the session should not be paid, and regular schools be established for certain districts; but he thought that the first step in that direction would be the requirement by the board of examiners of certificates of each candidate having attended some such course either in London or some recognized school in the provinces. In the meantime, they must individually do all in their power to encourage the managers of the association in their work. In connection with the toast, he would couple the name of the President of the Society, Mr. Fitzhugh, a man whom they all thoroughly esteemed, and with whom it was a pleasure to be associated.

Mr. Rayner proposed "The Teachers," and coupled with the toast the names of Mr. Major and Mr. Copley. Mr. Major having responded, Mr. Copley, in reply, said that in his experience the candidates for the Minor examination had not complained of the undue severity of the questions, and expressed a hope that the present standard would never be lowered, as he thought that those who were unable to pass the Minor examination as it is now conducted would be unfit for the proper conduct of the business.

Several other toasts were proposed and responded to. The proceedings were enlivened by songs and recitations, etc.

ANNUAL FESTIVAL OF THE GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The annual festive gathering of the members and friends of this society was held in the Crown Halls, Sauchiehall Street, on Wednesday, 3rd February. About 200 sat down to supper. Mr. John Currie, President, occupied the chair, and was supported by Drs. Miller and Milnes. Messrs. Greig, Kinninmont, Hamilton, McAdam, Fenwick, Fairlie (Secretary), McKenzie and ladies. Messrs. Whyte and Davison acted as croupiers, who were supported by Drs. McLean, Smith, and Moffatt, Messrs. Dun, Townshend, Scmitz and ladies. After supper the usual loyal and patriotic toasts were given from the chair, and duly responded to, Mr. Dun replying for the "Reserve Forces." The toast of the evening, "Success to the Association and Annual Festival," was proposed by Mr. Currie and replied to by the Secretary and Treasurer, Messrs. Fairlie and McKenzie. The toast of "The Ladies" was proposed by Dr. T. D. Moffatt, and replied to by Mr. John Foster. Among the other toasts on the programme were "The Medical Profession," "Chemical Science," etc.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 13, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE AMENDMENT OF THE ADULTERATION ACTS.

SHORTLY after this Journal goes to press, Mr. SCLATER BOOTH, the present head of the Local Government Board, will, pursuant to notice, ask leave to introduce a Bill to repeal the Adulteration of Food Acts, and make better provision for the sale of food and drugs in a pure state. It would be superfluous to insist upon the necessity for some amendment of the law in this respect, and we are glad to find that its urgency has not been overlooked. At present, of course, no information is obtainable as to the nature of the amendments proposed, but we shall take the earliest opportunity of placing our readers in possession of full particulars concerning them.

Meanwhile, it is worth mentioning that in several parts of the country the subject of the Adulteration Acts is attracting considerable attention, and steps are being taken by various associations with the view of suggesting alterations and improvements of the existing law. As an instance of such action we must specially mention a report by the Committee of the Birmingham and District Grocery Mutual Protection Association, containing a variety of suggestions adopted after carefully considering, with legal assistance, the operation of the Adulteration Acts. This report, which has been submitted to Mr. MUNTZ, is stated to have received his cordial assent; and, as it may therefore be expected this active participator in the legislation relating to adulteration will support the views put forward in this report, a statement of them will, we believe, be useful as well as interesting to our readers.

In the first place the report dwells upon the considerable injury that has been done to a number of respectable tradesmen, mainly in consequence of the want of knowledge on the part of analysts as to whether the presence of certain substances in various commodities constitutes an adulteration or not, and partly, also by the absence of any authoritative standards of purity in relation to imported and manufactured articles of food, drink, and drugs. As a remedy for this it is suggested that the Board of Trade should appoint analysts whose duty it should be to examine all such articles, with the object of establishing proper standards of purity, and if necessary varying them from time to time to meet the changing wants of consumers.

In reference to articles that are mixtures, it is suggested that it should be sufficient for the seller to state on the packets that the article is a mixture, and that it contains nothing injurious to health.

As regards the liability of the retail sellers of adulterated articles to the penalties of the Act, even when they did not know the articles were adulterated, but merely sold them as they had bought them, it is considered by the Birmingham Committee that great injustice has been inflicted upon honest traders by the proceedings under the second section of the Act. The Committee strenuously takes the ground that "no person should be held criminally responsible for "an act innocently done;" but at the same time it seems to be admitted that retail dealers are responsible for failing to certify themselves that the commodities they sell are pure and unadulterated, since it is suggested that the *onus probandi* should be put on the seller of adulterated goods, and that he should be held to be guilty *unless* he satisfied the Court that he did not know the articles sold by him were adulterated. On the other hand it is considered that the manufacturers of adulterated articles should in all cases be liable to penalty whether or not they personally knew of the adulteration.

Among other suggestions it is proposed that all Public Analysts should be paid by salary, and that it should be their duty to analyse any article brought to them, and certify the results for a certain fixed fee, to be paid to the fund from which the analyst's salary is derived. The appointment of special inspectors to carry out the provisions of the Act is recommended, and it is suggested that the inspector should leave with the seller of any article taken for analysis a sealed sample, so that the seller may, if he think fit, take it in that condition to an independent analyst; also, that a copy of the official analyst's certificate should be sent to the seller of any article examined by him, and that, in the event of prosecution, the analyst should attend in Court for examination on receiving notice to do so from the seller of the article impeached.

MEDICAL AND PHARMACEUTICAL EDUCATION AT A DISCOUNT.

THE state of Missouri has contributed its quota towards the solution of the education question, and it is by no means encouraging. It occurs in the report of a Committee appointed by the St. Louis Medical Society to consider the question of the mutual relations existing between physicians and druggists That Committee appears to have "resolved that thirty years' experience in elevating (*sic*) the standard "of medicine by the multiplication of schools and the "cheapening of diplomas has proved a signal failure," and that it is necessary to "discountenance and dis- "courage a similar suicidal and degrading system, "which is being inaugurated for pharmacy by un-

"scrupulous and ambitious aspirants, who, for the "sake of personal gain and notoriety, are willing to "sacrifice both their profession and their friends." Of course, after this evidence of its paternal regard for pharmacy it is not surprising to find that the Committee's anxiety extends to the instruction of pharmacists in their duties with respect to the conscientious dispensing of prescriptions, the renewing of prescriptions without the authority of the physician, the literary property of the physician in the prescription, and sundry similar matters. But we hardly expected to find it seriously proposed by any one outside a lunatic asylum, that laws should be enacted limiting the retail sale of poisons to the "filling of prescriptions duly and plainly signed by responsible practising physicians."

DRUGGISTS' STATISTICS IN THE UNITED STATES.

A writer in the *American Journal of Pharmacy* states that the number of druggists in the United States, according to the last census returns, is 17,369, of whom 33 are females, and 392 are 60 years of age or more. Only 14,273 are natives of the United States; whilst no less than 1470, or more than 8 per cent. of the whole are Germans. England and Wales have sent the next largest contribution—namely, 607; then Ireland, 339; British America, 189; France, 118; Scotland, 64; China and Japan, 51; Italy, 7; other countries, 163. Compared with the returns for 1850, druggists have increased in the United States in a ratio considerably beyond that of the increase in the population; for in the former year they were only 1 to 3778 of the population, but in 1870 they were 1 to 2219. During the same time the proportion of patent medicine manufacturers has increased from 59, or 1 to 369,472 of the population to 409, or 1 to 94,274.

THE ARTICHOKE A REMEDY FOR RHEUMATISM.

In the *British Medical Journal* for December 19, Dr. Copeland, of Norwich, has published some cases confirmatory of a former paper recommending the treatment of rheumatism with the common artichoke in the form either of tincture or extract. These are prepared from the leaves gathered just before the vegetable is fit for food, and whilst they are full of juice. If the leaves are left until the top is cut off for cooking purposes and the plant begins to wither, the product is useless and inert. To this circumstance, Dr. Copeland attributes the negative results met with by some practitioners who have tried this medicine.

THE IRISH PHARMACY BILL.

In accordance with notice given, Mr. Errington was on Thursday night to ask the Chief Secretary for Ireland, whether, in compliance with the recommendations of the Select Committee on the Apothecaries' Licences Bill of last session, it is his intention to introduce this session a Bill for the establishment of a Pharmaceutical Society in Ireland.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The seventh General Meeting was held at the Royal Institution, January 28th, 1875. The President, Mr. A. H. Mason, F.C.S., in the chair. Donations to the library of the *Pharmaceutical Journal* and the *American Chemist* were received and duly acknowledged. There being no miscellaneous communications, the President called on Mr. E. Davies, F.C.S., to read a paper on—

Nitrate of Soda, Its Production and Uses.

Nitrate of soda is a substance of so much commercial importance, that although its use in pharmacy is limited to the preparation of arsenate of soda, no excuse is necessary for bringing it under the notice of a Chemists' Association. A remarkable fact connected with this substance is that only on a narrow tract of the earth's surface are the conditions for its production found. In South America on the western side of the Andes is a desert region extending from near Arica for about 500 miles south. Near the sea the land rises abruptly to a height of from 2000 to 3000 feet, where a table land stretches to the foot of the Cordilleras. At first, on the side of the sea, the surface of the land is uneven, but nearer the mountains becomes a level plain, 30 miles wide. This is the pampa of Tamarugal. The nitrate district lies in the uneven part of the table land,—in Peru, about 10 miles from the coast to the edge of the pampa of Tamarugal—and stretches from Pisagua, 45 miles north of Iquique to Patillos, 30 miles south. In Bolivia there is a district not yet much worked.

The deposit is not continuous but is found principally on the edges of depression which have once been lagoons. It is covered by a layer of indurated gravel called "costra," on an average about 50 inches thick, the nitrate of soda layers averaging 25 inches in thickness. The layer is sometimes four yards thick. . The raw material called "caliche" is of two kinds, one light coloured and solid, the other softer and darker in colour.

The mining is done by blasting away the "costra" with gunpowder, made in the country from nitrate of soda. The "caliche" is broken up before lixiviation into small pieces, and dissolved either in open iron tanks or in closed vertical cylinders. In either case steam is led into the bottom separated from the charge by a false bottom of perforated iron plates. Water or the mother liquor of a previous operation is put on the broken "caliche," steam injected, and the solution drawn off and allowed to settle; when clear it is put into the crystallizers. The crystals are drained and dried, and the mother liquor used again. The great difficulties are the scarcity of water and fuel. Water must be obtained from deep wells, 200 to 300 feet in depth. It is very brackish and unfit for human consumption, though the mules drink it. Coal is brought from Iquique, and costs about thirty dollars per ton at the works.

An attempt is being made to bring down a solution made with cold water, in iron pipes to Iquique, in order to evaporate it there in closed cylinders, and condense the steam to furnish water for the use of the town, but it is not yet completely successful.

The origin of these deposits is not certainly known. There is no rain in these districts owing to the prevailing wind, the south-east trade wind, being deprived of its moisture in ascending the long eastern slope of the Andes, and then becoming warmer as it descends it tends rather to take up than to deposit moisture. The table land has evidently been at one time a marshy plain at the level of the sea, with extensive salt-water lagoons. Mr. D. Forbes, in a long article on the Geology of Peru and Bolivia (*Geological Magazine*, 1861), gives as an explanation of the deposits, that on evaporation, chloride of sodium decomposed carbonate of lime, forming chloride of calcium and carbonate of soda. The alkaline carbonate in presence of decomposing nitrogenous matter then gave rise to nitrate of soda. I cannot think that this is correct, for on evaporating chloride of sodium with precipitated calcium carbonate, I found that the residue, when moistened with water, was not even alkaline to test paper. When the dried mixture was treated with alcohol, it appeared that a slight decomposition had taken place, the alcohol containing a little chloride of calcium, and the residue being decidedly alkaline. The reaction may, therefore, under some conditions, give an alkaline carbonate, but it seems more probable to me to find a source for the alkaline carbonate in the vegetation which would be found on the salt-encrusted land. Such plants contain large quantities of organic soda salts, and on decaying would furnish both soda and nitrogen. The land has been subsequently upheaved. The deposit is comparatively modern, being found in post-Tertiary strata.

Uses.—The two principal uses are in the sulphuric acid manufacture, and as manure. No other means of carrying the oxygen of the atmosphere to the sulphurous acid has proved practically successful when sulphuric acid is to be made. In making sulphate of soda, Hargreave's process may, perhaps, help us to dispense with it. As manure, it is an alternative source of nitrogen with sulphate of ammonia. The matter of price has some influence on the choice of these two materials, but sulphate of ammonia is preferred as being more certainly returned as ammonia in any analysis which may be made. As manure it appears to be quite equal to an equivalent quantity of sulphate of ammonia.

In making nitric acid, nitrate of soda has the advantages that it is cheaper than saltpetre and gives more nitric acid, weight for weight, and also the residual product is directly available in alkali manufacture. It is not so readily purified from chlorides as nitrate of potash is, so the latter is used when a pure acid is required.

In the manufacture of saltpetre a valuable application of nitrate of soda has been found. The deposits at Stassfurt have given abundant supplies of chloride of potassium, which when mixed in saturated hot solution with a strong solution of nitrate of soda yield crystals of nitrate of potash on cooling.

Gunpowder has been made from nitrate of soda, but its tendency to become damp renders it insuitable. Probably, if quite free from chlorides, this would be less marked.

Other minor uses have been found for it, as in Heaton's process for purifying cast iron from sulphur and phosphorus; making oxygen by heating it with oxide of zinc, and the manufacture of manganates; but these are not important at present.

Several years since, when engaged in a chemical works some nitre drainings were sent for use. I found so much iodine in it that I made inquiries about the supply, but finding that there was very little to be had, I did not prosecute the research. The mother liquors of the nitrate of soda contain ·28 to ·36 per cent. of iodine. This is now successfully extracted. It was at first sent over as cuprous iodide, which is precipitated when sulphate of copper and protosulphate of iron are added to the solution of an iodide. This contains about 60 per cent. of iodine. Now the iodine is obtained in Peru, and sent over in a very pure state, some samples containing 99 per cent.

In conclusion, I have to own my great obligations to a paper by Mr. Flagg, in the *American Chemist*, for many of the facts connected with the extraction of the nitrate and the nitre districts.

A discussion followed in which Mr. Belcher, a gentleman connected with the firm which imports the principal part of Peruvian iodine, stated that the processes for extracting the iodine in Peru were kept secret as much as possible; and also that there was a great loss from evaporation in bringing it over.

Mr. Armstrong suggested that the use of casks lined with paraffin might prevent the evaporation. He expected that with a lower price, many important uses would be found for iodine.

Other members took part in the discussion, and the proceedings terminated with a vote of thanks to Mr. Davies.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Friday evening January 29, a supper was given in connection with the above Society, at the Wickliffe Rooms, Leicester. The chair was taken at 8.45 by Mr. H. Nettleship, and the vice-chair by Mr. E. H. Butler.

After supper, the usual loyal toasts having been drunk, Mr. J. Young proposed the Pharmaceutical Society of Great Britain. In doing so, Mr. Young alluded to the work accomplished by the Society in the past, and said that, though there might be various opinions as to imperfections existing in its constitution, there could be no doubt that it had been instrumental in raising the status of the trade, and in improving the quality of the drugs and chemicals supplied to the public.

Mr. W. B. Clark briefly responded, showing that in some degree, at least, the local Association should be to the town what the Pharmaceutical Society is to the country.

At the request of the chairman, Mr. E. J. Bishop then rose to propose the toast of the evening, "Success to the Leicester Chemists' Assistants and Apprentices' Association," saying, that no words of his were needed to recommend the toast to the favourable notice of all present, as most of them had been, either directly or indirectly, benefitted by the existence of the Society. He alluded feelingly to his own long connection with it, and expressed his belief that, being founded on right principles, and for the accomplishment of a very worthy object, it would still continue to be the guide and help of students preparing for the examinations.

Mr. E. H. Butler, in responding, referred to the work which had been done during the past year, with a view of showing that the object for which the Association was established—viz., helping young men to prepare for the Pharmaceutical examinations—had been effected; and urged all the assistants and apprentices before him to reap the full benefit of the advantages offered by the Society, assuring them that a regular attendance at its classes and lectures would considerably lessen the difficulties they would have to encounter.

Various other toasts were proposed and responded to, as "The Town and Trade of Leicester," "The Principals," "The Committee and Class Teachers," and "The Ladies."

The proceedings of the evening were enlivened by several songs, excellently rendered by Messrs. Baker and Green, and were closed by the company drinking to "The Health of the Chairman and Vice-Chairman," with musical honours.

ASSOCIATION OF CHEMISTS AND DRUGGISTS FOR WOLVERHAMPTON AND DISTRICT.

The members and associates of the above Society held a meeting in the Committee Room of the Agricultural Hall on Wednesday evening, February 3rd, under the presidency of Mr. R. H. Lowe. The table was covered with books, scientific apparatus, and valuable specimens of rare drugs, which had been presented by various friends in all parts of the kingdom. A large and well furnished cabinet of materia medica specimens, kindly given by Messrs. Evans, Lescher and Evans, was much admired.

After the minutes of the last meeting had been read and confirmed, and the amended rules of the Association passed, Mr. Brevitt (one of the Honorary Secretaries) read the report of the Sub-Committee, by which it would appear that, although the Association has been in existence not quite two months, nearly eighty members and associates had already joined. The Committee felt sure, as the prosperity of the Society increased, its circle of usefulness would be enlarged, and that chemists in other towns, not in the immediate neighbourhood of Wolverhampton would join. Regret was expressed that assistants and apprentices, for whose good the Association had been formed, did not more cordially take the matter up. The classes on materia medica and botany were well attended, and the lecturer (Mr. Stokes Dewson) had already made himself highly popular with the students. Many gentlemen having at heart the welfare of provincial pharmacy had, as soon as the establishment of the Association was known, kindly offered assistance and advice. Professor Attfield (of the Pharmaceutical Society) had sent the following letter of advice to the students—advice which ought to be written in letters of gold—in which he says—

"I wish your Association every success. You rightly say that I take deep interest in the progress of pharmaceutical education. I cordially sympathise with every association, school, or other organization having for its object the promotion of real pharmaceutical education. Consistently with that interest and sympathy I denounce mere preparation for examination. The two are perfectly distinct because examination at its best, and in the nature of things, is an inefficient test of education. Only when conjoined with and restricted to the subjects of a well-defined curriculum of study, does examination become a trustworthy test of education. I am sure that the members of your Association will range themselves on the side of real education, and that your young men will recognize examination not as an end in itself to be prepared for, but as a test of the soundness with which they have slowly and steadily, by years of honest endeavours, prepared themselves for the business of their life.

"Yours faithfully, JOHN ATTFIELD."

The following valuable donations had also been received:—Professor Attfield, Ph.D., F.C.S., etc., 'Chemistry: General, Medical, and Pharmaceutical;' Professor Bentley, F.L.S., etc., 'Manual of Botany;' Professor Proctor, 'Practical Pharmacy;' Dr. John Muter, F.C.S., etc., 'Pharmaceutical Chemistry' and 'Materia Medica;' Dr. Frankland (per the borough analyst), 'Organic and Inorganic Chemistry,' 2 vols.; Mr. Frank Lescher, 'Elements of Pharmacy;' Messrs. Evans, Son, and Lescher, a cabinet of Materia Medica; Messrs. Southall and Barclay, a cabinet of Materia Medica; Mr. J. B. Smith, 'Pharmaceutical Guide;' Mr. Daniel Hanbury, 'Pharmacographia;' Mr. A. Sadgrove, 'Chart of Materia Medica;' Mr. A. W. Gerrard, a very fine specimen of Jaborandi; Mr. W. Y. Brevitt, Southall's 'Materia Medica;' Mr. F. J. Barrett, F.C.S., mounted specimens of plants; and various other donations. The British Pharmaceutical Conference had forwarded (by their secretaries) a letter of recognition, and had promised to forward the Year-Books as they were published. The Secretaries had hoped to receive some assistance from the Pharmaceutical Society, the "Alma Mater" of most pharmaceutists, in founding a provincial school of pharmacy in Wolverhampton. In answer to the application of the Presidents, a long list of questions had been received which the Secretaries could not have answered satisfactorily on account of the recent establishment of the Association, and a request that the balance-sheet of the previous year might be forwarded. A request for the Journal of the Society appeared to be disregarded.* However,—as a member present remarked—self-help was best, and now it mattered but little whether the Association were recognized by the Pharmaceutical Society or not. In the autumn it is proposed to commence classes on pharmaceutical chemistry, pharmacy, and materia medica, in addition to the lectures now being given.

Two auditors (Mr. Hamp, Penn Road, and Mr. Theophilus Wedge, Victoria Street) were then elected for the present year. Three assistants (chosen by the associates)—Messrs. Cooley, Whewell, and Matthews—were elected as members of the Council. Mr. E. W. T. Jones, F.C.S. (the borough analyst) was then proposed, seconded, and elected by acclamation, an honorary and corresponding member.

A letter from Mr. Wentworth Lascelles Scott, F.C.S. (analyst for North Staffordshire, etc.) was then read by Mr. G. A. Davenport, expressing sympathy with the objects of the Society, and offering to deliver one or more lectures on various subjects during the session. This offer was most thankfully accepted, and the Secretaries were requested to make the necessary arrangements.

Mr. Stokes Dewson (of the Queen's Hospital) then read a highly interesting account of the two new drugs "Jaborandi and Boldo." After speaking of the botanical and geographical origin of these plants, and describing their structure and peculiarities and the different forms in which they occurred in commerce, their physiological action was fully commented on. The action of jaborandi as a sialagogue and diaphoretic was spoken of as remarkable, and Mr. Martindale's experiments upon himself were quoted. The tonic properties of boldo, supposed to be a valuable remedy in liver complaints, were also referred to. Various specimens of each of these drugs were exhibited.

After a very cordial vote of thanks to the author;—

Mr. F. J. Barrett, F.C.S. (the Hospital Pharmaceutist) gave an interesting account of "Milk Analysis," explaining the several processes by means of Horsley's lactometer. He spoke of the various constituents of milk, butter, oil, casein, sugar, and salts, principally phosphates of lime and magnesia, and explained how they contributed as a food to the formation of skin, cellular tissue, muscle, and bone. After commenting on the microscopical appearance of milk, and giving a short account of the way in which butter and cheese were produced, he showed by means of a graduated tube the separated constituents of milk, and pointed out how readily adulterations might be detected by means of Mr. Horsley's very ingenious apparatus. The adulteration of butter was next alluded to; samples of pure and sophisticated butter were shown, and the mode of detecting such adulterants demonstrated.

A short discussion then took place, in which Mr. Jones, F.C.S., took part; and after Mr. Barrett had replied, a vote of thanks was unanimously passed.

A very ingenious and portable oil lamp for microscopic work was then shown and explained by Mr. Jones.

A general discussion, on various subjects of pharmaceutical interest, followed by a vote of thanks to the Chairman, concluded a most enjoyable evening.

The next meeting is arranged to take place early in March, for which several interesting papers have been promised.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

ASSISTANTS' SECTION.

The fifth meeting of session 1874-75 was held in the West Hall, Anderson's University, on Wednesday, 27th January, at 9 p.m. The President, Mr. John C. Hunter, occupied the chair. The minutes of the last meeting having been adopted, the Chairman called upon the Vice-President, Mr. James Johnston Weir, to read a paper on "The Laughing Animal." Mr. Weir informed the meeting that man was the laughing animal, after which he described the differences which exist between the face of man and that of the lower animals. Mr. Weir carefully went over the nerves, which produce laughter, and referred to a few of the causes of laughter.

At the close of the paper, several questions were put by a few of the members on certain points in which they differed, and a short discussion followed in which the Chairman, Messrs. Nance, M'Cann, Taylor, and Foster took part; after which the Chairman proposed a vote of thanks to Mr. Weir for his very interesting and instructive paper, which was cordially responded to. Several new members were then elected.

The Secretary announced that the next meeting would be held on the 24th February, when Mr. M'Cann would read a paper on "Geology."

* The grievance of the sub-committee of the Wolverhampton Association seems to be, that it has been required to make an application on the form framed by the Council for the purpose of eliciting full information before making a grant. —ED. PH. J.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 4th of February, 1875. Professor Odling, F.R.S., etc., in the chair. The minutes of the previous meeting having been read there was a communication from Mr. G. Whewell, entitled "Test for Carbolic Acid." A note "On the Action of Anhydrous Ether on Titanic Tetrachloride," by Mr. P. P. Benson, was then read. Two crystalline compounds are obtained in this reaction, the one boiling at 105°-120° C., and melting at 42°-45° C. has the composition $TiCl_4(C_4H_{10})O$; the other, *titanium ethyl trichlorhydrine*, $TiCl_3(C_2H_5O)$ melts at 76°-78° C., and boils at 186°-188°. The last paper was by Mr. W. H. Perkin, F.R.S., "On Dibromacetic and Glyoxylic Acids." An animated discussion ensued, and the meeting finally adjourned until Thursday, 18th of February, when there will be a lecture, by Professor Clerk Maxwell, "On the Dynamical Evidence of the Molecular Constitution of Bodies." The Faraday lecture will be delivered by Dr. A. W. Hofmann, on the 18th of March.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture III.

The Influence of Common or Ethylic Alcohol on Animal Life. The Primary Physiological Action of Alcohol.

I have to consider next the primary action of ethylic alcohol on animal life. This is the alcoholic spirit which enters into wines, beers, and ordinary spirituous liquors.

There are two modes in which this subject must be discussed. One relates to the mere physical action of alcohol upon the body, the other to its action as a food for the body. Of the varied substances which we take into our systems, some, like chloroform or opium, produce very marked physical effects, which we may call physiological, but which have nothing to do with the nourishment of the organism, nor with the sustainment of its vital power. Other substances act as foods, producing certain continuous phenomena of structural build and of vital function. Alcohol is peculiar in that we are obliged to consider it, at the present time, from each of these points of view, and to-night I take up the first, I mean the purely physical action of alcohol, reserving the question of its qualities as a food for a future lecture.

A very simple problem lies before us. The sum of £117,000,000 of money is invested in this country on alcohol as a commercial substance. Where does the alcohol go? We know that the larger part of it goes for consumption by human beings. A little—I mean by comparison a little—is used for the purposes of art and science; but the greater portion of it, practically all but the whole of it, is consumed by human beings. Thus a question arises, we may almost say, of engineering and commerce, a question, therefore, particularly worthy of this Society, viz., What is the good of this invested capital, and of the substance which it supplies? It is not necessary for any of us to consider ourselves as physicians in studying this matter, but we may all consider ourselves as animal engineers, anxious to know the physical properties of agents which influence the animal life. To put it in a very practical way, suppose that there was no question involved in regard to the influence of alcohol upon the body, but that in the course of the invention of motive engines—common inanimate engines, which can be made to produce motive power by the application of heat to water—it had originally become the practice from some circumstance to put into the engines so much spirit with the water, and to work the engines with this mixture. Then suppose somebody said, "This is a very expensive process of working the engines; maybe they will work as well without the spirit." You would then naturally inquire, "Can such be the fact?" And you would seek an engineer to fill the place I now have the honour to occupy, to explain to you the mechanism of the engines. You would also beg him to explain and put before you facts which would bear upon the point, whether the admixture of spirit and water was useful or useless? Now, please, consider me to-night as an engineer, and the animal body as the engine I am to speak upon. I am not going to address a word to you as a physician; I am not going to offer advice. I simply mean to place before you, as far as I know them, the facts relating to the physical effects of this thing alcohol, when it is put into one of those millions of engines which we call men.

Alcohol will enter the body—the engine of which I am about to speak—by many channels. It can be introduced by injecting it under the skin or into a vein. Exalted by heat into the form of vapour, it may be inhaled by man or animal, when it will penetrate into the lungs, will diffuse through the bronchial tubes, will pass into the minute air vesicles will travel through the minute circulation with the blood that is going to the heart, will condense in that blood, will go direct to the left side of the heart, thence into the arterial canals, and will be carried throughout the body. Or, again, the spirit can be taken in by the more ordinary channel, the stomach. Through this channel it finds its way, by two routes, into the circulation. A certain portion of it—the greater portion of it—is absorbed directly by the veins of the alimentary surface, finds its way straight into the larger veins, which lead up to the heart, and so onwards with the course of the blood. Another portion is picked up by those small structures which proceed from the mucous surface below the stomach, which are called *villi*, and from which originate a series of fine tubes that reach at last the lower portion of a common tube known as the thoracic duct. This ascending tube, lying in front of the spinal column, terminates at the junction of two large veins on the left side of the body, at a point where the venous blood, returning from the left arm, joins with the returning blood from the left side of the head on its way to the heart.

Thus in whatever way the alcohol is introduced it enters the blood; the shortest way is that by inhalation, the longest and most ordinary way is by the stomach. Indeed, except for experimental purposes, the introduction is always by this latter and longest route, and we may, for our practical purposes, only think of alcohol as a fluid taken by the mouth into the stomach, and absorbed like a food or a drink from the surface of the alimentary canal.

Suppose then a certain measure of alcohol is taken into the stomach, it will be absorbed there; but, previous to absorption, it will have to undergo a proper degree of dilution with water, for there is this peculiarity respecting alcohol when it is separated by an animal membrane from a watery fluid like the blood, that it will not pass through the membrane until it has become charged, to a given point of dilution, with water. It is itself, in fact, so greedy for water, it will pick it up from watery textures, and deprive them of it until, by its saturation, its power of reception is exhausted, after which it will diffuse into the current of circulating fluid.

To illustrate this fact of dilution, I introduce a simple experiment. Here is a bladder, in which has been placed a mixture consisting of equal parts of alcohol and distilled water. Into the neck of the bladder a long glass tube is inserted and firmly tied. Then the bladder is immersed in a saline fluid representing an artificial serum of blood. The result is that the alcohol in the bladder has absorbed water from the surrounding saline solution, and thereby a

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

column of fluid has passed up into the glass tube. A second mixture of alcohol and water, in the proportion, this time, of one part of alcohol to two of water, has been put into another bladder immersed in like manner in an artificial serum. In this instance, a little fluid has also passed from the outside into the bladder, so that there is a rise of water in the tube, but less than in the previous instance. A third mixture, consisting of one part of alcohol with three parts of water, is placed in another little bladder, and is also suspended in the artificial serum. In this case there was for a time a small rise of fluid in the tube connected with the bladder; but after a time, owing to the dilution which took place, a current from within outwards set in, and the tube became empty. Thus each bladder charged originally with the same quantity of fluid contains now a different quantity. The first contains more than it did originally; the second a little more; the third a little less. From the third absorption is taking place, and if I keep changing and replacing the outer fluid which surrounds the bladder with fresh serum, I could in time, owing to the double current of water into the bladder through its coats, and of water and alcohol out of the bladder into the serum, remove all the alcohol. In this way it is removed from the stomach into the circulating blood when it has been swallowed. When we dilute alcohol with water before drinking it we quicken its absorption. If we do not dilute it sufficiently it is diluted in the stomach by transudation of water in the stomach until the required reduction for its absorption; the current then sets in towards the blood, and passes into the circulating canals by the veins.

If you direct your attention to a diagram showing the circulation, you will see that all the returning veins end in the large trunks which terminate in the central organ of the circulation—the heart. The heart, a moving muscular organ, has four cavities; two above called the auricles, two below called the ventricles. The cavities on the right side are called respectively the right auricle and right ventricle; the cavities on the left side are called respectively the left auricle and the left ventricle. The right auricle receives all the venous blood of the body, and transmits it to the right ventricle; the right ventricle drives the blood over the lungs where the blood is arterialised; the left auricle receives the blood from the lungs, and transmits it to the left ventricle, which drives it through these arterial tubes over the whole of the body, whence it returns again by the veins to the right side of the heart, and so on, in circulation. Alcohol, therefore, entering the veins, makes its way in the course I have described through the right heart, through the lungs, through the left heart, through the body at large by the arteries. This is the course of its travel in the organism; what does it do as it makes the round?

As it passes through the circulation of the lungs it is exposed to the air, and some little of it, raised into vapour by the natural heat, is thrown off in expiration. If the quantity of it be large this loss may be considerable, and the odour of the spirit may be detected in the expired breath. If the quantity be small the loss will be comparatively little, as the spirit will be held in solution by the water in the blood. After it has passed through the lungs, and has been driven by the left heart over the arterial circuit, it passes into what is called the minute circulation, or the structural circulation of the organism. The arteries extend into very small vessels, which are called arterioles, and from these infinitely small vessels spring the equally minute radicals or roots of the veins which are ultimately to become the great rivers bearing the blood back to the heart. In its passage through this minute circulation the alcohol finds its way to every organ. To this brain, to these muscles, to these secreting or excreting organs, nay even into this bony structure itself, it moves with the blood. In some of these parts which are not excreting, it remains for a time diffused, and in those parts where there is a large per-centage of water it remains longer than in other parts. From some organs which have an open tube for conveying fluids away, as the liver and kidneys, it is thrown out or eliminated, and in this way a portion of it is ultimately removed from the body. The rest, passing round and round with the circulation, is probably decomposed and carried off in new forms of matter; but concerning this, more on a future occasion.

When we know the course which the alcohol takes in its passage through the body, from the period of its absorption to that of its elimination, we are the better able to judge what physical changes it induces in the different organs and structures with which it comes in contact. It first reaches the blood, but, as a rule, the quantity of it that enters is insufficient to produce any material effect in that fluid. If, however, the dose taken be poisonous or semi poisonous, then even the blood, rich as it is in water—and it contains seven hundred and ninety parts in a thousand—is affected. The alcohol is diffused through this water, and there it comes in contact with the other constituent parts, with the fibrine, that plastic substance which, when blood is drawn, clots and coagulates, and which is present in the proportion of from two to three parts in a thousand; with the albumen which exists in the proportion of seventy parts; with the salts which yield about ten parts; with the fatty matters; and lastly, with those minute, round bodies which float in myriads in the blood, which were discovered by the Dutch philosopher, Leeuwenhoek, as one of the first results of microscopical observation, about the middle of the seventeenth century, and which are called the blood globules or corpuscles. These little bodies are, in fact, cells; their discs, when natural, have a smooth outline; they are depressed in the centre, as I indicate on the board, and they are red in colour; the colour of the blood is, indeed, derived from them. We have discovered in recent years that there exist other corpuscles or cells in the blood in much smaller quantity, which are called white cells. Here is a drawing, showing very beautifully how these different cells float in the blood-stream within the vessels. The red corpuscles, you will observe, take the centre of the stream; the white lie externally near the sides of the vessels, moving less quickly. Our business is mainly with the red corpuscles. They perform the most important functions in the economy; they absorb, in great part, the oxygen which we inhale in breathing, and carry it to the extreme tissues of the body; they absorb, in great part, the carbonic acid gas which is produced in the combustion of the body in the extreme tissues, and bring that gas back to the lungs to be exchanged for oxygen there; in short, they are the vital instruments of the circulation.

With all these parts of the blood, with the water, fibrine, albumen, salts, fatty matter, and corpuscles, the alcohol comes in contact when it enters the blood, and, if it be in sufficient quantity, it produces disturbing action. I have watched this disturbance very carefully on the blood corpuscles, for in some animals we can see these floating along during life, and we can also observe them from men who are under alcohol by removing a speck of blood, and examining it with the microscope. The action of the alcohol, when it is observable, is varied. It may cause the corpuscles to run too closely together, and to adhere in rolls; it may modify their outline, making the clearly-defined smooth outer edge irregular or crenate, or even star-like, as I define it on the board; it may change the round corpuscle into the oval form, thus; or in very extreme cases it may produce what I may call a truncated form of corpuscle, in which the change is so great that if we did not trace it through all its stages we should be puzzled to know whether the object looked at were indeed a blood-cell. All these changes are due to the action of the spirit upon the water contained in the corpuscles; upon the capacity of the spirit to extract water from them. During every stage of modification of corpuscle thus described, the function to absorb and fix gases is impaired, and when the aggregation of the cells in masses is great, other difficulties arise, for the cells united together pass less easily than they should through the minute vessels of the lungs and of the general circulation, and impede the current, by which local injury is produced.

A further action upon the blood instituted by alcohol in excess, is upon the fibrine or the plastic colloidal matter. On this the spirit may act in two different ways, according to the degree in which it affects the water that holds the fibrine in solution. It may fix the water with the fibrine, and thus destroy the power of coagulation; or it may extract the water so determinately as to produce coagulation. These facts bear on a new and refined subject of research with which I must not trouble you further, except to add that the inquiry explains why in acute cases of poisoning by alcohol the blood is sometimes found quite fluid, at other times firmly coagulated in the vessels.

These are the only points I have time to touch upon in respect to the physical action of alcohol upon blood. I must pass next to blood vessels, and trace out the action upon those fine ramifications of the larger vessels which we call the minute circulation. Upon these parts the spirit exerts a singular influence, from which arises a series of phenomena, characteristic of action when even a moderate quantity of spirit is taken into the body. That we may follow out this position clearly, it is essential I should for a few minutes put alcohol out of sight altogether and describe the mechanism and governance of this minute circulating system.

(*To be continued.*)

Parliamentary and Law Proceedings.

Alleged Adulteration of Precipitated Sulphur in Leeds.

On Wednesday, February 10, Mr. Joseph Harrison, chemist, Town Street, Stanningley, was summoned before Mr. Bruce, sitting at the Borough Court, Leeds, for having unlawfully sold as unadulterated 4oz. of precipitated sulphur which was adulterated with sulphate of lime.

The Town Clerk said the object of laying the information was that the public might be thoroughly aware for the future what different things were supplied under different names; and that when they asked for one thing the tradesman was not justified in serving them with another. It was quite clear, according to the Pharmacopœia, that sulphur præcipitatum was the only form of milk of sulphur known to the medical profession, and the result of the process detailed in the Pharmacopœia was pure sulphur. But they were made aware that there was a preparation of milk of sulphur known in the trade, but which was not recognized in the Pharmacopœia. This milk of sulphur was made in a cheaper manner by the use of sulphuric acid, and as in this case the chemist was asked for precipitated sulphur, he was not justified in selling milk of sulphur, which was not pure sulphur. The statute threw upon Mr. Harrison, who was a registered chemist under the Act, the onus of knowing that that which he sold as precipitated sulphur contained 64 per cent. of sulphate of lime. It was important that this should be known, because this impure sulphur was prejudicial, inasmuch as when precipitated sulphur was ordered by a medical man to be taken, and instead of that, this milk of sulphur, as prepared with sulphuric acid, was administered, the beneficial result expected was not attained. If there was any prejudice in the public mind that this milk of sulphur was better than precipitated sulphur, it was unfortunate that such a feeling should prevail; but he was there to protect the public to this extent, that when they asked for precipitated sulphur, they were entitled to get pure sulphur, and if supplied with milk of sulphur, which was composed of a great quantity of lime, they did not get that which they asked for.

James Handford said that on the 2nd February he went to Mr. Harrison's shop and asked for a quarter of a pound of precipitated sulphur. The defendant's shopman gave it to him, and he paid 3*d*. for it. He told the shopman that he had bought it for the purpose of having it analysed, and said he could go with him and see it analysed. The shopman then called the defendant, and Mr. Harrison came to him. Witness told him the same thing, and the defendant replied, "I sell it just as I get it from the wholesale dealers, Messrs. Goodall and Backhouse, and I have not adulterated it myself, and I should be surprised if it were adulterated."

The Clerk read the report by Mr. Fairley, the borough analyst, which stated that the precipitated sulphur referred to was largely adulterated, containing not less than 64 per cent. of sulphate of lime.

Mr. Harrison said that the borough analyst and the Court had not yet recognized as a fact, what was nevertheless true, that there are two precipitated sulphurs in commercial circles—one of the new style and the other of the old style. He trusted that the analyst himself would admit this fact—that adulteration meant the act of corruption by an admixture with a foreign article. In that case he was sure the borough analyst would not assert that there had been an admixture here by defendant or by the parties from whom he bought it; and it was only fair to Messrs. Goodall, Backhouse and Co. to say that he was supplied with the precise article he wanted. He asked for precipitated sulphur. They asked, "Which? Do you mean the precipitated sulphur of the British Pharmacopœia of 1867, or what is ordinarily known in commercial circles as lac sulphuris?" He replied that he meant "lac sulphuris—milk of sulphur"—and it had always been supplied to him. He wished to point out that under the old style precipitated sulphur, milk of brimstone, milk of sulphur, and lac sulphuris were synonymous terms and applied to the same article; but the preparation of the British Pharmacopœia of 1867 was another thing. The article which he had supplied, and had supplied for thirty years, and the correctness of which had never been questioned, had been supplied by him and obtained by him as precipitated sulphur of the old style. It was unfortunate that in his business an article was known by many different names, and people would come and ask for the same thing under different names. In no case had he been asked for precipitated sulphur of the British Pharmacopœia. Precipitated sulphur of the British Pharmacopœia was an article which would not obtain among his customers, and they would either bring it back or make statements behind his back which would be injurious to him. He quoted from Rennie's "Supplement to the Pharmacopœia" (1837), and from Hooper's "Medical Dictionary" (1838), to show what was meant by sulphur præcipitatum at that time, and went on to say that it was only when the British Pharmacopœia was issued in 1867 that precipitated sulphur was recognized as distinct from lac sulphuris.

Mr. Bruce said the authorities quoted seemed to show that in 1837 those doctors treated lac sulphuris and sulphur præcipitatum as the same thing.

The Town Clerk said he did not think they need take the point further as to the state of things then. But could Mr. Harrison show that it was not in consequence of the injury resulting from sulphur not being properly made that in the last Pharmacopœia it was set out how it should be made in order to be pure sulphur.

Mr. Harrison said chemists and druggists were obliged to sell numerous articles which were not recognized in the British Pharmacopœia. What he wished to show was that there was another sulphur præcipitatum of the new style, which was quite distinct and different from the precipitated sulphur which is known in the market, and of which a hundred times more is sold, and will continue to be sold, than of the sulphur præcipitatum of the British Pharmacopœia, because the latter is not so nice to look at, it is more bitter, and it has a worse smell. He kept the precipitated sulphur of the new style, but he did not supply it unless it was asked for. He could not admit that this action was for the purpose of serving the public. The public wanted the article he had supplied to them, and they would have it.

Mr. Bruce said he could not convict at present without giving the defendant an opportunity of calling witnesses.

The Town Clerk said his *primâ facie* case was at present unanswered.

The case was adjourned till Tuesday next.

Mr. George Teasdale, Bramley, was summoned on a similar charge. His case was also adjourned.—*Leeds Mercury.*

At the Hanley Borough Court on Monday, Mr. E. S. Insull was charged with having sold some precipitated sulphur, which the certificate of Mr. Scott alleged was grossly adulterated, and would be extremely injurious to health, especially in the case of children or persons of delicate constitution. A fine of 10*s.* and costs was inflicted.

ALLEGED ADULTERATION OF SCAMMONY.

On Monday last Mr. George Brown, chemist and druggist, Bryan Street, Hanley, was charged at the Hanley Borough Court, with having sold as unadulterated a shilling's worth of powdered scammony which was adulterated.

Mr. Fulford, in opening the case, said that scammony was largely used by medical practitioners, and if it were not pure serious injuries might result to patients. He apprehended that the only point in the case would be as to whether the scammony was as pure as could be got. He might mention, with respect to the certificate of Mr. Scott, county analyst, that, although it was stated the scammony was adulterated, the proportion of the adulterants was not given. Mr. Scott ought to have given it.

The Stipendiary: Mr. Scott has personally promised me he would state the proportion of the adulterants in such cases.

Mr. Smith stated for the defence that scammony was a kind of gum, procured from a tree, and was never imported to this country pure. There was always a certain percentage of resinous matter in it. He called Mr. R. G. Smith, druggist, from the establishment of Messrs. Evans, Sons, and Co., Liverpool, who said that he never knew even the so-called virgin scammony imported without having from 20 to 30 per cent. of impurity. Mr. Smith said that the Eastern growers allowed the impurity for the purpose of preservation. He submitted that, under the circumstances, Mr. Brown could not be held to be responsible.

The magistrates held a different view, but considered a fine of 10*s.* and costs sufficient to meet the justice of the case.—*Staffordshire Daily Sentinel.*

ADULTERATED PEPPER.

At Leeds, Patrick Ford, grocer, has been summoned for selling pepper adulterated with extraneous starchy matter to the extent of 26 per cent., and was fined 5*s.* and costs.

Joseph Nichols, chemist and druggist, for selling pepper adulterated with pea-flour to the extent of 50 per cent., was also fined 5*s.* and costs.

The Morning Tonic Case.—Correction.—We are informed that there is an error in our report of this case on p. 639, col. ii., line 47. The stipendiary magistrate having attributed to Mr. Harkness a statement that "pick me ups" sometimes contain 40 per cent. of solid matter, and not 10 as it appears in our report. We may remark that the error is due to an intentional alteration on our part. The reporter's notes gave the amount as 40 per cent., but the statement appeared to be so extraordinary, that it was attributed to an error in reporting, and the alteration was made to the more probable amount of 10 per cent. in accordance with the evidence of Mr. Baynes, jun.

BOOKS RECEIVED.

NOTE-BOOK OF MATERIA MEDICA, PHARMACOLOGY, AND THERAPEUTICS. By R. E. SCORESBY-JACKSON, M.D., F.R.S.E., etc. Third Edition. Revised by Dr. ANGUS MACDONALD, M.A., F.R.S.E. Edinburgh: Maclachlan and Stewart. 1875. From the Publishers.

THE ANALYST'S ANNUAL NOTE-BOOK. By SIDNEY W. RICH. London. 1875. From the Author.

MANUAL OF PUBLIC HEALTH FOR IRELAND. By THOMAS W. GRIMSHAW, M.A., M.D.; J. EMERSON REYNOLDS, F.C.S.; ROBERT O'B. FURLONG, M.A.; and JOHN WILLIAM, M.D. Dublin: Fannin and Co. 1875. From the Publisher.

A MEMOIR OF THE LADY ANA DE OSORIO, Countess of Chinchon and Vice-Queen of Peru (A.D. 1629-39); with a Plea for the correct spelling of the Chinchona Genus. By CLEMENTS R. MARKHAM, C.B., F.R.S., etc. London: Trübner and Co. 1875. From the Publishers.

Notes and Queries.

HARMLESS FACE POWDER.—Mr. Hans M. Wilder states (*Amer. Journ. Pharm.*) that the apothecaries in Copenhagen (Denmark), have agreed on the following two compositions as substitutes for the numerous, generally poisonous, fashionable face powders:—

White.

Oxide of Zinc	30 grms.
Wheat Starch	250 „
Oil of Rose	3 drops.

Red.

Carmine	1 grm.
Carbonate of Magnesia	4 grms.

[426]. JOCKEY CLUB BOUQUET.—In reply to J. Minro's inquiry, the following is taken from Piesse's 'Art of Perfumery':—

Extract of Orris Root		2 pints.
Esprit de Rose Triple		1 „
„ „ Rose, de Pommade		1 „
Extrait de Cassia	of each	½ „
„ „ Tubereuse		
„ „ Ambergris		½ „
Otto of Bergamot		½ „

[427]. MARKING INK FOR STAMPING.—I shall be glad if any correspondent will publish a formula for a permanent ink for marking linen which can be used satisfactorily with metal types.—INQUIRER.

Obituary.

SAMUEL MANTHORP.

We regret to have to announce the death, on Monday, the 1st of February, of Mr. Samuel Manthorp, Pharmaceutical Chemist, of Colchester, aged 66. Mr. Manthorp had been in business upwards of 41 years, was one of the founders of the Pharmaceutical Society, and from its commencement acted as its local secretary.

The high moral character and intellectual attainments of the deceased gentleman won for him the esteem, not only of his brethren in the business, but of all who knew him.

Notice has also been received of the death of the following:—

On the 14th November, 1874, Mr. Thomas McNay, Chemist and Druggist, of Barrow-in-Furness.

On the 6th January, 1875, Mr. John William Wells, Chemist and Druggist, of Castle Street, Oxford Street.

On the 8th January, 1875, Mr. Thomas Evans Edwards, Chemist and Druggist, of Bath.

On the 19th January, 1875, Mr. William Mansell, Chemist and Druggist, late of Plough Court, Lombard Street.

On the 22nd January, 1875, Mr. James Sawyer, Pharmaceutical Chemist, of Carlisle. Mr. Sawyer had been a member of the Pharmaceutical Society since 1842.

On the 23rd January, 1875, Mr. John James, Pharmaceutical Chemist, of Truro. Mr. James had been a Member of the Pharmaceutical Society since 1842.

On the 25th January, 1875, Mr. Benjamin Bullus, Chemist and Druggist, of Fareham. Mr. Bullus had been a member of the Pharmaceutical Society since 1870.

On the 28th January, 1875, Mr. Robert Bradshaw, Chemist and Druggist, of Cheltenham.

On the 1st February, 1875, Mr. Joseph Edwards, Chemist and Druggist, of 11, New Cavendish Street, London.

On the 2nd February, 1875, at 3, St. George's Circus, London, S.E., Mr. Stephen Francis Solly, Pharmaceutical Chemist, aged 67. Mr. Solly had been a Member of the Pharmaceutical Society since its formation.

On the 4th February, 1875, Mr. John Taylor Illingworth, Chemist and Druggist, of Bradford.

On the 8th February, 1875, Mr. James Peel, Pharmaceutical Chemist, of Stockwell Road, Surrey. Mr. Peel had been a Member of the Pharmaceutical Society since 1873.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Examinations.

Sir,—It is with some hesitation I write a few lines on the subject of the "examinations." So frequently in past time, has this subject been discussed and most likely will be again, that there is not much fresh ground to go over. It will, however, be a vexed question with many, until the returns show a greater success on the part of the examined, whether the examinations are too stringent or the candidates too deficient.

The summary in your January number shows a large total of 668 rejected candidates who presented themselves for the Minor and Major examinations. Surely this cannot be the fault of the Board of Examiners. Then there is only one conclusion to arrive at, that those who present themselves are lamentably wanting in pharmaceutical knowledge and have not availed themselves of the opportunities which the Society offers, and I fear this will continue to be the case until all are compelled to enter on a curriculum of study, for certain appointed terms, and at properly recognized schools of chemistry, before commencing the business of a pharmacist.

The principal point, however, on which, Mr. Editor, one is desirous of eliciting information is, regarding the obtaining of honours. I see in the course of the year 1874 only 8 obtained honours out of a total of 51 who presented themselves for the Major examination.

Now this is a small ratio, and causes some surprise, one is quite ignorant as to the requisite qualifications for the much-coveted distinction. Where is the line of qualification drawn? Is it merely at the option of an interested bias on the part of the examiners—by the word interested, I mean as regards the quick, prompt, ready, intelligent replies of the candidates—or is there a definite standard to be reached? If so, what is it?

I have been personally acquainted with many young men who have studied hard, worked well and long at the laboratory at Bloomsbury Square, were highly thought of by their instructors, still more, on presenting themselves for examination have completely satisfied their examiners, so far as they could ascertain, and yet failed to receive honours. Lately one gave me the questions which were put to him and the answers that were given; he mentioned the analyses he performed, and both answers and results of analyses were correct and explicit,—I was surprised that honours were not obtained.

Now is it not a point worth considering:—The good effects of granting honours more frequently, where it can fairly and honourably be done? The bestowal of honours gives a further impetus to study, it holds out a prize worth obtaining, it often prolongs a stay at the laboratories, and encourages students to follow on investigations and researches in chemistry and other sciences which otherwise they might cease to do. Surely a little more liberty, a little more latitude in bestowing honours could do no harm, and might be of lasting benefit to many.

Mr. Schacht has warmly advocated the founding of scholarships and interested himself zealously in the cause of pharmaceutical education, but if the prize, or rather the means of obtaining the prize (for to compete for the scholarships the student must first, by the present regulations have obtained honours) is debarred to so many, it would seem almost useless to adopt the plan. A few more months of study, encouraged by the giving of honours and the hope of a prize of scholarships would materially advance the interests of many of our students and ultimately bring forward more good men to the front rank of pharmaceutical science.

Just one other remark. In all boards of examiners there are always one or two who are especially dreaded by the students. We remember hearing in our early days—and the same remark is made in the present time—"I hope I shall not have Mr. —— to examine me," or, again, "if it had not been for Mr. —— I should have passed." This last remark is a very favourite one, but entirely fallacious and does not and never did bear any truth. No candidate was ever yet rejected at the option of one examiner. Still the fact remains, that in all boards of examiners one is generally singled out as a severe, hard, and unjust task-master. This must be an unenviable notoriety and also an unnecessary one; it is quite practicable to be *fortiter in re*, as regards the questions asked, and yet combined with the *suaviter in modo* as to the way of asking them.

Strand, Torquay. JAMES B. GUYER.

Pharmaceutical Remuneration.

Sir,—Your correspondent "Veritas" has written a good letter at page 580, as is proved by the numerous comments made upon it; but his £1,000 a year must be taken *cum grano salis.*

My experience teaches me that a man, who has been confined for years to a retail business, will have formed such economical and frugal habits as to be able to retire on a much smaller income.

To young men who feel the difficulties of commencing business I would recommend the reading of the 'Memoir of John Bell,' at page 589 of the eighth volume of the *Pharmaceutical Journal*, dated June, 1849, edited by his son, Jacob Bell.

This obituary of John Bell will teach young men of nervous timidity not to despise the day of small things; and the over-confident men, who dream of £1,000 a year, may read it with benefit.

"Take physic, pomp;
Expose thyself to feel what wretches feel;
That thou may'st shake the superflux to them,
And show the heavens more just."

Without disparaging the present series of the *Pharmaceutical Journal*, the first eighteen volumes, edited by Jacob Bell, contain much valuable information, and many practical suggestions.

JOSEPH LEAY.

Downside, Chilcompton, Bath,
January 30, 1875.

Sir,—One conclusion at which I arrive from perusing several of the attacks made on "Veritas," is that some of your correspondents are not very good arithmeticians or financiers. They appear to be utterly ignorant of the fact that money placed at interest at 5 per cent. doubles itself in a little over fourteen years. "Amor Veritatis," who seems to think the whole statement of "Veritas" an absurdity, and the doubling of the fortune during the last ten years its climax, betrays the ignorance I have intimated. Allow that a man, under the circumstances indicated, could secure an income of £500 by the time he was forty, it would be an easy matter to make it £1,000 by the time he was fifty. Mr. E. Nuthall says an average saving of £800 is required to accumulate £20,000 in twenty-five years. Instead of that being the fact, £800 put by each year for twenty-five years would amount to £38,181, and if the man commenced business at twenty-four instead of twenty-five, at fifty his savings would be £40,890. Judging from the letters of "Veritas" I certainly conclude that he is unlikely during his business career to have "hid" either his mental or metallic "talents in the earth," or "kept them laid up in a napkin." The *naive* simplicity with which some of that gentleman's opponents write, as if they expected in purchasing a business the returns would, like the laws of the Medes and Persians, never alter, leads me to entertain the belief, which I gather is that of "Veritas," that a large percentage of druggists are not overburdened with business ability, and, as a consequence, are not likely to be overburdened with business.

Does Mr. Nuthall suppose there are no businesses more profitable than the one indicated in his hypothesis? If so, his experience must be of a very "mixed" character.

MAGISTER.

Sir,—On reading the letter of "Veritas," I was much struck by the following most encouraging statement, which parents and guardians, in these days of competition and over-crowding in every branch of commercial life, would do well to lay to heart; he says, "It is a business in which a young man, with £200 or £300 to commence with, may confidently hope to retire on £500 a year by the time he is forty, or on £1,000, by the time he is fifty, and only one qualification absolutely necessary," he must be a man of business. Very good; that is to say this wonderful young man of business, who starts for himself say at the age of twenty-five (few begin sooner) with £300, in fifteen years finds he has amassed £10,000, which at 5 per cent. will bring him in £500 per annum, and if he only has the perseverance to hold on until he is fifty, which at the rate he is making money he is most likely to do, he finds that in ten years he has doubled his capital, and that now he can retire with something like dignity on £1,000 a year. And this is not an isolated case, but in the experience of "Veritas" no doubt has been accomplished over and over again. "Veritas" believes in even better times than these for the druggists of the future. What the man with a larger capital than £300 may achieve, I presume it is beyond even the pen of "Veritas" to describe; in the meantime, let us be thankful that we are not as other trades are, ironmongers, hatters, or even as this "Examined Assistant."

NIL DESPERANDUM.

January 19, 1875.

Sir,—There is nothing so very doubtful about the statement of "Veritas." I have £500 per annum; commenced business twenty years ago on a capital of £300, and am a little over forty years old. The secret of success may be summed up thus:—An examination diploma, civility, not servility, and work. I live in a small town, and have always kept my head well up. I have a family of three, keep two servants, and never unduly screw or pinch for the purpose of acquiring more cash.

I enclose my name and address, but not for publication.

A WORKING MAN.

Sir,—When I ventured to question the reasonableness and practicability of the proposition of assistants studying certain books during the hours of business, and the practicability of the further proposition of druggists closing their shops so early and so regularly as hatters, grocers, drapers, and ironmongers, I had no idea of provoking so great a controversy. Several of your correspondents, especially those who put direct questions to me, were I not to reply, might naturally construe my silence into discourtesy or inability. I therefore apprehend you will not refuse me the privilege of rendering them an answer, I promising that regard for the value of your space, not to mention respect for the value of my own time, will insure this being my last say. I trust that each one who has honoured me with his notice will find that I have not failed to heed his communication, although with so many to answer my reply must necessarily be more or less of a general character.

I respectfully contend that I have proved the two things I attempted to prove, and that my opponents virtually, though unintentionally, admit it. There would be little utility in repeating my arguments and re-slaying the slain. By some of your correspondents more ire than argument is apparently exhibited—I say apparently, for perhaps the anger is more seeming than real; at all events, there is no necessity, even though difference of opinion exist, why we should not agree to differ, and write and feel amicably.

"An Examined Assistant" is far less lucid in his last than in either of his former letters. In the last sentence of the third paragraph in his recent one he is quite incoherent. Retrogading to one or two of his preceding lines, I may observe that "the method of reasoning adopted by 'Veritas,'" certainly does not necessitate "the shutters being down and the gas flaring in the night;" neither did I intimate that I kept my "shop open till a very late hour." In this city the shops are ostensibly closed at six, and I heartily wish that they could be then closed physically (I don't intend a pun) until the next morning, but I cannot see the way, for the reasons given in my former letters, to its accomplishment. I often venture to remonstrate with customers who apply for articles late in the evening which might well be obtained earlier in the day, and I never complain if my assistants do so too. I have sometimes thought the evil might be remedied if all would combine to charge double price for articles supplied after a certain hour, but it is so difficult to get universal *bonâ fide* combination for such purposes.

I think the plan adopted at Bedford an admirable one. It doubtless answers especially well in so exceptional a place, where there appears to be scarcely an establishment with only one assistant or apprentice. My thanks are due to Mr. Waring for his explicit reply to my inquiry; he has excited in me an especial interest in Bedford. I am seeking for one of my sons an eligible opening for starting in business; I often visit a neighbouring town, and I purpose the next time I do so "taking stock" of Bedford, when I may have the honour of making Mr. W.'s acquaintance. Meanwhile, should he know of a house or shop to let in a good situation he will add to the favours already conferred by informing me of it. I note an apparent difference in Mr. W.'s two letters: in the first he says only one assistant "stops in," in the second he seems to intimate that while one attends to late customers, the others are engaged in study. Do they go out to study? and if so, where? Given that there are a dozen druggists in Bedford employing three or four assistants or apprentices, say that twenty are set free at seven, how many of the twenty pass the three or four hours at their disposal in study, and how many at billiards, or some kindred amusement, or in discussing a pipe, or "a weed" with "bitter?" If any do pass their evenings in either of these latter ways, I warn them that so far as their future welfare is concerned, it would be ten thousand times better that they should be kept to the very latest hour behind the counter that obtains in the most heartlessly conducted establishment in the kingdom. I cannot conceive anything that would have been more delightful and jolly than to have been able thus to pass my evenings when an apprentice and assistant; but if I had, where should I be now? Certainly not where I am. I should long since have gone—to use a figurative expression—to the devil, where I have known many go in my time. Again, Mr. W. says in his first letter that "only medicine is supplied" after seven, while in his second letter he says, "it is not necessary to keep all in for the sale of sponges, etc., etc." Now, which is to be understood, does the one assistant supply with undeviating strictness only medicine, or does he supply any article a customer desires who gains admission after seven? If all the druggists' shops have private doors I can understand the possibility of restricting sales to physic; but it strikes me it would be extremely difficult to practice if customers be admitted to the shop. A customer requires medicine, sees a box of tooth powder on the counter, and says, "I will take that." Would every druggist in Bedford, loyal to his fellows, say, "No, I can't let you take it, you must come to-morrow for it?" Lastly, I would ask Mr. Waring what hour is fixed for really closing, locking up for the night, or is there no fixed hour, but procrastinating people can come and worry the one assistant as late as they please? I need hardly repeat my contention, that a shop is not really closed so long as even one assistant is in attendance to respond to applicants.

The replies to my question, why some gentlemen prefer not to have a "Square" man (I never said I did) are not satisfactory; such considerations as those suggested would, I am sure, not influence those whom I have heard of as expressing such a preference. I have been credibly informed of one gentleman entertaining such preference (or shall I say prejudice?), whose name stands as high in connexion with British pharmacy and the Pharmaceutical Society as that of any man. Does not "scientific knowledge" *per se* add to the value of an assistant's services? I should certainly desire to choose that assistant whose services would be the most valuable. Mind having an assistant whose knowledge surpassed my own? Why, the shop or the laboratory would be transformed into a paradise, so far as the principal would be concerned, if he had nothing to impart but only to acquire—like the bee, gathering honey all the day from every flower.

I am perfectly at one with Mr. A. Warren in the sentiment expressed by him in the last sentence of his letter. There is no antagonism between it and what I said. He thinks there is: he clearly ignores altogether the all-important, utterly-indispensable qualification on which I laid such emphasis. I thank "Observer" for so well expressing what are my sentiments, as well as his own.

I propose to refer to certain incidents and circumstances which have fallen under my notice during the last thirty years or so, and therein Mr. A. Warren, "A Young Observer," "H. J. O." and Mr. R. Huggins, must look for a reply to their remarks or questions. I mentioned in my first letter something of the early history of a druggist's apprentice. During the latter years of his apprenticeship the business which eventually became Mr. Henry Deane's was for sale for £450. I have heard that apprentice say he would almost have given his ears to have been a few years older and possessed of £450, convinced that there was a fortune to be made by any man of business who might become the fortunate purchaser. Two or three persons failed to obtain a livelihood in it before Mr. Deane purchased it.

Some time between the years '40 and '50, the apprentice having £50 or £60 of his own, borrowed £200 at five per cent. interest, and started in business. After nine months he came to the conclusion that he would certainly never make a fortune in the locality he had chosen. His returns had not reached anything like £300 per annum; so one Friday he put an advertisement in the *Times* offering the business for sale. It brought him four applicants, to all of whom he shewed his daybook, ledger, and prescription and cash books, and within three days he had parted with it for £400, and went out £100 richer than he went in, nine months before. In the course of a few months he started again. His first year's returns in this second venture were £450; this he considered a fair success. Last year he turned over about £2,200, and for a good many years his returns and profits have been what folks would call considerable. I adduce him as an instance of a man, commencing with £200 or £300, being able to retire on £500 at forty and £1,000 at fifty. He says if his time were to come over again, he could—like many others—do much better, avoiding a good many blunders which during his career he made. He further says that he never knew the want of a pound or a shilling, that he never was unable to pay a traveller the full amount of the account he presented, and never gave a bill in his life, save for the loan of the £200. "Oh," some of your readers may exclaim (if I do not anticipate them), "you are depicting the career of some miserly curmudgeon —bachelor, perchance—'a wretch concentred all in self,' who never had a thought for a fellow creature, and whose sole interest was, if possible, to save all he earned." Not so; I do not know anyone who has apparently more keenly enjoyed existence. He was wont, when an apprentice, to say, "My first aim will be to keep myself, my second to keep a horse, my third to keep a wife;" and he succeeded in his aims, in the order he had prescribed; and I know no one who is more delighted than he to entertain those "who can talk of old friends" and old scenes "and old times."

There is a druggist's shop in a town within twelve miles of this which probably has been a druggist's shop some forty or more years. During the first half of its existence it had many owners, none of whom succeeded in getting a living, and I fancy its maximum returns seldom much exceeded £600: as it was in the principal street the rent and expenses were considerable. During the latter half of its being it has been in the hands of one proprietor. I estimate his present returns at something like £3,000, and he would not be likely to accept in exchange for it five times the amount for which he purchased it. His success has been far greater than that of my friend the apprentice of "the good old times." I know two businesses in another town in England in near juxtaposition. Somewhere between '48 and '50 one was purchased for £800. A year or two later the other was to be bought for £300 or £400. It was purchased by a quaker. Quakers generally know how a business should be conducted. His business would now be a bargain at considerably over £2,000, while I should hesitate to give for the other a higher sum than that at which it was sold twenty-five years since. Why this alteration in their values? Why, one has been managed in a manner it would be impossible to surpass, while the other has not. Thus we see man after man going to the wall, until one succeeds them who rapidly acquires a fortune, proving the truth both of Mr. Warren's affirmation and my assertion. "But," says Mr. Huggins, in his classic phraseology, "you haven't explained the 'clever trick' by which the small capitalist, or rather no capitalist, can certainly acquire a competency?" Here it is: he bears

"A banner with the strange device—"

"Rigid economy—(the fare of an anchorite, if needs be)— untiring industry—judicious enterprise—indomitable perseverance." Lastly, he who carries it must be a man of business, or he will find no more talismanic effect in his banner than in a dirty rag.

VERITAS.

January 26, 1875.

THE CHEMISTRY OF THE TAR ANTISEPTICS.

Sir,—I notice in your impression of the 9th ult. a paper entitled "The Chemistry of the Tar Antiseptics," which was read by Mr. W. E. Bickerdike before the Liverpool Chemists' Association, December 17th, 1874. The author, I see, admits the subject matter to be but imperfectly described by the title of his paper, and as the information he has attempted to convey seems to me to be equally misleading, I trust you will allow me a space in your valuable Journal, to draw attention to a few of the points on which correct information might have been of real value to your readers.

In describing the preparation of crude carbolic and cresyllic acids, Mr. Bickerdike begins by giving a very much too general outline of the process of coal gas tar distillation. Coal gas tar differs so much in character from the relative proportions present of products solid or fluid at natural temperatures, that no one process of distillation and separation is applicable to them generally.

So much so is this the case, that to take an example:— From Manchester coal gas tars the bulk of the mixed crude carbolic and cresyllic acids is extracted from the "light oils;" while from the London coal gas tars the bulk of the mixed crude carbolic and cresyllic acids is obtained from the heavy oils or creosote, stated by Mr. Bickerdike to contain cresol only, and to be employed without further treatment for saturating railway sleepers.

Mr. Bickerdike proceeds to state—"The further separation of phenol and cresol from the crude liquid is effected by repeated fractional distillation, assisted by crystallization of the phenol, from which the liquid cresol can be removed mechanically." Should Mr. Bickerdike employ no other means of purification than those described in his paper, I can only state that neither the phenol nor cresol so obtained is fit for surgical use or disinfection, containing as they would, free sulphur, many sulphuretted compounds, tar bases, etc., etc. Neither does the phenol constitute the B. P. quality first introduced for surgical and disinfecting purposes by my former partner, the late Dr. F. Crace Calvert.

Mr. Bickerdike next proceeds to describe pure carbolic acid, or as he calls it, absolute phenol, and any one reading the text of his paper would suppose it a description of a product newly obtained, manufactured and first described by him, the fact being that the product in question is well known in the trade, being manufactured by our firm and that of F. C. Calvert and Co., under the protection of letters patent, by the ton, and that a full description of the product and process of its manufacture were published simultaneously by the late Dr. F. C. Calvert and the writer, in 1867. Mr. Bickerdike's partner, Mr. Bowdler, (a chemist for some time in the employ of the late Dr. Calvert,) should have been able to give him more correct and extended information with regard to pure carbolic acid and its properties than displayed in his paper. Dr. Calvert gives the boiling point of pure phenol as 182° C., Mr. Bickerdike at 184° C. The writer's results agree with those of Dr. Calvert, and he can further add that these two degrees of difference in boiling point indicate a material impurity in the acid boiling at 184° C., in a scientific point of view.

As regards the non-deliquescent properties of pure phenol, Mr. Bickerdike does not seem to have recognized the fact that pure phenol attracts moisture from the air like pure cresol, but as the product in the former case is a solid crystalline hydrate at natural temperature, and in the latter case a liquid hydrate, the physical result of the action of moisture on a mixture of the acids must necessarily be more apparent than that shown by the pure phenol. With respect to Mr. Bickerdike's discovery (?) of "granulated phenol," probably most dispensers will have found it convenient to grind up in a mortar a portion of their stock of the pure phenol, but not advisable to prepare any great bulk in this state, as a summer temperature would certainly reconvert it into an adherent mass by a process of semi fusion and regelation.

Mr. Bickerdike states "that when phenol is heated with certain metallic oxides and an alkali, rosolic acid is produced."

This statement is absolutely incorrect, no such product being formed as proved by Caro years ago, who showed that the results obtained by Drs. Smith and Jourdin were due to the oxydation of the mixture of carbolic and cresylic acids constituting the impure acid used in their experiments, and that pure carbolic acid under the conditions above referred to, yields no rosolic acid. Mr. Bickerdike's description of the manufacture of rosolic acid (named aurine by writer when first introduced by him as a dye stuff), and its properties is now much less incorrect. As regards the manufacture it is really prepared by the prolonged action of heat (with a subsequent washing, etc., of the mass obtained) on a mixture of carbolic, oxalic, and sulphuric acids, in which the greater proportion of the carbolic acid is uncombined, or at lest not present, as sulphophenic acid.

Mr. Bickerdike's statement that "By the removal of unchanged phenol from the aurine of commerce, it may be obtained in a crystalline state," is also incorrect. The researches of Messrs. Dale and Schorlemmer on aurine have fully proved that the residue thus obtained would contain a very high percentage of other products, some being even colourless.

With regard to the manufacture of picric acid, it is now seldom if ever prepared by the direct action of nitric on carbolic acid, as described by Mr. Bickerdike, but by the action of nitric acid or nitrates on sulphophenic acid, either in water or sulphuric acid solution, with subsequent boiling, washing, and crystallizing processes.

The above remarks will sufficiently indicate the crude misleading nature of the information contained in the paper under review, and trusting their object will be sufficient apology for trespassing on your valuable space and the time of your readers.

CHARLES LOWE.

Manchester, February 3, 1875.

MILK OF SULPHUR.

Sir,—After reading your remarks upon precipitated sulphur and milk of sulphur in last week's *Pharmaceutical Journal* I came to the conclusion that at present I could not agree with your opinion, viz., that precipitated sulphur is not milk of sulphur. All the authorities that I have looked up agree in giving milk of sulphur as a synonym for precipitated sulphur, viz , Pereira, Royle, Attfield in his 'Pharmaceutical Chemistry,' Redwood in Gray's 'Supplement,' Scoresby Jackson, Ince in a paper read before the Pharmaceutical Society, 1842, Wittstein, by Darby, Neligan, and Paris. I do not contend that there is not a formula for lac sulphuris where it is ordered to be prepared with sulphuric acid, but what I do contend for is this, that that formula was found to be a bad one, and produced an impure product, and was subsequently improved by substituting hydrochloric for sulphuric acid which produced a purer product. Also I contend that the changing of the name from lac sulphuris to precipitated sulphur is really of no importance, as the former name would be given when old or barbarous names were in use, such as spiritus salis ammoniaci, tartarum solubile, and that it was not changed because sulphur præcipitatum was a different article, but changed like as the names spiritus salis ammoniaci and tartarum solubile were changed to spiritus ammoniæ and potassæ tartras, to be more in keeping with chemical knowledge, and to show the composition. I shall be glad if you will introduce this note amongst your correspondence, and perhaps it will elicit the opinions of more in the trade.

JOHN HALLAWAY.

52, Castle Street, Carlisle,
February 9, 1875.

[*** We fully agree with the spirit of these remarks, but cannot shut our eyes to the fact that the term milk of sulphur is still popularly associated with the old preparation containing sulphate of lime, although that has been pharmaceutically superseded by the much better preparation—precipitated sulphur.—ED. PH. JOURN.]

K. B.—No.

Q. S.—There is nothing in the label that would constitute a breach of the Pharmacy Act.

Inquirer.—(1) See Notes and Queries column. (2) See directions for coating pills in vol. iii., p. 467, and vol. iv., pp. 575 and 953 of the present series of this Journal.

W. Glass.—The "Pulvis Liquiritiæ compositus" of the 'Pharmacopœa Germanica.'

℞ Foliorum Sennæ	2
Radicis Liquiritiæ, singulorum pulveratorum partes duas	2
Fructuum Fœniculi pulveratorum . . .	1
Sulphuris depurati, singulorum partem unam	1
Sacchari optimi pulverati partes sex . . .	6

Misceantur.

"*England.*"—The "lead tannin" process was described by Mr. Allen in the *Chemical News* for May 1, 1874.

J. W. Sindall.—We agree with you that mercury is not antimony; but nevertheless "cinnabar of antimony" is an old name given to the sulphide of mercury which is left in the retort when perchloride of mercury is used in the preparation of chloride of antimony.

W. B.—*Bath Pipe.*—"Extract of liquorice, 1 oz.; powdered gum arabic, 1 oz.; white sugar, 1 lb.; hot water, q.s. to form a mass; to be rolled into pipes." (Cooley).

A. B.—We do not know the preparation.

A. P. S.—If you are correct in your observation we do not think the sediment can be avoided. A "Shake the Bottle" label should be used.

G. R. B.—We do not know.

E. Kemp.—The shell of the cephalopoda is sometimes external and sometimes internal. In the family of the *Sepiadæ* it is internal and is in the form of a broad calcareous plate. It is this that is known as "os sepiæ."

C. Jarvis.—The formula has not yet appeared in this Journal during the present year, but it may be found at p. 610 of the last volume, and with variations, at p. 849 and p. 891.

N. M. Barnes.—Barber's 'Pocket Companion to the Pharmacopœia' is published by Philip and Son, Fleet Street, price 5s.

"*Spes.*"—(1) We should expect that a person presenting himself for the Minor examination, unacquainted with a subject included in the Preliminary syllabus, would stand a good chance of being "plucked." (2) One or two or more substances may be present. (3) No. (4) 'The Calendar of the Pharmaceutical Society' for 1875 will be ready in a few days. (5) Stephenson and Churchill's 'Medical Botany.'

J. Whitfield.—Whether the article in question requires a patent medicine stamp depends upon what the Inland Revenue authorities may consider it to be. We have forwarded the handbill to them for their opinion, and will report their answer when we receive it.

A. P. S.—The transparent specimen sent corresponds with a transparent specimen of the so-called "Gum Cowrie," which is now imported into this country in considerable quantities. Concerning its origin see a letter in the present volume, *ante*, p. 259.

"*Investigator.*"—So far as the article termed "benzoline" is prepared from petroleum, it may be correctly termed "petroleum." The legal definition of "petroleum" comprises any hydrocarbon oil which has a flashing point below 100° F., whether it be prepared from petroleum, coal oil, or analogous sources. The licence to sell benzoline has reference to "petroleum" as defined by the Act.

T. Walker.—The point is one that can only be settled by experiment. We shall be glad to be informed of the result.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Thresh, Dr. Gray, Mr. Smith, "Minor," "Theta," J. S.

CARNAUBA ROOT.

BY CHARLES SYMES, PH.D.

Two bales of this root have been imported into Liverpool, with the following remarks in Portuguese:—

"A raiz da carnauba é um excellente depurativo ja reconhicido por varios facultativos i pelos mesmos applicada na cura de muitas molestias que tem sua sede primordial na impureza do systema sanguineo circulatorio. Causa pasmo e admiracao o despreso que ainda tem a referida raiz rival da salsaparrilha pelas suas qualidades therapeuticas, merecedora de toda confianca. A raiz da carnauba tem tambem vertudes diureticas, segundo somos informados, e é extremamenté efficaz na cura das blenorrhagias que agudas quer chronicas. E um bom refrigeranté mas como depurativo do sangue é da uma accão vigoroso, como tem demonstrado a expériencia."

Which in English might be rendered thus:—

"This root is recognized by the profession as an excellent purifying agent and has been successfully applied in the cure of various diseases arising from impurity of the blood. We are indeed astonished that it is not more widely known, as its therapeutic qualities, which are worthy of full credence, rival those of sarsaparilla. The carnauba root, likewise has a diuretic power and possesses unusual efficacy in the cure of acute or chronic blennorrhœas. It is, furthermore, very cooling and displays a vigorous action in purifying the blood."

The root is that of *Corypha cerifera*, a wax-bearing palm, growing on the shores of the Rio Francesco, in the Brazils; it is several feet in length and has an average thickness of three-eighths of an inch, of a mixed greyish and reddish-brown colour, giving off here and there small rootlets.

The cortical portion is comparatively thick, somewhat friable and loosely surrounds the meditullium which encloses the pith; thus a transverse section somewhat resembles in appearance an exogenous stem. Its infusion is similar in colour to that of wild cherry bark, possesses an agreeable, slightly bitter taste and an odour not unlike that of sarsaparilla; its colour is slightly deepened, but no precipitate occurs, on the addition of liq. potassæ; neither on the addition of dilute acids. Tinct. ferri perchlor. does not strike a black, but brownish colour, gradually followed by turbidity and the formation of a brown deposit. The decoction is not affected by iodine, indicating the absence of starch; a drop of it concentrated on a porcelain slab and treated with strong sulphuric acid produces an olive green, slowly changing to a brown colour. It yields 25 per cent. of a reddish-brown extract possessing a decidedly bitter taste.

It awaits further medical testimony in this country; should it prove equal to the particulars given it will be a valuable medicine, and possesses the advantage of an almost unlimited supply, at (I am informed) about one-half the cost of sarsaparilla.

Liverpool, February 12, 1875.

NOTE ON PURE PHENOL.

BY W. E. BICKERDIKE, F.C.S.

In a paper on the chemistry of the tar antiseptics, reported in the *Pharmaceutical Journal* of 9th ult., I stated that pure phenol was not deliquescent, and that the disposition to attract moisture which ordinary commercial phenol possesses is owing to a slight contamination with cresol. This statement was controverted by Mr. C. Lowe in a letter in the Journal of the 13th inst., the writer of which says that pure phenol absorbs water from the atmosphere like pure cresol, the only difference being that the hydrate in the former case is solid at ordinary temperatures, and in the latter case liquid. As this statement is at variance with my experience, I have compared the two bodies with reference to the above property. The results of the examination are detailed below.

Pure and recently distilled phenol was broken into small fragments, and exposed to a moderately damp atmosphere in an open platinum dish; the quantity of phenol taken was 3·99 grams. The weight of the vessel and its contents was taken at intervals, and was found to undergo a steady decrease, amounting at the end of eighteen hours to ·04 grams, or one per cent. This loss was owing to the slow volatilization of the phenol, which had not been balanced by the absorption of water. At the same time a quantity of cresol weighing 6·42 grams was exposed under exactly similar conditions; the weighings were taken as before, and, notwithstanding the loss from volatilization, the weight of the cresol increased from absorption of water, so that at the end of twelve hours the gain in weights amounted to 4·67 per cent. These results confirm my previous statement with respect to the very different behaviour of phenol and cresol in absorbing moisture from the atmosphere. On the other hand a sample of phenol which contained a small percentage of cresol, did absorb moisture without becoming liquefied, and this may account for the phenomenon which Mr. Lowe describes.

It might be supposed, that although phenol does not absorb moisture like cresol, yet it may do so more slowly, without any indication being given by an increase of weight in consequence of the loss from volatilization.

In this case the crystallizing point would be considerably depressed, as the hydrate melts at 16° only. In order to test this a larger quantity of the pure phenol was exposed for twenty-four hours on an open tray; on examination it was found that the fusing point had only been altered half a degree, showing an absorption of moisture quite insignificant.

THE EMPLOYMENT OF COAL OILS IN THE PREPARATION OF ALKALOIDS, ETC.

BY G. BOIRAUX AND E. LÉGER.

(*Concluded from p.* 643.)

Strychnine and Brucine.—These two alkaloids exist in about equal proportions in nux vomica seeds; whilst in the strychnos bark brucine predominates and brucine in St. Ignatius' beans. The following is the authors' method for obtaining the two alkaloids at the same operation:—1000 grams of grated nux vomica seeds are boiled during an hour with 6 litres of water and 20 grams of sulphuric acid; then during half an hour with 4 litres of water and 10 grams of acid; and finally during half an hour with 4 litres of water and 5 grams of acid, the marc being pressed strongly after each boiling. The three products are evaporated to 4 litres and precipitated by a sufficiency of milk of lime. The dried precipitate is treated in a displacement apparatus with sufficient cold carbolized coal oil to give 500 grams of percolate, and this is distilled with a solution of 15 grams of tartaric acid in a litre of water until all the benzine has passed over. About 500 grams of aqueous solution of the tartrates of strychnine and brucine are left, with sometimes a little fat or resinous matter floating on the top. The solution is filtered and precipitated with ammonia; the product washed and dried is a white powder consisting of a mixture of strychnine and brucine. To separate them advantage is taken of the solubility of the former and complete insolubility of the latter in the lighter oils. The mixture is placed in a small flask and heated in a water-bath during a quarter of an hour with a sufficiency of benzol, then decanted upon a filter; the operation being repeated until a few drops evaporated upon a watch glass give a residue coloured red by nitric acid. The solution upon evaporation gives abundantly crystals of brucine.

To obtain brucine alone decoctions are made with 1000 grams of strychnos bark, as with the seeds, 60 grams of acid being used for the first operation and 30 grams for each of the others; the liquors united are evaporated to one litre, and precipitated with a sufficiency of milk of lime. The precipitate, weighing about 125 grams, is heated in a water-bath with 500 grams of coal oil, and the whole thrown on a filter; the marc is washed with 500 grams more of hot coal oil, and the product is distilled with a solution of ten grams of tartaric acid in 1500 grams of water. After cooling, the residue in the retort, precipitated with ammonia, gives pure brucine.

Cantharidin.—500 grams of powdered cantharides are placed in a displacement apparatus, and are treated repeatedly with two litres of the heavier coal oil, previously heated in a flat-bottomed matrass to boiling by means of a water-bath. The liquor passes of a greenish-brown colour, and when it ceases to run the receiver is changed and the coal oil remaining in the powder is displaced with water. The two products are mixed, filtered, and distilled in a sand-bath until only about 80 grams of liquid remain in the retort. This is thrown into a porcelain capsule, and after about twenty-four hours it forms a greenish mass, in the midst of which appear brilliant needles of cantharidin. It is washed on a filter with a small quantity of carbon bisulphide, which carries off all the fatty matters and leaves the cantharidin intact in fine long silky white needles. Exposure to the air for a few hours removes all traces of the odour.

The yield of cantharidin varies with cantharides from different sources and of different ages; 500 grams of commercial cantharides, origin unknown, gave by this process 2 grams of cantharidin, and some excellent cantharides collected by the authors in the Department of Loiret, gave 5 grams of cantharidin to the kilogram. Fearing that the fatty and colouring matters were an obstacle to the solubility of the cantharidin, the authors exhausted 500 grams of the Loiret cantharides with carbon bisulphide until the decoloration of the liquor. These cantharides, treated as above, yielded at once the same proportion of white cantharidin as before—2·50 grams.

Quinine.—The authors state that a pure and excellent product may be obtained by operating in the following manner:—A decoction is made by boiling, during one or two hours, 1000 grams of yellow cinchona bark (of about 3 per cent.) in 6 litres of water containing 60 grams of hydrochloric acid. This decoction is poured off and two other decoctions are made by boiling the marc during an hour with two successive quantities of 4 litres of water and 30 grams of acid. The product of the three decoctions is treated with a sufficiency of milk of lime; the precipitate, weighing about 150 grams, is dried with care. This is heated in a water-bath with sufficient coal oil to obtain 500 grams of solution, which is distilled with a solution of 30 grams of tartaric acid in a litre of distilled water until about a litre, which contains all the coal oil, has passed over. The residue is filtered, the liquor passing through almost colourless, and measuring about half a litre. Ammonia is then added in slight excess, when there is formed a white curdy precipitate of quinine. 250 grams of benzol are poured in, and the whole heated in a water-bath, stirring from time to time. The benzol is decanted and evaporated in a retort until reduced to one half; this liquor, left to itself, deposits after a few days voluminous crystals of quinine, which effloresce rapidly in the air. When it is wished to obtain the quinine in powder, the precipitation is attended with some difficulty, as the alkaloid nearly always forms a pitchy mass, the desiccation of which is difficult. This may be avoided by pouring the acid solution of quinine, a little at a time, into a mixture of 50 grams of ammonia and 250 grams of distilled water, with slight stirring.

Cinchonine.—Operate as for quinine with one kilogram of grey huanuco bark, 14 litres of distilled water, and 120 grams of hydrochloric acid. Treat the calcareous precipitate with boiling coal oil to remove the small quantity of quinine that it contains. Displace afterwards with a sufficient quantity of carbolized coal oil to obtain 500 grams of tincture, which is to be distilled in a retort with a solution of 30 grams of tartaric acid in a litre of water. The coal oil and carbolic acid pass over entirely, and there remains in the retort a nearly colourless solution of tartrate of cinchonine, surmounted by a layer of resinous matter. After cooling it is filtered, and finally precipitated with ammonia, observing the same precautions as indicated for quinine. The cinchonine thus obtained is completely white.

Narcotine.—Narcotine and codeine are the only opium alkaloids which are soluble in coal oil. To prepare narcotine, 500 grams of the opium residue left in the preparation of the extract are macerated during twenty-four hours in 4 litres of water acidulated with 25 grams of hydrochloric acid. The product is passed through a strainer and the liquor is precipitated with a slight excess of ammonia. The precipitate is washed and dried and then treated, at the heat of a water-bath, with 250 grams of coal oil. The solution filtered whilst hot deposits the narcotine upon cooling, and a second crystallization yields it perfectly white.

The deposit given by extract of opium when treated with cold water contains a large quantity of narcotine, as much as 60 per cent. By treating this deposit with boiling benzine, a large quantity of pure narcotine may be at once obtained.

Aconitine.—Aconite root, coarsely powdered, is exhausted in a displacement apparatus with boiling water containing 1 per cent. by weight of tartaric acid. The product is evaporated to the consistence of a thick syrup and rendered strongly alkaline with caustic soda. After cooling, the mixture is poured a little at a time into benzol, as directed for atropine; the benzol, shaken with a little water acidulated with tartaric acid, yields to the latter the aconitine which is then precipitated by ammonia. Washed and dried, it presents the form of a white powder.

Coumarine is found in considerable quantity in the tonka bean, principally on the surface. In order to obtain it, it is only necessary to wash the whole beans placed in a funnel with cold benzine, and to concentrate the liquor. The coumarine is deposited in voluminous white crystals.

MODE OF MAKING AN EMULSION.*

BY DR. E. SAUNDERS.

A few hints on the above subject may not be unacceptable to some unfortunate who has not had the privilege of being taught this important branch of our art thoroughly. The first thing to do is to see that the mucilage is fresh and sweet; for although good emulsions can be made with sour mucilage, they require more labour, and spoil more quickly. A broad, flat pestle will be found to serve better than a narrow, round-faced one. Be sure that the mortar is clean and free from grease. Then put in the mortar, first, a small quantity of the mucilage and rub it round the mortar, so as to prevent any of the oil from adhering to the side. Add a little of the oil—about half the quantity of oil that you have used mucilage—and rub from the centre; the emulsion will begin to form immediately. When the first quantities are thoroughly emulsified, add first more mucilage and again half the quantity of oil, and make into a perfect emulsion. Continue in this way until the oil is emulsified, adding water between each addition of oil after the right quantity of mucilage has been added. Great care must be taken to keep the mucilage and water in excess of the oil used, or a thick mass will be formed, which it will be impossible to mix with water.

The object in making an emulsion is to have the particles of oil separated by water, but if the oil is in excess, the opposite is liable to take place; the particles of water are separated by the oil, and it is then impossible to form a good mixture, and the shortest way to do will be to throw out the mass and start again with fresh materials. Some people are in the habit of mixing the oil with powdered gum arabic, but it is impossible in that way to obtain a permanent emulsion, or even one in which the oil is sufficiently divided as to render the globules of oil invisible to the naked eye. A still worse mode is to put the oil and mucilage together in a bottle and shake them.

A perfect emulsion should be as white as milk, if made with olive oil, or any light colourless oil; it should mix readily with water in any proportion, without showing any signs of separating on standing, and should leave the mortar, or any vessel it may be put in, in such a condition that simple rinsing with cold water will clean the vessel, without leaving any traces of oil having been in it. The amount of mucilage to be used to a given quantity of oil varies. Half an ounce of mucilage is sufficient for two ounces of castor-oil or balsam of copaiba. Oil of turpentine, and the other light volatile oils, require rather more mucilage and longer trituration. If any syrup or sugar be ordered, it should be added after diluting the emulsion with all the water allowable. The same precaution should be taken with tinctures or any alcoholic preparations. The fact that mucilage of acacia is precipitated by alcohol should always be borne in mind. It is difficult to give an unvarying rule as to the amount of tinctures admissible in one emulsion, as the amount of gum and oil varies so much, but as a rule it is unsafe to put more than one ounce of a tincture made with dilute alcohol in a four-ounce emulsion, and tinctures made with stronger alcohol in proportion. Emulsions, if well made, are very handsome mixtures, and very permanent. The writer has some emulsions of castor-oil made four weeks ago, and of balsam copaiba made three weeks ago, both of which are as fresh and nice as the day they were made, and neither of which shows the least sign of separation.

* *American Journal of Pharmacy*, from the *Peninsular Journal of Medicine*.

THE CULTIVATION OF OPIUM AND CINCHONAS IN INDIA.

A great deal of valuable information on the products of India is contained in a recent report on the progress and condition of our Eastern Empire. The importance of opium as a source of revenue has long been an acknowledged fact. Cinchona barks, on the other hand, have, until a comparatively recent period, been only an experiment, though at the present time the cultivation of these trees has got far beyond this stage. So much has been said by different writers on the culture, preparation, and value of opium that it would seem as if nothing more could be said; nevertheless, there are many interesting facts contained in this report which are worth a wider diffusion than that usually accorded to a Government blue-book. The gross revenue upon Bengal opium for the year 1872-73 amounted to £6,069,793. The number of chests sold in that year was 42,675. Government exercises a strict supervision over the poppy cultivation, no one being allowed to grow the plant except on Government account, and the manufacture is conducted at two separate agencies, Patna for Bahar, and Ghazepoor for the North-west Provinces and Oudh. For the Bahar agency 330,925 acres are under poppy cultivation, and 229,430 for Benares. The poppy requires a high state of cultivation, the land has to be specially attended to and carefully manured; nevertheless, of late years the plants have suffered from blight. For the purpose of observing the conditions of this blight, Mr. Scott the curator of the Calcutta Botanic Garden, was deputed, soon after its outbreak, to proceed to the localities where it had appeared, "to work two seed gardens of his own, and watch the blight through all its phases, and he has also under his charge several small experimental gardens at the sub-agencies. Successful trials have been made of the effect of interchanges of seeds between the sister agencies of Bahar and Benares; but the trials of Persian and Malwa seeds have resulted in failure."

With regard to Malwa opium, which is free grown, and has consequently a heavy duty imposed upon it to bring it on an equality with the produce of Bahar and Benares, it is stated that the quantity exported from Bombay, which is its sole legal port of export, amounted during the official year 1872-73 to 42,401 chests.

Turning to cinchona we find a good deal of matter already familiar to us; but when we remember that it is only within the last fifteen years that the cinchona plants have been known at all in India it is surprising to see the facts of their numbers and distribution as here recorded, and the facts are more surprising when we consider that the plants had never before been in a state of cultivation. It was an experiment in the truest sense of the word; the result, however, has been highly satisfactory, and the total expenditure it is stated "has been under £70,000." In the Government plantations on the Neilgherries alone there are at the present time some 2,645,373 plants, covering an area of 950 acres. A private plantation at Balmadies, consisting in 1866, when it was first formed, of 31 acres, was extended in 1868 to 60 acres, and has now a fine crop of splendid trees. A large crop of fine bark was procured from them last year, which was sent to London, and realised good prices. Two other plantations, covering together some 1,000 acres, are reported as being in a thriving condition, besides which are many other smaller ones, in all of which the plants are thriving. At Mercara, in Coorg, there is a small plantation which is about to be extended, and on the Barbabudin hills, in Mysore, there is another plantation containing 24,000 trees. At the well-known plantations at Rungbee, 2,000 acres are under cinchona cultivation. Bark from this plantation has been seen in the London market, and has realised prices ranging to 1*s*. 3*d*. per lb. Besides these various plantations the cinchonas have also been taken into British Burmah, and planted at an elevation of about 3,700 feet above the sea; in one plantation between 300 and 400 plants are now fairly established. The well-known trees are said to "cover the slopes of the mountains which overhang Wynaad, and line the hillsides almost to the peak of Dodabetta. The tallest t ree is now 36 feet high, and 28 inches round the stem. The amount of green bark supplied to the quinine manufactory on the plantations during 1873 was 91,773 lbs., from which Mr. Broughton, the quinologist, manufactures a febrifuge alkaloid at 1½ rupees per ounce, which is supplied to the medical stores. Thousands of fever patients are thus annually cured. In November, 1873, the sale of 25,000 lbs. of Neilgherry cinchona bark belonging to the Government took place in the London market, and realized £3,490, the average price secured being 2*s.* 10*d.* per lb.; while one parcel was sold at the very unusual price of 5*s.* 9*d.* per lb. If this average is applied to the 91,773 lbs. used in the manufactory in India, it will place its value at £13,000. This makes the annual income of the plantations about £16,500, which will increase in future years."

Mr. Wood, who it will be remembered was appointed to the post of quinologist in 1873, has, it is stated, already manufactured a cheap form of the alkaloid, taking his supply of alkali from the ashes of the *Artemisia*, which grows in abundance on the Sikkim mountains, and is very rich in potash. The great problem to solve is said to be the discovery of "the cheapest form in which an efficient febrifuge can be manufactured from the bark; and there is every reason to expect that valuable results may be announced from Mr. Wood's labours."

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.*

BY J. BURDON SANDERSON, M.D., V.P.R.S.,

Jodrell Professor of Physiology in University College, etc.

Lecture I.

The subject of the present lecture is the relation of bacteria to the chemical and physical processes which constitute the life of the higher animals.

One of the first questions which suggests itself to the mind in approaching the subject is this: How does it happen that these bacteria, which we suppose must have existed half-a-dozen years ago in as great numbers as at present, were then scarcely heard of, and that they now occupy so large a place in the medical literature of this country and of Germany, and have lately afforded material for lively discussion in the French Academy? To us in England the subject is chiefly associated with the truly scientific investigations of Lister—the first to show its practical bearing on the pathology of traumatic diseases. In Germany, there can be no doubt that the extensive inquiry which is now being carried on by so many persons, took its start from the laborious researches of a poor professor of botany at Jena, who, with defective resources, bad instruments, and in spite of discouragement and disparagement of all kinds, has persisted for many years in his strivings to work out this intricate question. Unfortunately, he lost his way at an early stage of his enterprise, and, like many pioneers in exploration, has accumulated results of which it must be admitted that the value is scarcely proportional to the quantity. Need we be surprised that, of the many who are quite ready to sneer at Hallier and his cholera-fungus, few, if any, have undergone the labour of reading his papers?

As introductory to my subject, I must first give a short account of the natural history of the organic forms which we now, following high botanical authority, group together under the term bacteria. Secondly, I shall consider the question of their general influence on the processes of life of the higher animals, and the mode in which this is exercised. This will prepare us for discussing the question how far they act as morbific poisons, or as the vehicles of such poisons, or are characteristic of specific diseases. I would remind you that the question we have before us is not that of the origin of bacteria, nor that of their place in nature, but the more restricted one of their influence on ourselves, and on the lower animals whose life, whose health, and whose diseases are but the counterparts of our own.

It is because they are constantly invading our bodies and attacking the living protoplasm by which the work of life is carried on in our tissues, that we, as pathologists, take an interest in their natural history. It is for this reason that questions relating to them, which at first sight seem recondite and remote, have a direct and immediate bearing on practical questions. For if, as I shall endeavour to show, they are constantly present to us—constantly mixing up their life with ours—we cannot wisely remain ignorant of their nature. We do not aspire or profess to be botanists; but, if plant-forms and plant-life associate themselves with the very processes which it is our business to study, we must become botanists for the occasion.

In the short introductory account I shall give of the forms of bacteria, I shall follow Professor Cohn (*Ueber Bacterien, die kleinsten lebenden Wesen*, Berlin, 1872), as being the only botanist of high authority who has given special attention to the subject. For the remainder of what I intend to say, I am myself answerable. I shall, however, make it my endeavour not to vindicate the views which I have advanced myself, or which others may have attributed to me; but to place before you a general view of the work that has been done during the four years which have elapsed since the subject began to occupy the serious attention of pathologists.

Morphology and Natural History of Bacteria.

The first fact that I shall advance with respect to bacteria is, that they are the smallest and least organized of all living beings. As regards size, it is best to judge by comparison with objects with which we are microscopically familiar. The most common rod-like forms are in length about one-third of the width of a blood-corpuscle; *i.e.*, about $\frac{1}{10000}$th of an inch—so small that, if we examine a liquid containing them, with the ordinary magnifying powers used for histological observations, we can scarcely be said to see them to any practical purpose. It is necessary to have recourse to the best microscopes and the highest powers, if it be desired to observe them in such a way as to arrive at useful results.

What ground have we for stating that they are the lowest organisms? One is, that they present only very slight differentiation of parts; but in this sense they are certainly not simpler than many other forms that might be referred to. The chief ground for the statement lies in this, that they are much less *specific* in their characters—much more under the influence of the conditions under which they originate and are developed—than organisms of any other class. Just as in the higher animals and in man himself we call those functions lowest which are most completely automatic—*i.e.*, most completely under the guidance of known conditions—so also, as regards form, we recognize that while all animal and vegetable forms, even the highest, are moulded by circumstances to fit their places in the economy of nature, this moulding power—this adaptation of form to circumstance—becomes more and more obvious the lower we descend in the scale of development.

The new fact relates to the *habitat* of bacteria—to the medium in which they live—water. They inhabit water either as such in the ordinary sense, or in the various conditions recognized as *moisture*, whether occurring on damp surfaces or as filling the interstices of solid bodies, which bodies, when so impregnated with water, are said to be damp. Those who are familiar with chemical work, know that this quality of dampness goes a great deal further than the popular notion of it; that many things

* Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal.*

ordinarily called dry, yield, when subjected to the drying processes commonly used in the laboratory, evidences of being really moist. Consequently, moisture, regarded as a limiting condition of bacterial life, is a very wide and comprehensive one.

From this statement, it must not be understood that bacteria do not exist in the atmosphere. But their existence there in an active form strictly depends on moisture. They attach themselves, without doubt, to those minute particles which, scarcely visible in ordinary light, appear as motes in the sunbeam, or in the beam of the electric lamp. It is by the agency of these particles that they are conveyed from place to place.

Notwithstanding that the word bacterium means a rod, and that many of the forms to be immediately referred to are not rod-like, I am obliged to use it, because it is used by others as a general term for the whole group of organisms known to botanists as *Schizomycetes*. This designation being obviously too long, I attempted, in 1870, to introduce the word *microzymes*, a word which was intended to denote the fact that, in the development of these organisms, the process of vegetation is always associated with chemical processes of a peculiar kind, in a way comparable to that in which the vegetation of the yeast-plant is associated with the alcoholic fermentation. I forego the use of the word microzyme for the reason I have mentioned, viz., that it has not been taken to, but I am not the less sensible that such a word is as much needed now as ever; for it is evidently inconvenient to say, as I now find myself compelled to say, that bacteria —rods—may be either globular, egg-shaped, or filamentous. Cohn classifies our organisms under terms expressive of these various forms, the most important being micrococcus, bacterium, vibrio, and spirillum.

Bacteria have, as a rule, two states of existence—a state of activity and a state of rest. When a liquid teeming with bacteria in the active state is observed under the microscope, the attention is so riveted, that it is an effort to take away the eye from the instrument. The movements have been often described. In the case of rod-shaped bacteria, the axial movement in which the rod advances or retreats in the line of its axis, the direction being frequently reversed, is the most common. This kind of locomotion occurs often by fits and starts, the body remaining in the intervals quite still, or assuming a pirouetting or spinning movement. In all rod-like bacteria, it is probable that the progressive or axial movement is associated with rotation, for, in observing the motion of vibrios, it is easy to see that they, in progressing, twist round the axis of the spiral. When this is the case, it looks as if the filament were executing a wriggling motion, *i. e.*, as if its body were contractile; but this is obviously deceptive. The mechanism of the motion is as little understood as those of *Oscillatoria*, which it closely resembles. It must be carefully distinguished from the passive motions which are exhibited by all particles of size comparable to that of bacteria, when suspended in a liquid of which the density does not differ very widely from their own. We shall find afterwards that certain forms of bacteria appear to be motionless in all stages of their existence.

Rod-bacteria multiply by repeated bisection. This mode of multiplication goes on continuously, the rate varying with the conditions of life, and particularly with temperature. Under favourable circumstances, it is enormous. From actual measurement of the time which elapses in a single case between a bisection and the division of each half into quarters (in other words, of the longest time that a single bacterium remains without dividing), it has been ascertained that the interval in question, in common bacteria, is about an hour. This being the case, it is easy to compute that every single bacterium must produce 16,777,220 individuals in twenty-four hours. Putting it otherwise, the progeny of a mass of bacteria weighing $\frac{1}{2400}$ grain would, at the end of a day, weigh a pound.

In the largest forms of bacteria, it can be made out that each individual consists, not, like an animal cell, of one sort of living substance,* but, like a plant-cell, of a protoplasmic interior enclosed in an envelope of cellulose, by virtue of which the bodies of bacteria are enabled to resist the action of reagents, particularly weak acids and alkalies, which dissolve protoplasm. In those bacteria which separate from each other as soon as they assume the form of distinct individuals, the more stable external part presents itself as a mere envelope; but when, as very usually happens, the progeny which results from a continuous succession of divisions remains in a state of aggregation, the envelope appears to become identified with the "gelatinous" matrix by which they are held together. This observation was made more than twenty years ago by Cohn, who devised the term zoogloea as a general designation for the clumps, or as Hallier calls them from the mode of aggregation above described, "colonies." You will find that this term is now very constantly used by writers on the subject, for these gelatinous masses occur under a great variety of circumstances. In form, they are mostly either spheroidal or membranous, and have this one characteristic which is noteworthy, that their structure is such as to indicate that they grow at their surfaces or margins, not interstitially. Thus, for example, in the spheroidal forms, which, as seen under the microscope, present a more or less circular outline, it is obvious that the multiplication of individuals is most active near the edge. The membranous forms, on the other hand, often present a growing outline in one direction, a disintegrating one in the other.

We are not able to state that the process of repeated division into two is the only one by which bacteria come into existence. When we watch a liquid in which they are beginning to appear as if spontaneously, where none were visible a few minutes before, all that we can make out is, that a nebula presents itself; and that here and there, in the previously homogeneous liquid, particles exist which, although their form is at first indistinguishable, eventually become recognizable as bacteria. As to the way in which this happens, it is difficult to speak positively, for with reference to it no evidence is admissible excepting such as is founded on direct observation—*i.e., on watching the process in a single instance for many hours*—fixing the eye on a single bacterium, a thing weighing two-billionths of a grain, and measuring one-eight-thousandth of an inch, and not quitting it till it divides and divides again. Klebs has attempted to do this, but I will not detain you with an account of his researches.

From what I have said as to their structure and ordinary mode of multiplication by division, it is obvious that bacteria resemble plants, and particularly the Oscillatoriæ, more than animals. The proof that they are plants rests on what is known as the nature of the chemical processes which constitute their life, to the consideration of which we must now pass.

How do bacteria act on the medium in which they live? On this subject, we owe the foundations of our knowledge to Pasteur. The first fact is, that bacteria act on the media in which they live, not as animals, but as plants. Like plants, they derive the nitrogen that they use to build up new albuminous compounds, not from previously existing albuminous compounds, but from ammonia. Like other colourless plants, they derive their carbon apparently from any carbon-compound except carbonic acid, by dissociation of its elements. Like plants, they require certain inorganic constituents to be present in their soil, particularly potash and phosphoric acid.

As regards the assimilation (or fixation), of carbon,

* In using the expression, "one sort of living substance," I must guard against being supposed to mean that any kind of living protoplasm is homogeneous. Strange though it may appear, we are not able at present to assign any limit to its complexity of structure.

Cohn's researches have very materially advanced our knowledge since the publication of Pasteur's work. It was obvious that bacteria did not decompose carbonic acid under the influence of sunlight, by the same wonderful process by which that dissociation is performed by green plants. This they could not do in the absence of chlorophyll. But in this respect they were not in any different position from the fungi, or even from the colourless phanerogamic parasites—as, for example, the bird's-nest orchis.

Pasteur's investigations* related, not to bacteria or to the organic forms which are associated with the process of putrefaction, but to the yeast-plant. With reference to that organism, he proved that it derives its nitrogen directly from ammonia. He proved at the same time that the cellulose of which the external part of the yeast-cell consists, is derived from grape-sugar, and cannot be formed in the absence of that body. He did not extend the application of these facts to the organisms of putrefaction; but it came to be assumed that what was true of the yeast-plant would also be true of the others—viz., that although ammonia was a sufficient source of nitrogen, some hydrocarbon must be present to yield carbon.

Cohn showed this assumption to be a mistaken one, by applying to the organisms of putrefying liquids the same mode of investigation that Pasteur had before applied to the yeast-plant (Cohn, *Beitrage zur Biologie der Pflanzen*, Heft ii, pp. 191-202). That method (since known as the method of cultivation) consists in first finding a liquid of known chemical composition in which the plant to be investigated grows vigorously, and then gradually modifying the composition of this liquid by the elimination of one after another of its ingredients, until at last a mixture is obtained in which the greatest possible simplicity is combined with the greatest possible adaptedness as a soil to the requirements of the particular organism; adaptedness being judged of by rapidity of growth. Such a liquid, as regards the yeast-plant, is that known as Pasteur's cultivating fluid. Its composition stands for the fact that sugar and certain crystalline salts are all that is wanted for the nutrition of the yeast-plant.

In the earlier experiments as to the cultivation of bacteria, *e.g.*, in those which I made in 1871, it was assumed that Pasteur's liquid would also be the most suitable liquid for bacteria. During the same year, however, Cohn, observing that, although bacteria flourished in it abundantly, it was very difficult to prevent the growth at the same time of the yeast-fungus and of pencillium, *i.e.*, common mould, left out the sugar, and found that the bacteria flourished better without it than with it. His next step was to substitute for the solution of yeast-ash (a material which is troublesome to prepare) a solution containing the required salts in about the proportion in which they are ascertained to exist in the ash of the yeast-plant. The liquid which we now use as a "cultivation liquid" for bacteria is prepared by dissolving half a percentage each of potassic phosphate and magnesic sulphate in water having a trace of calcic phosphate in suspension,† and then adding as required a further percentage of ammonic tartrate, and of course boiling the mixture. In this liquid, bacteria grow rapidly—a fact which proves not only that they are able to take their nitrogen from ammonia, but that they can also derive carbon from the tartrate—the only carbon-containing body which is present. Although, however, it supports the life of bacteria so completely, that they not only subsist in it, but multiply with enormous rapidity under favourable conditions of temperature, it never originates them, if it have been boiled. It can, indeed, be very easily kept for indefinite periods without change, remaining absolutely transparent and barren, provided that care be taken to protect it from contamination. It is, however, much better practically to keep the solution of inorganic salts, adding the tartrate in the proper proportion for each set of experiments.

In order to determine the development of bacteria in a liquid of this kind, all that is necessary is to touch it with a "damp" surface—a glass rod, a thread of cotton or silk —*any object which, having been exposed to the atmosphere, has not since its exposure been dried by heating it to a sufficient temperature.* The result may be equally well attained by allowing a particle of dust or a drop of water, or common distilled water, to fall into the liquid. All these liquids, although they contain no organic forms which can be recognized even with the aid of the highest powers, yet contain that which, when added to solution of ammonic tartrate, determines its decomposition, and the building up of its nitrogen and carbon into higher combinations—in a word, vegetation. I call this process quasi-spontaneous. It is not spontaneous, for this simple reason—that it is dependent on conditions which are so far known, that it is possible to control them with perfect certainty.

I may add, that it was by experiments such as those to which I have just been referring that I was enabled to show, in 1871, that moist surfaces and particles of solid material in suspension in the air play the chief part in the propagation of bacteria; *i.e.*, in the conveyance of the material out of which they spring from one soil to another. This inference has now been confirmed—I think I may venture to say, established—by very numerous observations.*

(*To be continued.*)

* The experiments in question are to be found in Pasteur's well-known papers on Alcoholic Fermentation (*Annales de Chimie et de Physique*, tome lviii., 1858).

† The calcic phosphate is best prepared by precipitating solution of calcic chloride with common sodic phosphate, taking care that the former shall be in excess. This precipitate splits on boiling into a soluble and an insoluble phosphate.

* On this subject, see Cohn, *loc. cit.*, p. 194; Landau, *Arch. für Chirurgie*, xvii., p. 531.

RIVERS POLLUTION COMMISSION.

(*Concluded from page* 645.)

Pollution of Water by dissolved Matters.—The analyses of the very numerous samples of foul waters from mines, the results of which are given in the descriptive section of this report, show that the polluting matters present in the effluent water from metalliferous mines are, with very few exceptions, altogether in suspension. The same is the case with the effluent water from clay pits, and it is only to the water discharged from collieries, and from mines upon which arsenic is manufactured, that remedies applicable to polluting matters in solution are required. And of twenty-five samples of water discharged from collieries and coal-washing floors only nine have transgressed any of the suggested standards relating to polluting matters in solution. Of these there were eight transgressions of the standard relating to metals other than calcium, magnesium, potassium, and sodium, the offending metal being iron in each case, and one transgression of the standard relating to arsenic. Taking into consideration the great extent of river channel inspected and the great abundance of collieries in this country, the Commission is of opinion that the sum total of pollution arising from matters in solution derived from coal mines is insignificant. Moreover, the polluting matters when mixed with a considerable volume of river water are not, so far as ascertained, injurious to the health of man or air-breathing animals; they are undoubtedly very fatal to fish, but unlike all other forms of pollution, they only exert their pernicious effects upon water-breathing animals in the immediate neighbourhood of the discharges themselves; the onward flow of a river soon restores to it, by the absorption of atmospheric oxygen, its power of supporting fish life. There is, indeed, a most perfect and efficient remedy for this evil, but this, it is admitted by the Commissioners, will be found considerably more costly than any yet recommended. It consists in adding to the polluted water flowing from the mine, or being discharged from it, a quantity of quicklime (previously slaked), sufficient either to neutralize the acidity of the water, or to replace the oxide of iron it contains. About twelve hours' subsidence of the precipitated oxide of iron would then be required.

The Commission considers that the advantages to be gained by the prevention of this comparatively unimportant form of pollution would not be worth the cost of the remedy.

The only other polluting agent in solution in colliery water is arsenic, which occurred in a proportion exceeding the suggested standard (·05 part metallic arsenic in 100,000 parts of water) only in the case of the water which had been used for coal washing at a colliery connected with the Dowlais iron works near Methyr Tydfil. The occurrence of arsenic in colliery water in so large a proportion appears to be quite exceptional, and as there are no known practical means of removing this ingredient from water, especially if the latter be, like that discharged from the Dowlais coal-washing floor, non-ferruginous, the Commission recommends that colliery water and mine waters generally be exempted from the operation of standards (*d*) and (*e*). This exemption is to some extent justified by the circumstance that these polluting substances are not, as a rule, in the cases exempted, the result of waste products of a manufacturing operation; they are, on the contrary, the result of the natural washing, for the most part unavoidable, of natural mineral substances. It is, however, far otherwise in the case of mines where arsenic is actually manufactured. The vast quantities of white arsenic now being made and sold at the Devon Great Consols and some other mines has been alluded to. This arsenic is required in several important branches of British industry. It is used largely, for instance, in the manufacture of some of the new colouring matters obtained from coal-tar, in calico-printing and dyeing, and in the manufacture of glass and of shot. Whilst it would, therefore, be very undesirable to impose any serious impediments in the way of its production, it appears to the Commission only reasonable that (as is now the case with the retail sale of this article) the manufacture of a poison so virulent that a single ounce of it is sufficient to destroy the lives of 100 men, should be subject to special State supervision; and it, therefore, recommends that any officer appointed for such supervision should be empowered to require that the best practicable means be taken not only to prevent the poisoning of the air by the volatilization of the arsenic, but also to hinder the access of the poison to running water.

Pollution arising from Metal Manufactures.—The remedies for river pollution arising from metal manufactures, are most of them of a very obvious and simple character. The metalliferous liquors discharged from tin-plate and galvanizing works, together with those sometimes allowed to escape in much smaller quantities from brass foundries, German-silver works, and electro-plate factories, contain metallic salts, which, in all well-regulated works, are manufactured into marketable products and sold; or they are sometimes disposed of in their crude condition to chemical mannfacturers who utilize them for various purposes. At Messrs. Thompson, Morgan, and Company's tin-plate works at Broadwaters, near Kidderminster, the waste pickling liquor is concentrated in shallow leaden evaporating pans, until, on cooling, it deposits a copious crop of crystâls of green copperas which is sold at a small profit; the mother liquor from these crystals is fortified with fresh sulphuric acid and used over again, none being allowed to go into the river. In this way all the sulphuric acid used in tin-plate and galvanizing works would become transformed into marketable green copperas, yielding a profit to the manufacturer instead of poisoning the fish in the rivers or destroying the brickwork of the sewers, into which it is now in many cases discharged, in utter disregard of injury to the property of others. The remedy for river pollution from the muriate of iron produced in such works is equally simple, but does not hold out so certain a hope of profit. The crude waste liquor may be concentrated by evaporation and sold as a disinfectant, for which purpose it is valuable; or it may be decomposed by lime or a mixture of chalk and lime, which would transform the polluting muriate of iron into non-polluting muriate of lime; the oxide of iron precipitated by the lime may be sold to iron smelters or gas manufacturers, or dried in the ash-pits of the numerous furnaces employed in such works and then carted away with the ashes. The prohibition of the discharge of metalliferous liquids from tin-plate and galvanizing works into rivers and town sewers, would inflict no serious hardship upon manufacturers; whilst it would preserve much valuable property which is now injured or destroyed by these noxious chemicals. Still less hardship would result from the similar prohibition of such discharges from nickel, iron and steel wire, German-silver, and electro-plate works, and from brass foundries, because the liquids are of comparatively much smaller volume, whilst the metallic salts, which may be extracted from many of them, are of far higher value than those obtainable from tin-plate and galvanizing works. Where the nickel, German-silver, electro-plate and brass factories are situated in towns, such waste liquids as their owners choose to discharge may be, owing to their comparatively small quantity, safely admitted into town sewers. They will not, for the same reason, interfere with the subsequent utilization or purification of the sewage.

The Commission concludes its report by recommending, with the exceptions already mentioned in reference to the standards (*d*) and (*e*), the following liquids be deemed polluting and inadmissible into any stream :—

(*a.*) Any liquid which has not been subjected to perfect rest in subsidence ponds of sufficient size for a period of at least six hours, or which, having been so subjected to subsidence, contains in suspension more than one part by weight of dry organic matter in 100,000 parts by weight of the liquid, or which, not having been so subjected to subsidence, contains in suspension more than three parts by weight of dry mineral matter, or one part by weight of dry organic matter in 100,000 parts by weight of the liquid.

(*b.*) Any liquid containing, in solution, more than two parts by weight of organic carbon, or ·3 part by weight of organic nitrogen in 100,000 parts by weight.

(*c.*) Any liquid which shall exhibit by daylight a distinct colour when a stratum of it one inch deep is placed in a white porcelain or earthenware vessel.

(*d.*) Any liquid which contains, in solution, in 100,000 parts by weight, more than two parts by weight of any metal except calcium, magnesium, potassium, and sodium.

(*e.*) Any liquid which, in 100,000 parts by weight, contains, whether in solution or suspension, in chemical combination or otherwise, more than ·05 part by weight of metallic arsenic.

(*f.*) Any liquid which, after acidification with sulphuric acid, contains, in 100,000 parts by weight, more than one part by weight of free chlorine.

(*g.*) Any liquid which contains, in 100,000 parts by weight, more than one part by weight of sulphur, in the condition either of sulphuretted hydrogen or of a soluble sulphuret.

(*h.*) Any liquid possessing an acidity greater than that which is produced by adding two parts by weight of real muriatic acid to 1,000 parts by weight of distilled water.

(*i.*) Any liquid possessing an alkalinity greater than that produced by adding one part by weight of dry caustic soda to 1,000 parts by weight of distilled water.

(*k.*) Any liquid exhibiting a film of petroleum or hydrocarbon oil upon its surface, or containing, in suspension, in 100,000 parts, more than ·05 part of such oil.

In any enactment for the correction of River Pollution the above standards may be safely qualified by the following proviso:—Provided always, that no effluent water shall be deemed polluting if it be not more contaminated with any of the above-named polluting ingredients than the stream or river into which it is discharged.

The Commission is also of opinion that any law having for its object the prevention of River Pollution should—

(1.) Absolutely forbid* under adequate penalties the casting of solid matters into river channels;

(2.) Enact the foregoing standards of purity† below which any liquid discharges into watercourses should, with the exceptions already mentioned, be forbidden;

(3.) Give power to all manufacturers in towns, except‡ those of gas, paraffin oil, pyroligneous acid, animal charcoal, tin-plate and galvanized iron, to discharge their drainage waters into the town sewers under suitable regulations;

(4.) Confer additional powers on corporations, local boards, manufacturers, and mine owners, to take land compulsorily, under "Provisional Order," for the purpose of storing their waste refuse, or of cleansing sewage or other foul liquids, either by irrigation, filtration, or otherwise.

Further that the equal and efficient administration throughout the country of any Act that may be passed for these purposes would be best secured by the appointment of inspectors to whom should be committed the duty of detecting and proving offences against the law, and of procuring the conviction of offenders, and that in order to secure the independence of these inspectors from local influences they should, like the Inspectors under the Alkali Act, hold their appointments from Government.

SOIRÉE OF THE MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual *soirée*, under the presidency of Mr. Thomas Barclay, in connection with this Association, was held in the Town Hall on Thursday evening, Feb. 4th, and was attended by nearly four hundred persons. Hitherto the *soirée* has taken place at the Royal Hotel, but this year the accommodation was found to be insufficient for all who desired to be present. The arrangements for the entertainment of the guests were admirably carried out. The floor of the hall was covered with a diaper cloth, and there were temporary stairs for ascending to the side galleries. Part of the great gallery and the corridors were set apart for the exhibition of a variety of interesting objects, chemical and scientific experiments, and processes of art and manufacture. One of the most interesting experiments in the great gallery was Mr. W. Crookes's discovery of attraction and repulsion by radiation, exhibited by Dr. R. H. Norris. Three glass bulbs were arranged on a small wooden frame, each of them having suspended within it, by a delicate filament of silk, a small bar of pith. One bulb contained atmospheric air, while in the second the air was partially, and in the third entirely exhausted. The object of the experiment was to illustrate the fact that heat and light can produce repulsion in solid bodies when they are delicately suspended. Mr. Crookes in the course of some experiments a short time ago discovered that a bar of pith delicately suspended in a closed glass bulb which contained atmospheric air of the ordinary pressure was attracted towards the source of heat or light; but that when he proceeded to exhaust the air in the bulb, in the process of exhaustion he came upon a *nil* point, or a point of zero, at which there was no attraction. In proceeding still further with the exhaustion he found a further point at which the pith bar became repelled by heat or light. This was illustrated by the application of a spirit lamp to each of the three bulbs. In the first the bar was attracted, in the second there was no attraction, and in the third the bar was repelled. Mr. C. J. Watson exhibited an experiment in thermo-electricity on a table opposite. Dr. Davis's curious experiment illustrating the motion of the waves was exhibited by Mr. C. J. Woodward, B.Sc.

An apparatus called a compound pendulum, by which a variety of most elaborate and intricate designs can be drawn with the greatest precision by the motion of two pendulums, was shown by Mr. W. R. Morris.

The whole of the east corridor was occupied by Messrs. Gammon, Marrian, and Co., the well-known Birmingham confectioners. They had made extensive preparations, and had taken great trouble in order to illustrate to the visitors the many interesting processes in the manufacture of sweetmeats. About a dozen of their workpeople were engaged in making lozenges, liqueurs, creams, and a variety of fancy confectionery. This corridor during the evening, as might be expected, was considerably patronized, especially by the ladies, who were greatly interested in the various processes.

In the west corridor several of Southall, Bros., and Barclay's *employés* carried on two or three important chemical processes known as Sublimation and Scaling. The art of engraving on glass was shown on an adjoining table by Mr. John Tomey (from the works of Messrs. Stone, Fawdry, and Stone). In the same corridor Mr. Willmott, of Great Hampton Row, gave some practical illustrations of paper box making. Several of his workpeople showed the plan of making paper boxes, comprising square, oblong, and other varieties. The exhibition of scientific instruments, chemicals, and other articles remotely and directly connected with the pharmaceutical and chemical profession was of a first-rate character. Mr. J. E. Howard, F.R.S., contributed some fine herbarium specimens, illustrating the genus cinchona. A large number of new and powerful microscopes and microscopic objects, exhibited by local opticians and manufacturers under the management of Mr. Wright Wilson, M.R.C.S., F.L.S., occupied a prominent position on a table, and were a source of instruction and amusement. In the large collections of chemicals, new drugs, etc., Messrs. Hopkin and Williams and Messrs. Morson and Son, of London, were conspicuous exhibitors, as were also Messrs. Southall, Bros., and Barclay, of Birmingham. The other principal objects in the same row which attracted great attention were a large and valuable miscellaneous collection of surgical instruments and novelties, sent by Messrs. Lynch and Co., and Messrs. Maw, Son, and Thompson, London; a lot of very old herbal and botanical works, also a beautiful collection of foreign medicinal plants, bark, flowers and fruits and other botanical specimens which were in excellent preservation, were lent by Mr. W. Southall, F.L.S. Mr. Sunderland, photographer, of Bull Street, showed a large number of photographic views of the principal buildings and churches in Birmingham and the suburbs. At half-past eight o'clock the *soirée* opened with a lecture by Mr. Josiah Pumphrey, who used lime-light illustrations. Dancing commenced at about half-past nine. The *soirée* was a great success, which is to a great extent due to the exertions of Mr. W. Jones, the honorary secretary.

---

* A precedent for this provision exists in the Newport (Monmouthshire) Harbour Act, 32 & 33 Vict. c. 118, s. 18.

† A precedent for the enactment of standards for the definition of forbidden discharges exists in the Alkali Act, 26 & 27 Vict. c. 124.

‡ A precedent forbidding foul discharges into sewers exists in the Metropolis Management Act, 18 & 19 Vict. c. 120, s. 205.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 20, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

PHARMACY AND THE PHARMACOPŒIA.

WHEN MR. SPURGEON reproved the inconsistency of those of whom he said that they bore the loss of thousands with equanimity, and blasphemed furiously over a missing shirt-button, he only illustrated a common paradox in his accustomed vigorous style. We are about to refer to a similar, if less grotesque, example in connection with the pharmaceutical body in this country. An event of paramount importance has passed before our eyes without apparently attracting any special observation, while topics of the most ordinary kind have come in for a full share of criticism. The circumstance to which we allude has such an important bearing upon the honour and dignity—and, as we believe, upon the material advancement—of pharmacy, that we make no apology for placing it more conspicuously before our readers.

In a discussion on the Additions to the British Pharmacopœia, which took place at an evening meeting of the Pharmaceutical Society last May, Mr. CARTEIGHE took occasion to point out the propriety of giving greater prominence to the element of practical pharmacy in the Pharmacopœia Committee of the Medical Council.*

Again at the meeting of the Council of the Pharmaceutical Society,† in the month of July, Mr. HAMPSON, in pursuance of this suggestion, submitted a resolution, which was seconded by Mr. GREENISH, and after discussion and amendment was ultimately carried unanimously in the following terms :—

"Resolved—That this Council respectfully urges "upon the Medical Council the desirability of asso- "ciating more practical pharmacists with any Com- "mittee which may be appointed for the purpose of "preparing any future edition of the British Phar- "macopœia, or any further addendum to the present "issue. This Council would be prepared to nominate "such pharmacists in the event of the Medical Council "agreeing to their proposal."

A copy of this Resolution was officially communicated to the Medical Council and read at its next meeting, but *no answer* was vouchsafed to the suggestion thus respectfully submitted, and we are left to the mortifying conclusion, that the Medical Council declines to consider the representations of the Pharmaceutical Society in reference to a matter in which pharmacists, as well as medical men, are so profoundly interested. But, though this may change the scene, it cannot decide the issue. The reasonable claims of pharmacy cannot be thus summarily disposed of. The Council of the Society is pledged to the principle embodied in the Resolution, and it will be supported in the endeavour to carry that out by the unanimous voice of the body it represents. It cannot go back, it must not stand still, nor can we regard any *permanent settlement* possible which does not give to pharmacy an independent and responsible share in the compilation of the national Pharmacopœia.

The powers of the Medical Council are derived from the Medical Act, 1858, which was passed for the purpose of regulating the qualification of medical practitioners, but the occasion was incidentally used for amalgamating the three Pharmacopœias and placing the new British Pharmacopœia under the direction of a more representative parliament of medical science. This measure, whether so intended or not, was, in effect, an important step towards the admission of pharmacists ; but the Act being essentially a *Medical* Act could not properly include pharmacists in its executive ; nor perhaps had the time arrived when pharmacy could successfully substantiate its claims to share the privileges of the medical corporations. In the sixteen years which have since elapsed much progress has been made in pharmaceutical education, organization and status. The Pharmacy Act, 1868, both recognized the past operations of what till then had been no more than a voluntary Society, and conferred upon it substantial privileges: it restricted the practice of pharmacy, even more stringently than the Medical Act restricts the practice of medicine, to duly qualified registered persons ; and entrusted to the Pharmaceutical Society the duty of testing the qualifications and protecting the register of future pharmacists. If this important recognition had preceded the enactment of the Pharmacopœia clause of the Medical Act the Society would have had a *locus standi* before the Parliamentary Committee on the Bill, and there is every reason to believe that its application must have been successful.

It is not necessary, nor would space permit us, to substantiate the claims which pharmacy can advance to take part in the compilation of the Pharmacopœia. Unless words are a perversion of sense the proposition is itself a truism. The competence of pharmacists and the advantage of the organization of the Pharmaceutical Society for collecting materials for the work are sufficiently attested by the course actually taken for the publication of the last edition. We quote from the preface: "The Council think it right "to add that the present edition of the Pharmacopœia "has been *prepared by* PROFESSOR REDWOOD, *of the* "*Pharmaceutical Society*, and Mr. WARRINGTON, of

* See PHARM. JOURN. [3], vol. iv., pp. 900 *et seq.*

† See *ante*, p. 15.

"Apothecaries' Hall,* under the direction of a Committee of the Council consisting of the following "members: Dr. BURROWS, Dr. APJOHN, Dr. CHRISTISON, Dr. SHARPEY, and Dr. QUAIN, who also "acted as Honorary Secretary."

The practice of almost every other country in Europe, as well as that of the United States of America, constitutes an overwhelming precedent in our favour, to which we may add that it is in harmony with our national theory of Government that those who are bound by the law should be represented in the Councils where the law is made.

We attach much importance to the influence which the desired privilege would exert upon the advancement of pharmacy and the elevation of pharmacists. Nothing could be better calculated to promote pharmaceutical science and to encourage pharmaceutical research than the laudable ambition of contributing to make the national Pharmacopœia a worthy standard of British Pharmacy. It is even more than a national question, and we owe it to the pharmacists of Europe and America that our common vocation should not be dishonoured in our keeping; but we invert the proper order of things when we set ourselves to devise the scheme of a Universal Pharmacopœia, and send delegates to the farther end of Europe to assist in framing a codex for all Christendom, while we sit down ignominiously at home under the imputation of being unworthy to take part in the compilation of our own. There are probably few of our readers who have not at some time or other experienced annoyance at their own superior knowledge being over-ruled by an assumption of *ex cathedrâ* infallibility, and they will appreciate the importance of the principle for which we contend, that it is the province of pharmacy to pronounce authoritatively upon pharmaceutical subjects.

While we regretfully feel that the Medical Council treated the respectful proposition of the Pharmaceutical Society with scant courtesy, we are willing to believe that "all is for the best." It was right to make the overture, but it would not be satisfactory for pharmacists to hold a place on the Pharmacopœia Committee at the pleasure or by the sufferance of the medical element. Both faculties have an inherent title to be represented, and both must be there with co-ordinate powers, derived from a common source. This is the system in operation abroad, and nothing less should satisfy us. We are now driven by the force of circumstances to appeal to a more powerful and impartial tribunal, where our claims will be decided upon their merits; and we trust that the Members of the Pharmaceutical Society will see their way to urging this course upon their representatives, and be prepared at the annual meeting in May next to give to Mr. HAMPSON's later words the weight of an instruction to the incoming Council, viz., "that "the Parliamentary Committee should be alive to "the importance of this question, and that if any "opportunity presents itself, such as an amendment "of the Medical Act, it may be taken advantage "of to bring the subject *under the notice of the* "*Legislature.*"

* In consequence of Mr. Warrington's illness the onus of this duty devolved almost entirely upon Dr. Redwood.—ED. PHARM. JOURN.

THE ADULTERATION OF FOOD AND DRUGS BILL.

THE Adulteration of Food and Drugs Bill which Mr. SCLATER-BOOTH introduced into the House of Commons on Friday last, has been printed, and will be found at p. 675. Mr. SCLATER-BOOTH has reserved for the second reading, which is fixed for the 19th inst., his explanation of the principles of the Bill. Meanwhile it is worth notice that it proposes to repeal the 24th section of the Pharmacy Act, 1868, which refers to the adulteration of medicines. The seventh clause would appear to indicate an intention to give the Pharmaceutical Society a recognized position in the working of the Act. What its particular duties would be are not very clearly stated, although possibly they might consist in assisting to define the limitation of the "usages of trade" referred to more than once in the Bill. We shall be glad to be informed of the opinions of those of our readers who have considered the subject, as to the probable working of the proposed Bill.

THE STUDENTS' ASSOCIATION.

WE are requested to state that at the next meeting of the Students' Association, to be held on Thursday evening, the 25th inst., at 17, Bloomsbury Square, a paper will be read by Mr. JOHN MORRIS BROAD, on "Pharmaceutical Ethics." The attendance of assistants or apprentices as visitors is invited.

THE SALE OF MILK OF SULPHUR.

WE have received a communication from Messrs. HIRST, BROOKE, and HIRST, of Leeds, enclosing a recommendation from the Solicitors engaged in the defence of the recent prosecution that the wholesale druggist should advise his customers not to sell milk of sulphur without attaching a label declaring its mode of preparation. The words suggested are "Milk of Sulphur.—Lac Sulphuris, not Sulphur "Præcipitatum." The proposition is so reasonable and self-evident, that it will probably be adopted by all persons who are likely in this respect to be affected by the operation of the Adulteration Act.

PHARMACY IN IRELAND.

IN reply to a question by Mr. ERRINGTON, Sir MICHAEL HICKS BEACH stated in the House of Commons on the 11th instant, that it is the intention of the Government to bring in a Bill during the present session to regulate the practice of pharmacy in Ireland.

A GRATIFYING testimonial has recently been presented to Mr. F. CUPISS, M.R.C.V.S., of Diss, a founder, and formerly a member of the Council of the Pharmaceutical Society. The occasion was a desire on the part of the townsmen and friends of Mr. CUPISS to show their sympathy with him under the circumstances of the destruction by fire of a valuable house which he had bought and fitted up for the purpose of retiring from business after being engaged in it during more than fifty years. A sum of £101 13*s.* 6*d.* was rapidly subscribed, which was presented privately to Mr. CUPISS by the Rector of the parish and the Secretary for the testimonial.

AT the next meeting of the Quekett Microscopical Club, on Friday next, the 26th inst., a paper on the Histology of the Eye will be read by Mr. B. T. LOWNE, M.R.C.S. etc.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH, EDINBURGH.

The third meeting of the present session, took place in the Society's rooms, 119a, George Street, on Monday evening, 15th February, at half-past eight o'clock.

Mr. William Gilmour, President in the chair.

Mr. John Sadler, lecturer on botany to the Royal High School, and assistant to Professor Balfour, Edinburgh University, made a very interesting communication on—

Edible Mushrooms and Toadstools.

Mr. Sadler began his lecture by pointing out the fact that as there were upwards of 600 genera and 5,000 different species of fungi their presence was universal. Their growth was generally inseparable from and connected with the decay or transition of matter from one state to another. He referred to the extensive diseases caused by the lower forms of fungi amongst plants and animals, and even in the human subject. Amongst the former he instanced the potato, turnip, wheat, and vine diseases, and amongst the latter, the diseases of many insects, the beard disease of man, fevers of several kinds, cholera, etc. In contrast with these evils, he pointed out the great benefits conferred by the fungi acting as "scavengers" in removing the dead and dying matter, by a beautiful process of burning. He referred to the different situations in which fungi were found and explained their structure, mode of growth, and classification. He also dwelt at some length on the mushroom and toadstool form of fungi, and pointed out the difficulty of distinguishing between edible and poisonous species, and related some personal experiences, not of the most pleasant nature. Interesting details were given regarding the principal edible kinds used in Europe at the present time, as well as the effects on the human subject of various poisonous species. The lecture was illustrated by a large series of diagrams, models, and dried specimens.

At the close of Mr. Sadler's paper which was frequently applauded, and after some remarks by Dr. Wm. Craig and others, a hearty vote of thanks to the lecturer, proposed by the president, and seconded by Mr. Young, was carried with acclamation.

The Secretary then announced the following contributions to the library of the Branch:—104 volumes of various works with sundry pamphlets from the Society in London; 'Pharmaceutical Journal,' from Toronto; 'Journal of the Chemical Society,' and library catalogue, from Mr. Mackay; two large volumes of Coloured Medicinal Plants, with two printed volumes descriptive of the same, by Dr. Von Esenbeck, from Mr. Tait, Princes Street, Edinburgh; twelve volumes Gmelin's 'Organic Chemistry,' nicely bound, and in perfect order; six volumes Gmelin's 'Inorganic Chemistry,' with a complete index, bound, and in excellent order; two volumes of the 'Elements of Chemical and Physical Geology,' by Gustav Bischof, also in good order, from Mr. P. R. Brown, Edinburgh.

Mr. Mackay proposed that special votes of thanks be given to those gentlemen who had so handsomely contributed to the library, but more especially to Mr. Brown, whose contributions had of late been so numerous and so valuable.

This motion, seconded by the president, was carried with loud applause.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The half-yearly meeting of the members of the above Association was held at the rooms, Halford Street, on Tuesday, the 2nd instant. Mr. Clark, President, in the chair. The following report having been read, was unanimously adopted.

"In directing the attention of the members to the proceedings of the Society during another period of its existence, it gives the Committee great satisfaction to be able to say that, in their opinion, the twelfth session yields to no other, either as to the amount or importance of the work accomplished. Though the number of members has been somewhat smaller than usual, the attendance at the Meetings of the Association has improved in a marked degree, notwithstanding the numerous other classes and lectures in art, literature, and science, held regularly in the town through the winter months.

"The Committee hope that the impetus thus given to the Society may not prove transient, but may indicate a determination on the part of its members to devote themselves more earnestly to the acquisition of that knowledge which, in their opinion, will alone ensure success to the future pharmacist.

"The laboratory, which was fitted up during the previous session, has been used constantly by gentlemen preparing for their examinations, and has been extremely useful in enabling them to obtain that experimental knowledge of the facts and laws of the science of chemistry demanded under the new regulations.

"The museum, which is being arranged under the supervision of two gentlemen appointed by the Committee, has also proved of great service to the members, as a means of acquiring a practical acquaintance with the distinguishing characteristics of the various drugs and chemicals used in medicine, and the Committee take this opportunity of expressing their gratitude to the gentlemen who have so ably fulfilled the onerous duties of curators.

"During the session, two lectures on scientific subjects have been delivered by Mr. J. E. Weatherhead and Mr. F. T. Mott, and forty-one classes have been held, conducted by Messrs. Clark, Cadoux, Wright, and Basker, the average attendance at which has been ten. The Committee feel that they are only giving expression to the general sentiment, when they tender their thanks to those gentlemen who have contributed so much to the success which has attended the past session, by devoting their time, energies, and abilities to the advancement of the Society's interests."

After the usual vote of thanks to the retiring committee and the class teachers, the members proceeded to elect the Committee for the ensuing session, with the following results:—Mr. T. Wright, President; Mr. S. H. Cadoux, Vice-President; Mr. W. B. Clark, Treasurer; Mr. A. W. Shakespeare, Secretary; Mr. E. H. Butler, Mr. E. J. Bishop, Mr. J. M. Duncalf.

The Treasurer's account for the half-year, ending January 31st, was presented showing an income of £20 12*s.* 10*d.*, and an expenditure of £11 12*s.* 3*d.*, leaving a balance in hand of £11 12*s.* 0*d.*

CHEMISTS AND DRUGGISTS' SOCIETY OF IRELAND.

The monthly meeting of this Society was held at the Society's rooms, William Street, Dublin, on Tuesday evening, the 9th inst., Professor Tichborne, V.P., in the chair. After some formal business, the Honorary Secretary, Mr. W. Hayes, informed the meeting that the services of Dr. Frazer had been secured to conduct the botany and materia medica class, which will commence at the end of the present month. He considered the Society fortunate in having secured so eminent a man as their teacher.

Professor Tichborne congratulated the Society on the acceptance of the duties by Dr. Frazer and reminded his audience that, although the botany and materia medica class might not be so interesting as the class in chemistry, on account of the absence of experiments, yet it was fully as important to the pharmacist, and he urged the members not to miss a single lecture.

In reply to a question from Mr. Holmes, the Secretary said he was not able to give the Society any information about the introduction of a Pharmacy Bill for Ireland, but that he had had a conversation on the subject with Mr. Errington, M.P., who would, no doubt, question the Government. In reply to a further question, he said he had received no communication from the Pharmaceutical Society of Great Britain on the subject.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

At the ordinary monthly meeting of this Association, held on Wednesday evening, February 10th, Mr. W. S. Brown, President, in the chair, Mr. Louis Siebold, F.C.S., delivered the fourth of his series of lectures on the

Analysis of Common Articles of Food and Drink.

Mr. Siebold commenced by referring to a statement made in his last lecture, that the amount of solids not fat in milk should not be less than 9·3 per cent. At a recent meeting of public analysts 9 per cent. had been adopted as the standard by which samples should be judged. Passing on to butter, the lecturer said the analysis of this substance was not so simple as that of milk. Some of our public analysts are exceedingly clever; they can not only tell us to what extent butter is adulterated with foreign fats, but can write down the percentage of lard, beef suet, mutton suet, etc., which has been used. He did not profess to be able to do this. It was not, however, very difficult to estimate the proportion of fats other than butter fat which a sample contained, and it was not of much consequence to the public whether the adulterant had been beef, mutton, or other fat. As a preliminary test, a weighed quantity of the butter under examination should be dried on a water-bath and exhausted with cold ether, which would dissolve out the pure butter fat only, and on evaporation in a water-bath should yield not less than 80 per cent of the quantity of butter operated on. Should this experiment prove the necessity of a quantitative analysis, the following process was recommended.

Dry a weighed quantity on a water-bath until its weight remains constant; the loss is water, which in good butter should not exceed five or ten per cent. Then exhaust with hot ether and carefully wash the residue on a filter with more ether; the filtrate will contain the butter fat mixed with any other foreign fats present in the sample, but on cooling the latter will separate, settle down, and may be removed by filtration, and weighed; the butter fat may then be recovered from the ethereal solution and weighed as in the preliminary test. The residue left on the filter from the hot ethereal solution consists of the salt and casein; dissolve out the former by hot water and estimate by solution of nitrate of silver. The casein may then be dried and weighed.

Stoddart's method of estimating the value of butter by the use of Horsley's milk tubes * was then described and strongly recommended.

Flour.—A rough, but very useful test of the quality of this substance, and one that may be very quickly applied by a purchaser to a number of samples, consists in mixing one ounce of each with half an ounce of water. That which makes the stiffest paste is the best. Colour must of course be taken into account, and if the stiffest is also the whitest, so much the better; but it often happens that very white flour contains much water and forms a thin paste when mixed in this way. The quality of flour does not depend entirely on the skill or honesty of the miller, grain grown in southern countries, as Austria and Italy, is richer in gluten than that grown in our own and colder countries.

Mineral matter is now but seldom added to flour to increase its weight. A good sample should not yield more than 1 to 1½ per cent of ash.

Ergot is a very dangerous impurity often present in rye flour. If the sample be treated with solution of caustic potash if ergot be present trimethylamine will be produced and volatized, and may be detected by its herring-like odour; or if the vapours be passed through a heated tube and the products condensed in water, hydrocyanic acid will result from the decomposition of the trimethylamine, and may be detected in the usual manner.

Ergot may also be detected by shaking a sample of the flour with ether, adding a few crystals of oxalic acid, boiling for a short time and then allowing the flour to subside, the supernatant liquid will show a red coloration should ergot be present.

Bread.—The demand for very white and light bread had led to the addition of small quantities of sulphate of copper, or larger quantities of alum, to the flour by the baker, these substances having been found to exercise a remarkable effect in whitening bread.

Copper may be detected by incinerating a sample of the bread, treating the ash with water and dilute nitric acid, concentrating the solution, and treating it with solution of hydrogen sulphide, when any copper present would be thrown down as sulphide, and might be examined in the usual way.

Seven years ago, when experimenting on this subject, the lecturer had been unable to obtain bread free from alum from any baker in Manchester. There had, however, been a great improvement of late. The quantitative estimation of alum in bread is not an easy operation. Not less than 1,000 grains should be incinerated, and this being a very slow process, occupying several hours, a little nitrate of ammonia may be added occasionally to assist the burning out of carbonaceous matter. The ash should then be treated with pure hydrochloric acid and heated to dryness, the residue exhausted with water and more hydrochloric acid, then concentrated, and treated with solution of pure caustic soda in excess, to precipitate the earthy phosphates. The alumina passes into solution, and may be precipitated from the filtrate by boiling with solution of ammonium chloride; from the precipitated alumina, washed, dried, ignited, and weighed, the percentage of alum present in the sample of bread may be calculated.

A simplification of this method by Mr. E. L. Cleaver, which is published in the *Pharmaceutical Journal*, [3] iv. p. 851, was then described and strongly recommended by the lecturer.

Horsley's mode of applying the logwood test is exceedingly simple and sufficiently delicate to detect 1 grain of alum in one pound of bread. A drachm of weak tincture of logwood is mixed with one drachm of strong solution of ammonium carbonate and two ounces of water. A piece of the suspected bread is immersed in this solution for five minutes, removed, drained, and treated for a short time on a water-bath. If pure it will show a delicate pink colour which almost disappears on drying, but if adulterated with alum it will assume a violet colour. This is one of those preliminary tests which any chemist and druggist is capable of performing, and which, if showing the absence of alum, may save the trouble of a tedious quantitative analysis.

Starches.—In the microscopic examination of these, authentic specimens should be used for comparison. In this way the characteristic appearances of the various kinds will be much more easily learnt than from plates. It is important to the pharmacist to have a ready test for distinguishing pure from adulterated arrowroot. If one part by weight be shaken for ten minutes with ten parts of dilute hydrochloric acid (made of equal volumes of the B. P. acid and water), the mixture should not gelatinize, nor develop any odour. Pure arrowroot will subside, leaving the acid perfectly limpid; any other starches used as adulterants will render it more or less gelatinous, and the presence of potato starch will be indicated by a peculiar odour, not unlike that of French beans.

Coffee and Chicory.—Pure roasted coffee leaves about four per cent. of ash, for the most part soluble in water, and containing neither sodium nor silicon. Roasted

* See *Pharmaceutical Journal* [3], vol. v., p. 189.

chicory leaves five per cent. of ash nearly insoluble in water, and containing both sodium and silicon. Roasted coffee contains about one per cent. of sugar; chicory, twelve to eighteen per cent. The sugar may be estimated in infusions by Fehling's copper test, ten c.c. of which indicate half a decigram of sugar. Coffee is much lighter than chicory, and some years ago Mr. Draper proposed a plan of separating one from the other, based on this fact. He stated that by floating one c.c. of the mixture carefully on the surface of water in a tube, the lower and narrower part of which is graduated into tenths of a c.c., the chicory would shortly sink to the bottom of the tube, where its quantity might be read off; whilst the coffee would remain suspended. This test is of little value, as specimens of coffee are met with which will sink very rapidly, and of chicory, which will remain long suspended. The colour of their respective infusions is of much more importance: cold water will take up colour from chicory almost instantaneously, but remain colourless for some time when mixed with pure coffee. The test is best applied by shaking fifteen grains with four ounces of water.

The absence of sodium in the ash of pure coffee affords another ready means for the detection of chicory. Neither coffee nor chicory contains starch. If, therefore, a sample shaken for a few minutes with liquor potassæ should yield a filtrate which, when acidulated with hydrochloric acid, gives a blue coloration with tincture of iodine, it has been adulterated with roasted grain.

The analysis of tea will form the subject of Mr. Siebold's next lecture, to be delivered on Wednesday evening, March 10th.

LEEDS CHEMISTS' ASSOCIATION.

The seventh meeting of this Association, session 1874-5, was held in the library, on Wednesday evening, the 10th inst., the President, Mr. F. Reynolds, in the chair, when Mr. J. R. Kirk was duly elected an associate, and Mr. Joseph Walker proposed as an associate.

The Chairman then called upon Mr. H. Pocklington to read the paper for the evening which was entitled "Sugar Optically and Chemically Considered." This paper will be published in a future number.

On its conclusion an enthusiastic vote of thanks was passed to Mr. Pocklington, on the motion of Mr. Yewdall, seconded by Mr. Childe.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

ALCOHOL, ITS ACTION AND ITS USES.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

LECTURE III.

(*Continued from page* 655.)

If any of you ever visited the Royal College of Physicians you would find there a system of blood-vessels dissected and traced out by the immortal discoverer of the circulation of the blood himself, William Harvey; and I think it would strike you, as you looked on, that all the organs of the body, which constitute the body in its entirety, are built upon these minutes vessels. It is as though Harvey had suggested the thought that the vascular system was the primary part of the animal organization, and that upon it were planted and developed all the structures. I have here had constructed a diagram illustrative of what I mean. The arteries are all shown branching out into their extreme divisions and giving the outline of the limbs, of the brain, of the visceral parts, and of the other organs. The veins are seen springing or continuing from these extreme arterial parts, as rivers may be said to spring, and to form at last trunks of large and larger size by which they bring back the blood to the centre of the circulation to be vivified there, and carried on again.

From this distribution of blood in these minute vessels the structures of organs derive their constituent parts; through these vessels brain matter, muscle, gland, membrane is given out from the blood by a refined process of selection of material, which up to this time is only so far understood as to enable us to say that it exists.

These minute vessels are therefore more intimately connected than any other part with the construction and with the function of the living matter of which the body is composed. Think you that this mechanism is left uncontrolled? No; the vessels, small as they are, are under distinct control. Infinitely refined in structure, they nevertheless have the power of contraction and dilatation, which power is governed by nervous action of a special kind. If we pass to the lower class of animals, we find, running along the body, in addition to its vascular system, a series of points of nervous matter, consisting of what are called ganglia. These ganglia are connected together in chain, and from them filaments of nerves emanate, which are distributed to all the active moving parts of the body. In the lower animals the nervous system thus described stands alone, and when we rise in the scale and come even to man we find still the same primitive nervous chain. But we find also now another and more highly developed nervous system, the centres of which are locked up in the brain and spinal column, from which centres nerves of special sense go into the organs of sense, nerves of sensibility or common sensation go to the skin and other sensitive surfaces, and nerves of voluntary motion go to the muscles, all combining to perform their respective functions in the animal economy.

Thus man has two nervous systems: the primary nervous chain and the added centres, with their fibres. The two systems are connected by their fibres in different parts, but they are still distinct, both anatomically and functionally. The primary nervous system is called the system of the organic vegetative or animal life; it governs all those motions which are purely involuntary, and its centres are believed by some, and I think with perfect correctness, to be the seats of those faculties which we call emotional and instinctive. The centres of the brain and spinal chord, with their parts, are the centres of the volitional and of the reasoning powers of all those faculties, that is to say, which are directly under the influence of the will.

Keep in mind, if you please, the two nervous systems, and add to the remembrance this one additional fact, that all those minute blood-vessels at the extremities of the circulation are under the control of the primary or organic nervous supply. Branches of nerves from those organic centres accompany every arterial vessel throughout the body to its termination, and without direction from our will regulate the contraction and dilatation of the blood-vessels to their most refined distribution. This fact was suspected by the older anatomists, but it remained for modern research to make it a demonstration. Thus it has now been proved that if the organic nervous supply of a part of the minute circulation be cut off by division of the organic nerve feeding that part, the vessels become paralysed, as these flexor muscles of my hand, which now grasp so firmly, would be paralysed were their voluntary nervous supply divided.

It will be clear at once that an important advancement of knowledge respecting the course of the blood through the minute circulation has been gained; but our knowledge does not rest at this point. When certain simple physical impressions are made upon the organic nerves, the disturbance of their supply is indicated by distant phenomena, and the blush which mantles, or the pallor which overspreads the cheek, under the influence of mental emotions or shock, are phenomena of this order.

---

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

I can bring to your notice an experiment, showing the production of paralysis, and of all the phenomena above quoted by the mere action of cold upon the organic nervous fibre. By evaporating ether from the back of my hand quickly, I freeze the skin, and thereby I produce paralysis. I take the ether away, and now into the paralysed vessels, which are capable of offering no efficient resistance, the blood rushes, distending the vessels, remaining for a moment stagnant in them, and giving a brilliant red colour or crimson blush over the part. I feel in this part the glow commonly called hot-ache; it is the blush which occurs on the cheeks, and it is from the same physiological condition.

Still further in advance, and with the mention of the fact I am brought back to the subject proper of my lecture; we have learned that certain chemical agents can so influence the organic nervous chain as to disturb its functions, after the manner of a pure physical act. When this peculiar fluid, the nitrite of amyl, to which I have before called your attention, came before me for investigation, I divined, from the symptoms it produced, that it influenced the organic nervous fibre precisely after the manner of a division of that fibre. I dipped a spill of paper into the liquid, brought that near to my nose, as I do now, inhaled the vapour, and immediately felt my face in a red glow, as you see it again at this moment, and felt my heart beating rapidly, as I feel it beating at the present time. I reasoned, naturally, and as events proved correctly, that this fluid, by its action on the organic nerves, paralysed the vessels of the minute circulation, and finding this to obtain with one chemical agent I traced it in others, and found a class of chemical substances, all of which have this same property of relaxing the blood-vessels at their extreme parts. The whole series of the nitrites possess this power; ether possesses it; but the great point I want to bring forth from this description is, that the substance we are specially dealing with, alcohol, possesses the self-same power. By this influence it produces all those peculiar effects which in every-day life are so frequently illustrated. It paralyses the minute blood-vessels, and allows them to become dilated with the flowing blood.

If you attend a large dinner party, you will observe after the first few courses, when the wine is beginning to circulate, a progressive change in some of those about you who have taken wine. The face begins to get flushed, the eye brightens, and the murmur of conversation becomes loud. What is the reason of that flushing of the countenance? It is the same as the flush from blushing, or from the reaction of cold, or from the nitrite of amyl. It is the dilatation of vessels following upon the reduction of nervous control, which reduction has been induced by the alcohol. In a word, the first stage, the stage of vascular excitement from alcohol, has been established.

The action of the alcohol extending so far does not stop there. With the disturbance of power in the extreme vessels, more disturbance is set up in other organs, and the first organ that shares in it is the heart. With each beat of the heart a certain degree of resistance is offered by the vessels when their nervous supply is perfect, and the stroke of the heart is moderated in respect both to tension and to time. But when the vessels are rendered relaxed, and resistance is removed, the heart begins to run quicker, like a watch from which the pallets have been removed, and the heart-stroke, losing nothing in force, is greatly increased in frequency, with a weakened recoil stroke. It is easy to account in this manner for the quickened heart and pulse which accompany the first stage of deranged action from alcohol, and you will be interested to know to what extent this increase of vascular action proceeds. The information on this point is exceedingly curious and important. After I had observed the effect of alcohol on the circulation generally, I attempted to calculate the rate at which it expedited the rate of circulation by observing its effect on the beat of the heart in the pigeon. Alcohol may be administered to this bird quite painlessly, and, as the animal quickly goes to sleep under the influence, and is therefore perfectly quiet, the beating of its heart can be calculated with precision. I traced in these observations an increase of beats of the heart amounting in the course of two hours to one-fourth beyond what was natural. Then I essayed to make researches on myself, but many circumstances intervened, connected with the persistent labour and anxiety of professional life, which prevented me conducting the necessary operations so correctly as I desired, and as I might perhaps at another time have done. Fortunately, the information has been far more ably supplied by the researches of Dr. Parkes, of Netly, and the late Count Wollowicz. The researches of these distinguished inquirers are so valuable, I make no apology for giving them in detail. The observers conducted their inquiry on the young and healthy adult man. They counted the beats of the heart, first at regular intervals, during what were called water periods, that is to say, periods when the subject under observation drank nothing but water; and next, taking still the same subject, they counted the beats of the heart during successive periods in which alcohol was taken in increasing quantities. Thus step by step they measured the precise action of alcohol on the heart, and thereby the precise primary influence induced by alcohol. Their results were as follows:—

"The average number of beats of the heart in twenty-four hours (as calculated from eight observations made in fourteen hours) during the first, or water period, was 106,000; in the alcoholic period it was 127,000, or about 21,000 more; and in the brandy period it was 131,000, or 25,000 more.

"The highest of the daily means of the pulse observed during the first, or water period, was 77·5; but on this day two observations are deficient. The next highest daily mean was seventy-seven beats.

"If, instead of the mean of the eight days, or 73·57, we compare the mean of this one day, viz., seventy-seven beats per minute, with the alcoholic days, so as to be sure not to over-estimate the action of the alcohol, we find:—

"On the 9th day, with one fluid ounce of alcohol, the heart beat 430 times more.

"On the 10th day, with two fluid ounces, 1,872 times more.

"On the 11th day, with four fluid ounces, 12,960 times more.

"On the 12th day, with six fluid ounces, 18,432 times more.

"On the 13th day, with eight fluid ounces, 23,904 times more.

"On the 14th day, with eight fluid ounces, 25,488 times more.

"But as there was ephemeral fever on the 12th day, it is right to make a deduction, and to estimate the number of beats in that day as midway between the 11th and 13th days, or 18,432. Adopting this, the mean daily excess of beats during the alcoholic days was 14,492, or an increase of rather more than 13 per cent.

"The first day of alcohol gave an excess of 4 per cent., and the last of 23 per cent.; and the mean of these two gives almost the same percentage of excess as the mean of the six days.

"Admitting that each beat of the heart was as strong during the alcoholic period as in the water period (and it was really more powerful), the heart on the last two days of alcohol was doing one-fifth more work.

"Adopting the lowest estimate which has been given of the daily work of the heart, viz., as equal to 122 tons lifted one foot, the heart, during the alcoholic period, did daily work in excess equal to lifting 15·8 tons one foot, and in the last two days did extra work to the amount of 24 tons lifted as far.

"The period of rest for the heart was shortened, though, perhaps, not to such an extend as would be inferred from the number of beats, for each contraction was sooner over.

The heart, on the fifth and sixth days after alcohol was left off, and apparently at the time when the last traces of alcohol were eliminated, showed in the sphygmographic tracing signs of unusual feebleness; and, perhaps in consequence of this, when the brandy quickened the heart again, the tracings showed a more rapid contraction of the ventricles, but less power than in the alcoholic period. The brandy acted, in fact, on a heart whose nutrition had not been perfectly restored."

(*To be continued.*)

Parliamentary and Law Proceedings.

Adulteration of Food and Drugs Bill.

The following Bill to Repeal the Adulteration of Food Acts, and to Make Better Provision for the Sale of Food and Drugs in a Pure State, was brought into the House of Commons on Friday, February 12, by Mr. Sclater-Booth. The second reading is fixed for Friday, February 19 :—

Whereas it is desirable that the Acts now in force relating to the adulteration of food should be repealed, and that the law regarding the sale of food and drugs in a pure and genuine condition should be amended:

Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. From *the commencement of this Act* the 23 & 24 Vict. c. 84, 31 & 32 Vict. c. 121, s. 24, and the 35 & 36 Vict. c. 74, shall be repealed, except in regard to any appointment made under them and not then determined, and in regard to any offence committed against them or any prosecution or other act commenced and not concluded or completed, and any payment of money then due in respect of any provision thereof.

2. This Act shall not apply to Scotland or Ireland except as herein provided.

3. The term "food" shall include every article eaten or drunk by man, other than drugs:

The terms "drug" shall include medicine for internal or external use:

The term "county" shall include every county, riding, and division, as well as every county of a city or town, not being a borough:

The term "justices" shall include any police and stipendiary magistrate invested with the powers of a justice of the peace.

Description of Offences.

4. No person shall knowingly mix, colour, stain, or powder, or order any other person to mix, colour, stain, or powder, any article of food with any ingredient or material of a nature injurious to health, with intent that the same may be sold in that state, and no person shall knowingly sell any such article so mixed, coloured, stained, or powdered, under a penalty in each case of fifty pounds for the first offence; every subsequent offence, after a conviction in such penalty, shall be a misdemeanor, for which the person, on conviction, shall be imprisoned for a period not exceeding six months with hard labour.

5. No person shall knowingly, except for the purpose of compounding as hereinafter described, mix, colour, stain, or powder, or order any other person to mix, colour, stain, or powder, any drug with any other ingredient or material of a nature injurious to health, with intent that the same may be sold in that state, and no person shall knowingly sell any such drug, so mixed, coloured, stained, or powdered, under the same penalty as in the last clause for a first and subsequent offence.

6. No person shall knowingly sell any article of food or any drug which is not of the nature, substance, and quality of the article demanded by the purchaser, under a penalty of *twenty* pounds, except as herein excepted and provided; that is to say, except—

Where any matter is mixed therewith for the purpose of rendering it portable, or of preserving it;

Where a harmless ingredient is mixed with it for the purpose of rendering it palatable or of improving its appearance;

Where according to the usage of trade it is sold in a mixed state;

Where it is the subject of a patent in force, and is supplied in the state required by the specification of the patent;

Where British, colonial or foreign spirits are reduced from their ordinary strength by persons licensed and paying duties under the excise;

Where a drug is compounded either in conformity with a prescription of a registered medical practitioner or otherwise, according to the usage of trade;

Where the article is unavoidably mixed with some extraneous matter.

7. No person shall sell any article mixed for any of the purposes mentioned in the exceptions above set forth, if the matter mixed be more than is ordinarily required for the purpose, under a penalty of *ten* pounds.

No person shall sell any article of food which by the usage of trade is sold in a mixed state, unless the ingredients shall be mixed in the proportions required by such usage, and no person shall sell any compounded drugs, except the same shall be compounded according to the prescription in writing submitted for that purpose, or in accordance with the regulations prescribed by the British Pharmacopœia issued by the General Medical Council, or with a basis to be laid down by the Pharmaceutical Society, or the Local Government Board, or the Privy Council, subject to a penalty of *twenty* pounds.

8. Provided that no person shall be guilty of an offence in respect of the sale of an article mixed with any ingredient not injurious to health, whether the case may or may not fall within any of the above mentioned exceptions, if at the time of delivering such article he shall supply to the person receiving the same a notice to the effect that the article is mixed, by a label written or printed on or with the article.

9. No person shall knowingly, and with the intent that the same may be sold in its altered state without notice, abstract from an article of food any part of it so as to affect injuriously its quality, substance, or nature, and no person shall knowingly sell any article so altered without making disclosure of the alteration, under a penalty in each case of *ten* pounds.

Appointment and Duties of Analysts, and Proceedings to obtain Analysis.

10. In the city of London and the liberties thereof, the commissioners of sewers of the city of London and the liberties thereof, and in all other parts of the metropolis the vestries and district boards acting in execution of the Act for the better local management of the metropolis, the court of quarter sessions of every county, and the town council of every borough having a separate court of quarter sessions, or having under any general or local Act of Parliament or otherwise a separate police establishment, may, as soon as convenient after the passing of this Act, where no appointment has been hitherto made, and in all cases as and when vacancies in the office occur, and when required so to do by the Local Government Board, shall, for their respective city, districts, counties, or boroughs, appoint one or more persons possessing competent knowledge, skill, and experience, as analysts of all articles of food and drugs sold within the said city, metropolitan districts, counties, or broughs, and shall pay to such analysts such remuneration as shall be mutually agreed upon, and may remove him or them as they shall deem proper; but such appointments and removals shall at all times be subject to the approval of the Local Government Board, who may require satisfactory proof of competency to be supplied to them, and

may give their approval absolutely or with modifications as to the period of the appointment and removal, or otherwise.

11. The town council of any borough may agree that the analyst appointed by any adjoining borough or for the county in which the borough is situated, shall act for their borough during such time as the said council shall think proper, and shall make due provision for the payment of his remuneration, and if such analyst shall consent, he shall during such time be the analyst for such borough for the purposes of this Act,

12. Any purchaser of any article of food in any district, county, city, or borough where there is any analyst appointed under this or any Act hereby repealed shall be entitled, on payment to the analyst, or if there be no such analyst then acting for the district to the analyst of a neighbouring district, of a sum not more than ten shillings and sixpence, as shall be agreed upon between such person and the analyst, to have such article analysed by such analyst, and to receive from him a certificate of the result of his analysis.

13. Any medical officer of health, inspector of nuisances, or inspector of weights and measures, or any inspector of a market, or any pol'ce constable under the direction and at the cost of the local authority appointing such officer, inspector, or constable, may procure any sample of food or drugs, and if he suspect the same to have been sold to him contrary to any provision of this Act, shall submit the same to be analysed by the analyst of the district or place for which he acts, and such analyst shall with all convenient speed analyse the same and give a certificate to such officer, wherein he shall specify the result of the analysis.

14. The person purchasing any article with the intention of submitting the same to analysis shall, after the purchase shall have been completed, notify to the seller or his agent selling the article his intention to have the same analysed by the public analyst, and shall offer to divide the article into three parts to be then and there separated, and each part to be marked and sealed, or fastened up in such manner as its nature will permit, and shall, if required to do so, deliver one of the parts to the seller or his agent.

He shall afterwards retain one of the said parts for future comparison, and submit the third part, if he deems it right to have the article analysed, to the analyst.

15. It the seller or his agent do not accept the offer of the purchaser to divide the article purchased in his presence, the analyst receiving the article for analysis shall divide the same into two parts, and shall seal or fasten up one of those parts, and shall cause it to be delivered, either upon receipt of the sample or when he supplies his certificate to the purchaser, who shall retain the same for production in case proceedings shall afterwards be taken in the matter.

16. If the analyst do not reside within two miles of the residence of the person requiring the article to be analysed, such article may be forwarded to the analyst through the post office as a registered letter, subject to any regulations which the Postmaster General may make in reference to the carrying and delivery of such article, and the charge for the postage of such article shall be deemed one of the charges of this Act or of the prosecution, as the case may be.

17. If any such officer, inspector or constable, as above described, shall apply to purchase any article of food or any drug exposed to sale, and shall tender the price for the quantity which he shall require for the purpose of analysis, not being more than shall be reasonably requisite, and the person exposing the same for sale shall refuse to sell the same to such officer, inspector, or constable, such person shall be liable to a penalty of five pounds.

18. The certificate of the analysis shall be in the form set forth in the schedule hereto, or to the like effect.

19. Every analyst appointed under any Act hereby repealed or this Act shall report quarterly to the authority appointing him the number of articles analysed by him under this Act during the foregoing quarter, and shall specify the result of each analysis, and such report shall be read at the next meeting of the authority appointing such analyst.

Proceedings against Offenders.

20. When the analyst having analysed any article shall have given his certificate of the result, from which it may appear that an offence against some one of the provisions of this Act has been committed, the person causing the analysis to be made may take proceedings for the recovery of the penalty herein imposed for such offence, before any justices having jurisdiction in the place where the article or drug sold was actually delivered to the purchaser, in a summary manner.

Every penalty imposed by this Act shall be recovered in the manner prescribed by 11 & 12 Vict. c. 43, and may be mitigated according to the judgment of the justices.

21. At the hearing of the information in such proceeding the production of the certificate of the analyst shall be sufficient evidence of the facts therein stated, unless the defendant shall require that the analyst shall be called as a witness, and the parts of the articles retained by the person who purchased the article shall be produced, and the defendant may, if he think fit, tender himself and his wife to be examined on his behalf, and he or she shall, if he so desire, be examined accordingly.

22. The justices before whom any complaint may be made under this Act may, upon the request of either party, in their discretion cause any article of food or drug to be examined and analysed by the analyst of an adjoining district, who shall thereupon make the analysis as if he were applied to by any officer in his district, and may be required to attend to give evidence at the hearing of the case; and the expense of such examination, analysis, and attendance shall be deemed part of the expenses of executing this Act, unless the justices order the same to be paid by the complainant or the defendant.

23. Any person who has been convicted of any offence punishable by any Act hereby repealed or this Act by any justices may appeal to the next general or quarter sessions of the peace which shall be held for the city, county, town, or place wherein such conviction shall have been made after the expiration of ten days from the day when such conviction shall take place, provided that such person enter into a recognizance within three days next after such conviction, with two sufficient sureties, conditioned to try such appeal, and to be forthcoming to abide the judgment and determination of the court at such general or quarter sessions, and to pay such costs as shall be by such court awarded; and the justices before whom such conviction shall be had are hereby empowered and required to take such recognizance; and the court at such general or quarter sessions are hereby required to hear and finally determine the matter of such appeal, and may award such costs to the party appealing or appealed against as they shall think proper.

24. In any prosecution under this Act, where the fact of an article having been sold in a mixed state has been proved, if the defendant shall desire to rely upon any exception or provision contained in this Act, it shall be incumbent upon him to prove the same.

25. If the defendant in any prosecution under this Act, prove to the satisfaction of the justices or court that he sold the article in the same state as when he himself purchased it, and that he bought it, as the same article in nature, substance, and quality as that demanded of him, and with a warranty in writing to that effect, he shall be discharged from the prosecution, but no order for costs, shall be made in the case, unless he shall raise any other question which shall be decided against him, in which case he shall be liable to pay the costs incurred by such question.

26. Every penalty imposed and recovered under this Act shall be paid in the case of a prosecution by any officer, inspector, or constable, to the prosecutor, and shall be by such prosecutor paid to the authority for whom he acts, and be applied towards the expenses of executing this Act.

27. Any person who shall forge, or shall utter, knowing it to be forged for the purposes of this Act, any certificate or any writing purporting to contain a warranty, shall be guilty of a misdemeanor and be punishable on conviction by imprisonment for a term of not exceeding *two* years with hard labour.

28. Nothing in this Act contained shall affect the power of proceeding by indictment, or take away any other remedy against any offender under this Act, or in any way interfere with contracts and bargains between individuals, and the rights and remedies belonging thereto.

Expenses of Executing the Act.

29. The expenses of executing this Act shall be borne, in the city of London and the liberties thereof, out of the consolidated rates raised by the commissioners of sewers of the city of London and the liberties thereof, and in the rest of the metropolis out of any rates or funds applicable to the purposes of the Act for the better local management of the metropolis, and in counties out of the county rate, and in boroughs out of the borough fund or rate.

Special Provision as to Tea.

30. From and after the first day of January one thousand eight hundred and seventy-six all tea imported as merchandise into and landed at any port in Great Britain or Ireland shall be subject to examination by persons to be appointed by the commissioners of customs for the inspection and analysis thereof, for which purpose samples may, when deemed necessary by such inspectors, be taken and with all convenient speed be examined by the analysts to be so appointed; and if upon such analysis the same shall be found to be unwholesome, mixed with other substances or exhausted tea, the same shall not be delivered unless with the sanction of the said commissioners, and on such terms and conditions as they shall see fit to direct, either for home consumption or for use as ships stores or for exportation; but if on such inspection and analysis, it shall appear that such tea is in the opinion of the analyst unfit for human food, the same shall be forfeited and destroyed or otherwise disposed of in such manner as the said commissioners may direct.

31. Tea to which the term "exhausted" is applied in this Act shall mean and include any tea which has been deprived of its proper quality, strength, or virtue by steeping, infusion, decoction, or other means.

32. This Act shall commence on the *first day of October one thousand eight hundred and seventy-five.*

33. This Act may be cited as "The Sale of Food and Drugs Act, 1875."

SCHEDULE.

Form of Certificate.

To * and .

To all to whom it may concern.

I, the undersigned, public analyst for the , do hereby certify that I received on the day of , 18 , from † , a sample of for analysis, which then weighed , and have analysed the same, and declare the result of my analysis to be as follows:—

The said sample contained the parts as under.

---

*Observations.**

I return the residue of the sample not consumed in the analysis herewith.

As witness my hand this day of , 18 .

A.B.,
at .

* Here insert the name of the person submitting the article for analysis.

† Here insert the name of the person delivering the sample.

* Here the analyst may insert at his discretion his opinion as to whether the mixture (if any) was for the purpose of rendering the article portable or palatable, or of preserving it, or of improving the appearance, or was unavoidable, and may state whether in excess of what is ordinary, or otherwise, and whether the ingredients or materials mixed are or are not injurious to health.

THE ALLEGED SALE OF ADULTERATED SULPHUR.

At the Leeds Town Hall on Wednesday, the adjourned summons before Mr. Bruce, against Mr. Joseph Harrison, chemist, Stanningley, was heard. The summons had been issued under the Adulteration Act, 1872, at the instance of the Superintendent of the Sanitary Department, and charged the defendant with selling, on the 2nd instant, as precipitated sulphur, 4oz. of sulphur, which was adulterated to the extent of 64 per cent. with sulphate of lime. The Town Clerk prosecuted, and Mr. Granger appeared for the defendant.

Mr. Brooke (Hirst, Brooke, and Hirst), wholesale druggist, said that sulphur præcipitatum as prescribed by the Pharmacopœia of 1867 was pure sulphur; lac sulphuris contained sulphate of lime. Both were prepared by precipitation. Since the present proceedings had been instituted he should supply the pure article, viz., that mentioned in the new Pharmacopœia, if precipitated sulphur were asked for. Previously if precipitated sulphur had been asked for it would have depended on the price quoted as to which of the two kinds he would have supplied. His price list had been altered since the question had come before the court.

Mr. Scattergood, surgeon, was then called.

Mr. Granger asked whether it was advisable to have medical evidence.

Mr. Bruce: Yes, I think so. Supposing Mr. Harrison should be convicted, it would be of great benefit to the druggists that they should know what they are doing. Mr. Harrison does not wish to do a thing which is contrary to the law, therefore, I should suppose he would desire to have the fullest evidence on the subject.

Mr. Scattergood said the compilers of the Pharmacopœia attached so much importance to the fact that the precipitated sulphur of the new Pharmacopœia should be pure that they had given tests. The terms milk of sulphur and precipitated sulphur had always been held to be synonymous by writers on materia medica. Lac sulphuris was left out of the new Pharmacopœia, and sulphur præcipitatum was the only term used for precipitated sulphur. He believed that the reason for altering the formula for preparing precipitated sulphur was because by the mode originally adopted it could not be obtained without an admixture of sulphate of lime. When people got what was supplied as precipitated sulphur, it was very often not effectual as a medicine, because it was not pure sulphur. The complaint that it was difficult to get the article pure had led to its disuse in medicine to a great extent. Sulphur was usually ordered for its purgative action. Sulphate of lime was not a purgative at all; the best that could be said of it was that it was inert. When he prescribed precipitated sulphur he expected that the pure article would be supplied.

By Mr. Granger: He very rarely used precipitated sulphur. He knew that milk of sulphur was very often used. He took the terms to be synonymous, milk of sulphur being the adulterated article.

Mr. Smeeton, chemist, stated that if he were asked for precipitated sulphur he should supply a pure article.

By Mr. Granger: He had altered his labels for milk of sulphur since the prosecutions began, adding the words "Contaminated with sulphate of lime." He had had the pure article brought back by customers two or three times. In poor neighbourhoods milk of sulphur was generally preferred, but his customers, as a rule, knew the difference.

Mr. Granger then raised the same defence as the defendant set up when the case was last before the court, viz., that there were two kinds of precipitated sulphur, one of which was identical with milk of sulphur, and therefore containing sulphate of lime, and the other the pure sulphur. It appeared, he said, that many of the druggists were altering their price lists, etc., as a consequence of the present proceedings; what they had hitherto done having been done simply from ignorance, and not with any intent to defraud the public.

Mr. Bruce said there was no imputation that either Mr. Harrison or any of the druggists had made any attempt to defraud.

For the defendant Mr. Thomas Walker, chemist, was called, and he contended that milk of sulphur was often asked for under the name of precipitated sulphur, and had been called by that name in the old Pharmacopœias. In his neighbourhood where the customers were chiefly of the poorer class, milk of sulphur was greatly preferred to the pure sulphur, which had been returned to him on several occasions.

Mr. Bruce stated that according to the new Pharmacopœia precipitated sulphur was a pure article without a trace of lime in it, and when therefore a person asked for it he had a right to have it, and not an article that contained 36 parts of sulphur and 64 of sulphate of lime. Whilst he could not do otherwise than convict, still it seemed to him that Mr. Harrison had only been doing what all the other druggists had been doing, without a knowledge that it was improper. That was proved by the evidence on both sides, and Mr. Harrison would leave the court without a stain on his character. A fine of 1*s.* was imposed, it being understood that this was only a test case.

The Town Clerk remarked that ignorance would no longer be an excuse.

The Town Clerk applied for costs, but Mr. Bruce did not think it was a case in which he was entitled to them.

Mr. Geo. Teasdale, chemist, Bramley, was summoned for a similar offence, and a fine of 1*s.*, without costs, was inflicted.—*Yorkshire Post.*

Poisoning by Chloral Hydrate.

On Friday, February 12, Dr. Hardwicke held an inquest at Bloomsbury on the body of Edward P. Kendall. Mr. J. W. Barnes, surgeon, said when he first saw deceased he had been dead some time; he was dressed, lying on his right side, both his feet drawn up, and arms folded. His nails were dark, and there was a frothy mucus on the pillow. Witness saw two bottles, one of which had contained a solution of hydrate of "chloral" and one of "syrup." They were both empty. He made a post-mortem examination, and was induced to believe the cause of death was an over or poisonous dose of hydrate of chloral.

Mr. William Blades, assistant to Mr. Cooper, chemist, of Oxford Street, said he knew deceased as a customer, coming usually on a Sunday for chloral and sedative mixtures, owing, as he said, to want of sleep. On Sunday last he asked for "hydrate of chloral," which witness told him was in crystals and the crystals being rather large it would be awkward of him to judge of a dose, which was 20 grains. Deceased wanted eight doses, and witness suggested his having it in solution, and gave him 160 grains in solution, a 1½-ounce bottle labelled "poison," and the doses were also marked by a paper label. Witness had dispensed 60 grains of chloral to be taken in four hours, and up to the present time he had not known of any bad consequences of taking chloral, which had become a fashionable remedy for want of sleep.

The Coroner, in summing up, said the practice of taking chloral ought to be checked. Its action was far more powerful than alcohol, and again it underwent changes and its properties were therefore altered, and what would be a harmless dose at one time might become an overdose at another, especially under the effects of light. It was also doubly dangerous to persons of intemperate habits.

The jury returned a verdict that "the deceased died from the effects of taking an overdose of 'hydrate of chloral,' and that in their opinion the same was brought about by misadventure."—*Standard.*

Poisoning by Laudanum.

Two inquests have been held in Leeds within the last few days, in each of which a verdict was returned that the deceased had been poisoned by laudanum.

In one case it appeared from the evidence that the deceased lived with a woman who was in the habit of taking daily a large amount of laudanum. She admitted in evidence that she had on one occasion taken as much as six ounces in one day. It was shown that deceased purchased an ounce of laudanum, but there was no evidence to show whether he took it or not. In the evening he went to sleep and became unconscious, and, subsequently, a surgeon was called in and applied the stomach pump and other remedies, but the deceased died the following evening. The Coroner said there was no evidence to show by whom the laudanum had been administered, and advised the jury to return an open verdict.

The second inquest was on the body of William Jackson, chemist and druggist, late of Bradford. The deceased, it appeared, had been in the habit of taking laudanum for neuralgia, and whilst on a visit to some friends took, it was supposed, three or four ounces of laudanum. He went to sleep, and on getting up on the following morning still appeared drowsy. About dinner-time a doctor was called in, but the deceased never rallied, dying about twenty-four hours after taking the dose. The jury were of opinion that the deceased did not intend to commit suicide, and returned a verdict that "death was accidentally caused by taking an overdose of laudanum."

Notes and Queries.

[428]. EXT. HÆMATOXYLI.—Can any reader inform me how the bright colour imparted to solution of Ext. Hæmatoxili by caustic potash can be rendered permanent?—Wm. J. Cooper.

NOTE ON POMADES.—The question has often been asked by correspondents how the misty appearance so often perceived in bottles of pomade, apparently between the pomade and the glass, may be avoided.

After trying all the plans suggested without success, I adopted the expedient of dipping the bottles, after the pomade has become cold, into warm water for about a minute, when the misty appearance entirely disappears. I have never found the above plan to fail.—Leontodon.

BOOKS RECEIVED.

TRAITÉ PRATIQUE DE LA DÉTERMINATION DES DROGUES SIMPLES D'ORIGINE VÉGÉTALE. Par G. PLANCHON. Two volumes, with 305 Engravings. Paris: F. Savy. 1875. From the Publisher.

MANUEL DE CHIMIE PRATIQUE, ANALYTIQUE, TOXICOLOGIQUE, ZOOCHIMIQUE; à l'usage des Étudiants en Médecine et en Pharmacy. Par E. RITTER. With Illustrations. Paris: F. Savy. 1875. From the Publisher.

ON BRITISH WILD FLOWERS CONSIDERED IN RELATION TO INSECTS. By Sir JOHN LUBBOCK, Bart., F.R.S., etc. With numerous Illustrations. (Nature Series.) London: Macmillan and Co. 1875. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PHARMACEUTICAL REMUNERATION, ETC.

Sir,—As an old stager, having entered the drug trade somewhere about thirty-five years since, you will perhaps allow me to say a few words before the present exciting controversy is closed.

Now it did not seem to me that anything contained in the first letter of "Veritas" indicated in the least a twenty years' sleep; most reasonable persons could see that it was written with the intention of showing that things were greatly improved inside the pharmaceutical sphere, as well as outside its boundaries, and if we had not kept pace with other trades and other classes of the community, it was in a great measure owing to the peculiarity of our business, which entailed upon us exceptional obligations.

My experience quite agrees with most of his statements of course excluding the typical "apprentice," for there are now, as there were then, hard and exacting employers, as there were, and are, kind and considerate ones.

I must conscientiously coincide with every word he says to "An Examined Assistant" and particularly, as regards "unemployed time in business hours," the very mention of which shows "An Examined Assistant" to be no man of business.

The second letter of "Veritas" appears to have more of a personal character; written when just recovering from sickness, and under irritation caused by remarks made upon his letter by "An Examined Assistant;" so that remembering "Nemo mortalium omnibus horis sapit," it would have remained unnoticed by me had it not contained that startling statement upon pharmaceutical remuneration which seems to have overwhelmed others as well as myself with astonishment, as the numerous letters appearing week after week in your columns amply testify. Now all extremes are bad. Extreme statements are mostly mischievous.

I could point to a man who entered the drug trade without any capital except his head and his hands, who rose to be the head of a large wholesale firm, and who retired with great wealth; but while this might be legitimately adduced as an example of what it was possible for *one*, under certain circumstances, by dint of industry and energy, to accomplish, it would be very ridiculous to make the sweeping statement that *all* young men entering the drug trade might reasonably expect to become millionaires.

"Veritas" has both facts and experience against him, and this is so patent to all who choose to make use of their ordinary powers of observation, that it were scarcely worth confuting him but for this—that men are too apt to welcome with eagerness any extravagant statement which but promises enough and prophesies enough, whether it be confirmed by a single particle of evidence or not.

I know something of the rule of geometrical progression by which the thirty-two nails in a horse's shoes, beginning at a farthing the first nail, are made to amount to a marvellous sum. I have also read a little about the law of natural selection, by which the weaker is supposed to be crushed out in the struggle for existence. But although there has been a great display of arithmetic in your columns over the question, I do not think the first would exactly apply, the latter would not be kind, and moreover the £200 man would be the most likely to be the victim.

No sensible man with £200 or £300 will reasonably expect any such amount of success, the limits of the drug trade pretty clearly indicating that all such cases must be very exceptional, and further, I would strongly advise his putting aside all thoughts of horseflesh until at all events he has secured his £500 retiring allowance, or it will greatly retard its attainment. There is far less chance for him if he endeavours to perform this feat on horseback.

As to taking a wife it is better not to hazard an opinion any further than this: if he means to do it at all, I think one would recommend the wife first, for if the horse takes the first place in the affections it may perhaps keep there.

"Veritas," in his last letter, fights hard and thinks he has demolished all his opponents, but although he says so, he has not in any way proved the truth of his assertion. Need a man submit to the fare of an anchorite and other privations to be able to retire into inactivity in the prime of life? I hope many of your younger readers will say—No.

Just a line as to pharmaceutical hours of business. This knotty point will never be solved by letter writing. If masters will be considerate and young men reasonable, little cause for complaint need exist.

Employers are doing great things in the way of improving the old condition of things. Young men are often both exacting and unreasonable. I would in all kindness put before them an old exhortation—"Let not your good be evil spoken of."

If time given for study, attending lectures, etc., makes you all the more diligent in business hours, your employer will feel encouraged in making sacrifices; but if (as is too often the case) you are never seen studying in your own time, and his business too is neglected, you do not deserve much consideration, nor ought you to expect any.

ONE WHO HAS KNOWN THE DRUG TRADE MORE THAN THIRTY YEARS.

Sir,—I think many of us who are young men and about to start in business have cause to be thankful to "Veritas" for his very cheering letters.

It has been the custom of late years (at any rate, among assistants) to talk disparagingly of the future prospects of chemists and druggists, and a very common saying has been—"Oh, it is no use to pass the examinations, for unless a fellow has £700 or £800 he will never get a business worth anything." The effect of such a feeling has been to discourage many from seeking to obtain either the Minor or Major qualification.

Hence, I think that such bold and manly letters as "Veritas" has written are likely to be productive of great good, by inspiring the hearts of the poorer class of assistants with the hope that they may one day become masters of lucrative businesses, although their means to commence with may be but small. Such a hope would prove a great incentive to study and practical work, and go a far greater length to make them happy than even the closing of the establishment an hour earlier than usual.

M. P. S.

Sir,—The following table, showing the sums necessary to be laid by annually in order to acquire £10,000 in the course of fifteen years, may interest those who have read the correspondence elicited by the statement of "Veritas." It is assumed that the young man of twenty-five has purchased with his £300 a business, of which the returns are at first £500 per annum, out of which he contrives to lay by one-fourth. I leave it to each of your readers to form his own judgment as to the probable percentage of persons, confining themselves to a chemist's legitimate business, who could, with so small an outlay secure such a desirable result.

Years.	Net Annual Profit.		Years.
1st.	£125	£259	15
2nd.	170	336	14
3rd.	230	433	13
4th.	300	538	12
5th.	400	684	11
6th.	500	814	10
7th.	600	930	9
8th.	600	886	8
9th.	600	844	7
10th.	600	804	6
11th.	600	766	5
12th.	600	729	4
13th.	600	694	3
14th.	600	661	2
15th.	600	630	1
		£10,008	

The third column shows the amount of the annual profit improved at 5 per cent. compound interest for the number of years specified in column four.

"COMPOUND INTEREST."

Sir,—A typographical error occurs in my last letter in your columns. "In this city the shops are ostensibly closed at six." "Six" should been "eight."

VERITAS.

February 13, 1875.

PHARMACEUTICAL EXAMINATIONS.

Sir,—I am very glad to see that Mr. Greenish has brought before the Council the question of the equal (or otherwise) severity of the Pharmaceutical Examinations, as conducted respectively in London and Edinburgh.

That three months should elapse before a candidate who has failed can again present himself for examination, is generally understood to be the rule, but I rather doubt if such a law is, or at any rate was, always insisted on, for I certainly remember hearing of an instance, in which a candidate who had been thrice plucked in London presented himself at Edinburgh (I think in the very next month after his third failure), came out in honours, and following up his successes also passed his Major Examination at the "Modern Athens" at the end of another three months.

If such ever was the case, we may alter the old saying into "they can manage these things better in Scotland."

Mr. Hampson remarked that "statistics to be of any value must cover a somewhat prolonged period;" but about two years ago I called your attention to the different percentage of failures at the two places of examination, and do not think there has been much variation in it since.

Under these circumstances it certainly seems the duty of the Council to inquire into the cause, and I would venture to suggest (without in the slightest degree wishing to insinuate that such is the case) that it would be advisable to see whether any of the London Board of Examiners, in an excess of zeal for the higher education of pharmacists, do not ask questions in their particular departments, which may be considered as almost too severe when compared with those put by the other members of the Board.

This might, I imagine, be ascertained by a comparison of the numbers of the victims in the various subjects (for I presume that the examiners usually take the same), and would surely be a fit object for the inquiries of a committee of the Council, a report from which would doubtless prove that candidates have no more to fear plucking at the hands of any one or two of the examiners than they have from the others.

EDWARD H. STOREY.

42, *Castle Street, East, W.,*
February 15, 1875.

EARLY CLOSING.

Sir,—The early closing at Bedford certainly answers very well, but Mr. Waring did not speak "to the card" when he stated that medicines only are supplied after the shops are closed, no limitation of that kind being made. With regard to "every chemist keeping three or four assistants," that was simply a stretch of his imagination, for there are only two chemists in the town who employ more than two pairs of hands, reckoning assistants and apprentices together, and at the present time, I believe, there are only three or four paid assistants in the town; so that Mr. Waring must either have left Bedford for some considerable time or be troubled with a very short memory. The fact is, the medical profession, as in many other towns, dispense their own prescriptions, so that there is very little chance of getting much of a dispensing business, the main part of the trade consisting of the ordinary chemists' sundries, combined with such pharmaceutical products as paints, petroleum, and tar. "Veritas" is welcome to come and "take stock," and will, I am sure, meet with civility from any chemist of whom he may make inquiries, but I am afraid he will not find it such an El Dorado as he has been led to expect. I can tell him for his comfort that no less than three chemists have commenced business in Bedford within the last few years, and none of them could succeed in getting a living.

A BEDFORDIAN.

A. Plimsoll.—You will find the process described in the British Pharmacopœia, under the head of "Ferrum Redactum."

"*Erratum.*"—We are requested by Mr. Lowe to make the following correction in his letter in last week's issue. In the tenth line of the last paragraph but three, for "is *now* much less incorrect," read "is *not* much less incorrect."

"*Leontodon.*"—See an article by Mr. J. Spiller on "Nickel Plating as applied to Photographic Purposes," in the *Pharm. Journ.* for Nov. 4, 1871, p. 368.

"*Inquirer.*"—We do not think a qualification to enter the medical profession could be acquired in the manner described, but the question had better be addressed to one of our medical contemporaries.

H. Foster.—The first label would, in our opinion, be liable to a stamp; the second probably so; the third we think would not. But decisions of the Commissioners have shown the grounds upon which they have been made to be so indeterminate by outsiders that, to be safe, it would be better to submit the labels to the Board.

J. Browne.—A fresh volume of the *Pharmaceutical Journal* is commenced in the first issue in July of each year.

"*Student.*"—This is a preparation mentioned in Squire's 'Companion' as having been made at the suggestion of Dr. Spencer Wells. A note in reference to it will be found in *Pharm. Journ.* for April 19, 1873, p. 821.

J. S.—Most manuals of chemistry, including those mentioned by you, define the fundamental chemical principles upon the application of which the answers to the questions sent would depend.

"*Quærens.*"—No such list is kept at Bloomsbury Square. Perhaps you might obtain the information by applying at the office of the Crown Colonies Commission, 12, Spring Gardens, S.W.

J. Garth.—(1) The arms are those of the Pharmaceutical Society as a corporate body, and no legal right exists to use them in any other way. (2) We cannot say; apply at Apothecaries' Hall. (3) This question should be submitted to the Registrar of the Medical Council.

M. D.—Bleached sponge is prepared by soaking ordinary sponge in very dilute hydrochloric acid, then in several successive quantities of cold water, afterwards in water containing a little sulphurous acid or chlorine. Finally the sponge is repeatedly washed in clean water.

J. Bradshaw and *A. P. S.*—We are unable to give advice upon medical subjects.

"*Theta.*"—Phospho-molybdic acid is prepared by digesting with the aid of heat freshly precipitated molybdic acid, with sufficient solution of phosphoric acid to dissolve it.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. E. Smith, Mr. S. Taylor, Mr. Haselden. Mr. Ince, Mr. Bell, Mr. Baynes, Mr. Pocklington, Mr. Plimsoll, Mr. E. J. Searle, Mr. A. C. Bowdler, Mr. Reynolds, Mr. A. Warren, "One who values Time and loves Study," H. F., C. D.

ON SOME ADULTERATED PEPPER.

BY HENRY POCKLINGTON, F.R.M.S.

Shortly after the Bradford exposure of the tricks of the pepper trade, an examination of the contents of the domestic pepper-box induced me to make sundry examinations of various peppers purchased or otherwise obtained from different sources in Leeds, with results quite different from my expectations. In common, I believe, with many others interested in food analysis, I have been under the impression that pepper has been very little adulterated notwithstanding its present exemption from excise supervision; but so far as Leeds is concerned,—and I have not at present extended my observations beyond its bounds,—there is no doubt that this impression is an erroneous one, and that vast quantities of a highly sophisticated article are in the market. Under these circumstances, it occurs to me that a short notice of the three groups, into which the specimens I have examined may be arranged, may be of interest, and perhaps of value, to West Riding pharmacists in particular and to the readers of the Journal in general. I regard this as the more probable since the worst specimens that I have examined have been procured, not from small chandlers' shops, but from respectable pharmacists in poor neighbourhoods.

The first sample examined was supplied to my family in the ordinary way, and is quite characteristic of some manufacturers doing an extensive trade amongst small shopkeepers either directly or through the medium of a wholesale house. I am of opinion the latter. This pepper was adulterated to the extent of 50 per cent. with various farinas, of which a species of so-called Brazilian arrowroot, a "yam" starch, forms by far the largest proportion. There was a small quantity of rice starch and a little wheat flour present. The arrowroot granules are large, of an exaggerated "mussel" shape, and polarize very brilliantly. The starches appear to have been damaged by water and to have been subsequently stove dried. Fragments of the mycelium of fungi and spores could be detected.

Sample No. 2.—This was supplied by a firm of pepper grinders direct to a respectable pharmacist under special warranty that it was genuine. It proved to be *black* pepper adulterated with about 60 per cent. of "pea-meal," locust-beans in very small quantities, wheat, and rice starch. It has been frequently met with in Leeds and Bradford.

Sample No. 3.—This differs exceedingly from the preceding, and I have no idea as to its origin, the specimen having been handed me for examination without any indication of the source whence it was derived. It is largely adulterated with farinas, amongst which are small quantities of wheat-starch, oatmeal, and a compound starch of which I have not as yet determined the nature. This sample is also adulterated with a somewhat notable quantity of lime, and is singularly devoid of flavour. I have only seen one sample. There can be little doubt that the major portion of the pepper supplied to small shops in this locality is more or less adulterated. The sophistication is extremely easy of detection by any one possessed of a microscope, as the characters of genuine ground pepper are utterly unlike those of the substances mixed with it. The following plans answer well in practice.

Take a small quantity of the suspected pepper on the point of a clean spatula and place it on a glass slip, add a drop of water, and mix the pepper with the water. Place on the usual thin cover and examine with a quarter-inch objective. The presence of starch will at once be detected and the nature determined by its salient features. Those not familiar with the microscopical appearance of starch granules will derive great assistance from the use of iodine solution, which will at once stain the granules with the characteristic blue violet coloration. More efficient service, however (since genuine pepper contains starch in very characteristic and minute granules) is rendered by the use of the micro-polariscope which shows the starch granules brilliantly white on the dark ground and marked with their several black crosses. When the analyst intends to avail himself of this method, he will find it desirable to moisten the pepper on the slide with either oil of cloves or thin Canada balsam or dammar, as the bi-refractive intensities of the starch granules are very considerably exalted by the use of these media. The approximate percentage of starch present may be obtained by separation of the starch from the pepper by the usual methods pursued in the preparation of starch. The mixture is well agitated in a test tube with plenty of water and allowed to rest a short time. The heaviest portions including nearly all the fragments of pepper will speedily subside. The water has now to be poured into another tube and the suspended starch allowed to subside. Comparison of the amounts of the two precipitates will give fairly accurate results, but each precipitate should be microscopically examined. It might be mentioned that this method much facilitates the diagnosis of the starches employed as adulterants. Any floating particles should be examined microscopically, as they will include fragments of the husks of the pepper and any cereals employed.

WHAT IS A SYNONYM?

BY A. F. HASELDEN, F.L.S.

Upon an occasion this was a question in the Preliminary Examination. How it was answered forms no part of this communication, but I have often thought how little as a matter of teaching the subject is brought to the notice of our students.

The Pharmacopœia abounds in synonyms: it is questionable whether they receive sufficient attention. It appears to me that the Pharmacopœia does not go back far enough in its synonyms, although when compared with former Pharmacopœias written in Latin it is decidedly in advance. In reading the prescriptions of young members of the professions of medicine and surgery the information may be sufficient; but is it equally so for those of older dates? Prescriptions of twenty, thirty, or even forty years ago are still dispensed either from the original or a copy in the prescription book. When the Pharmacopœia was written in Latin, translators like Phillips and Collier considered it one of the important features of the work to give the various names applied through many previous Pharmacopœias to the same article.

The British Pharmacopœia of 1867, as a rule, gives only in addition to the name used in the work that of the last edition of the London, Edinburgh, or Dublin Pharmacopœias. In the case of hydrargyri perchloridum, as also in hydrargyri subchloridum, the synonyms of 1864 are added, namely, for the former hydrargyrum corrosivum sublimatum, and for the latter, calomelas.

May it not be worth while, in the interest of those now studying, to draw attention to the matter of synonyms or former names and present names? Let me take one of the preparations of mercury of the B.P.—

Name—Hydrargyrum Ammoniatum.
Syn.—Hydrargyri Ammonio-Chloridum, London and Dublin.
Hydrargyri Præcipitatum Album, Edinburgh.

For this in Phillips's translation of the London Pharmacopœia I find—

Name—Hydrargyri Ammonio-Chloridum.
Syn.—Mercurius Præcipitatus Albus,
Calx Hydrargyri Alba,
Hydrargyrus Præcipitatus Albus,
Hydrargyrum Præcipitatum Album.

The most unusual and least likely to be known amongst these is the calx hydrargyri alba, at one time frequently so written and still met with in old prescriptions.

Hydrargyri oxidum or hydrargyri oxidum cinereum is not in the B.P.; it is seldom now prescribed, but was formerly in ointment. Since writing this a prescription has been presented in which hydrargyri oxidum cinereum is ordered, the prescriber upon a second thought writing underneath black oxide, evidently under the impression that it might not be understood.

Name—Hydrargyri Binoxidum.
Syn.—Mercurius Calcinatus,
Hydrargyrus Calcinatus,
Hydrargyri Oxidum Rubrum,

was omitted in the B.P. of 1867, but has since been placed among the additions as hydrargyri oxidum flavum. It is now prepared by precipitation, employing a solution of perchloride of mercury and solution of soda in place of a solution of bichloride of mercury (former name) and solution of potash.

Hydrargyri nitrico-oxidum is now hydrargyri oxidum rubrum.

These omissions, alterations, and re-admissions are perplexing to those well versed in the matter,—must they not be more so to those not far advanced in pharmaceutical study? and therefore, as it appears to me, it is not out of season but desirable that attention should occasionally be drawn to them.

If prescriptions were never written but in accordance with the nomenclature of the B.P. then it would be needless to study synonyms except for the understanding of prescriptions written before 1867; but even that would, I think, be a sufficient reason for becoming acquainted with them. But who can say that the nomenclature now in use shall not be put aside when the establishment of a Universal or International Pharmacopœia takes place? The millennium of a permanent pharmacopœial nomenclature is yet far distant. Given, that all chemists agreed as to the names of the chemical portions of the work, what shall I say of the galenical?

Take for instance the simple preparation confectio rosæ caninæ, how many pupils of three years' standing would recognize it in conserva cynosbati,—a name much in vogue not long since, to be seen in many a cough linctus form, and a name quite within the range of possibility to be used again? Some prescribers prefer unusual names, so that patients may not know exactly what they are taking. Again, take emplastrum cantharidis, formerly known as emplastrum vesicatorium, and emplastrum epispasticum, the last word being rejected to designate the emplastrum in the B.P., but taken up to christen the blistering liquid, liquor epispasticus. If I were to go into the articles of the vegetable Materia Medica, or those in demand in a general pharmaceutical business, such as is found in many parts of London and all parts of the provinces, the subject of synonyms might be continued to a very considerable extent, more especially if the common English names given to some of the American preparations or remedies be mentioned, *e.g.*, Podophyllum peltatum (common names,—may apple, hog apple, raccoon berry, wild lemon, and mandrake), or Leptandria Virginica (common names,—black root, culver's root, culver's physic), etc. Again, Hydrastis Canadensis (golden seal, yellow puccoon, ground raspberry, turmeric root), etc. But enough I feel has been stated to make the matter worthy of inquiry and study.

If it be true, as has been said, that there have been those who did not know that hydrargyri oxidum and hydrargyri oxidum cinereum were synonymous, and that antimonii potassio-tartras was sought for on the shelf of the dispensing counter when antimonium tartaratum was full in view; that magnesia, magnesia levis, magnesiæ carbonas, magnesiæ carbonas levis, condensed magnesia and condensed carbonate of magnesia are a puzzle to many; then surely no apology is necessary for introducing the subject. If such sayings be fallacious there can still be little or no harm in jogging the memory upon synonyms.

LEAD IN HAIR RESTORERS.

BY JOHN C. HUNTER, A.P.S.

Pharmacists have generally looked upon "hair restorers" with some suspicion, former analyses having shown them to be more or less charged with lead.

A gentleman in Glasgow, otherwise in good health, was seized with partial paralysis of the tongue rather suddenly. His medical adviser on questioning him found that he had been using for his hair, which was turning grey, a hair restorer, and on the bottle being produced it was seen to be one well known in the trade. On the label it was stated that the "restorer" was perfectly harmless, being free from lead and other injurious ingredients. The patient's symptoms indicated a stage of lead poisoning, and the label on the bottle did not satisfy his medical man as to the harmlessness of its contents. He therefore caused some of it to be sent to me in a bottle, for examination, to ascertain if there were any lead present, and, if so, in what quantity.

I found the contents of the bottle to consist of a clear fluid portion, and a grey-white precipitate. On filtering off the clear fluid, and applying the usual tests for the presence of lead, it was found to be present in the proportion of 2·75 grs. in the fluid ounce, existing in the form of acetate.

On examining the precipitate it was found to consist of ·5 gr. lead carbonate, and 2·8 grs. sulphur in each fluid ounce of the hair restorer; therefore the total amount of the two lead salts was equal to 3·25 grs. in each fluid ounce of it, notwithstanding the statement on the label that the "restorer" contained no lead or any other injurious ingredient.

BENZOATE OF LITHIUM.*

BY E. B. SHUTTLEWORTH.

This salt has been proposed as a remedy for certain disorders of the urinary organs, and appears to possess advantages over the forms in which lithium has heretofore been exhibited. The comparative insolubility of the

* From the *Canadian Pharmaceutical Journal.*

carbonate has always proved a bar to its general employment, and though the citrate is in this respect much more eligible—only twenty-five parts of water being required for solution—yet the salt is of an unstable and deliquescent character, and somewhat troublesome to prepare and dispense. The benzoate is not open to any of these objections, and has the additional advantage of containing, in combination, an acid which is itself of no inconsiderable repute in the treatment of patients suffering from various forms of urinary deposits.

This salt is not usually to be met with in commerce, but is not difficult to prepare. I am not, however, aware of any work of reference which contains any directions or formula for this purpose; and am, therefore, induced to believe that a few remarks on the subject may prove acceptable.

Benzoate of lithium may be most advantageously prepared from the carbonate—

$$\underset{74}{L_2CO_3} + \underset{244}{2\,HC_7H_5O_2} = \underset{256}{2\,LC_7H_5O_2}$$

In a wedgewood dish put one ounce, avoir., of carbonate, mixed with nine ounces of water. Heat gently by aid of a spirit lamp, and add gradually, and by small portions, benzoic acid until effervescence is no longer produced. About three and a quarter ounces will be required. Evaporate to dryness, stirring constantly, and reducing the heat towards the close of the operation. The product may, for convenience, be powdered. The yield will be nearly three and a half ounces.

By following this process a much less quantity of water and consequently less evaporation will be needed than if the benzoic acid be dissolved and the carbonate added thereto. If, by reason of impurity or discoloration of the benzoic acid, it is necessary to filter the solution, three ounces more water may be added before evaporation; and, if required, a little purified animal charcoal may be used. The benzoate may be obtained in crystals by withdrawing the heat and setting the solution aside immediately after the benzoic acid is all added.

Watts* says the lithium salt of benzoic acid is uncrystallizable. This is incorrect; the benzoate may be crystallized without the slightest difficulty. It takes the form of glistening, pearly scales, or laminæ, somewhat resembling iodide of cadmium, but less lustrous. The crystals feel soapy or greasy to the touch; have a cool, sweetish, and not disagreeable taste, and are perfectly permanent in the air. The solution has an acid reaction.

I have found the salt to be soluble in three and a half parts of water at 60° F.; in two and a half parts at 212° F.; and in ten parts of cold alcohol, sp. gr. 838.

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.†

BY J. BURDON SANDERSON, M.D., V.P.R.S.,

Jodrell Professor of Physiology in University College, etc.

LECTURE I.

(*Concluded from page* 666.)

INFLUENCE OF BACTERIAL VEGETATION ON THE PROCESS OF PUTREFACTION.

In referring to Cohn's classification of the organisms which constitute the group of Schizomycetes according to their form, I stated that this classification was chiefly of value for the purposes of description, and that the exact similarity of any two forms cannot here be taken as evidence of their organic continuity any more than their dissimilarity affords indication of the absence of intimate relation between them; for the influence of environment over organisms such as bacteria is so great, that it seems as if it were paramount; the surrounding conditions claiming a power not merely of moulding the organism into conformity with themselves, but even of originating it.

For reasons on which it is unnecessary to enter here, we do not admit the latter part of this claim; but it is a principle of fundamental importance in dealing with the question we have now before us—that of the agency of bacteria in septic processes—that the influence of circumstance over form is practically so powerful, that, in considering the relation of bacteria to septic processes, we shall do best if we regard the appearance of particular forms as mere links in the chain of events of which the process consists.

To illustrate this, it will not be waste of time to refer for a moment to the singular fact discovered a short time ago by Professor Cohn, that, under conditions as yet quite unknown, colouring matters come into existence in albuminous liquids when left to themselves at ordinary temperatures; and that this development of pigment is associated with the development of bacteria. Not long ago, having left a "solution" of ordinary egg-albumen in a cupboard in the laboratory, I found that the liquid, which had no putrid odour, possessed an intense indigo blue colour. Being acquainted with Cohn's observations, I at once guessed what had happened, and found on microscopical examination, that the blue scum on the surface of the liquid consisted, first, of colourless bacteria, resembling in form those met with in septic liquids; and, secondly, of blue pigment particles of extreme minuteness, which appeared to be imbedded in the interstitial gelatinous material by which the organisms were surrounded. The process continued for some time, but eventually the liquid was inadvertently allowed to dry. On inoculating a similar albuminous liquid with the dried residue, I was unsuccessful in reproducing the process; but Cohn, who came upon several of his colour-producing bacteria in a similar accidental way, was able to perpetuate the process by repeated transmissions.*

I mention this observation merely to illustrate what I have been saying as to the relation between the two collateral processes—between the vegetation process on the one hand, and that of the formation of a characteristic chemical product on the other. Here we have no sufficient reason for saying either that the production of colour is the cause of the development of bacteria, or that the bacteria are the agents in the production of the pigment. All that we observe is, that the two phenomena begin, continue, and end together; we regard them, therefore, as collateral characteristics of one and the same process.

As the result of innumerable observations, we know that, as a rule, those changes in albuminous liquids, which we familiarly recognize as constituting putrefaction, are accompanied by the presence in such liquids of characteristic vegetable organisms. We also know that the two processes—viz., the chemical changes and the rapid vegetation go on *pari passû*, and that the same circumstances which favour the growth and multiplication of organic forms also favour putrefaction.

As to the meaning of these facts, there is some difference of opinion even among competent naturalists. All are agreed that the relation between the chemical process and the vegetative process is an intimate one; but somewhat discrepant views prevail as to its nature.

The fundamental experiment by which the intimacy of the association is proved is this. When a tube or flask is partly filled with water containing albuminous matter in solution or suspension, and subsequently boiled for a sufficient length of time, and closed hermetically during ebullition, no putrefaction occurs under any circumstances; but if, after such a tube has been heated and allowed to cool, a drop of distilled water, or any other exposed liquid, be added before the tube is again sealed, putrefaction follows, provided that the preparation is kept at the ordinary temperature.

As I have already hinted, there are some naturalists who would not agree to the terms in which I have stated

* 'Dict. of Chem.,' p. 552.

† Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal*.

* Cohn, *loc. cit.*, p. 180.

this result. They would rather substitute for the words "under any circumstances" some such expression as "in 9,999 cases out of 10,000." For our present purpose, it makes little difference whether the statement be accepted absolutely or not. But there is another point relating to the origin of bacteria in albuminous liquids of much greater importance, which the discussion about abiogenesis is apt to conceal, or throw unduly into the background. It is a question which arises directly out of the results of the "cultivation" experiments to which I have just referred. These experiments show that bacteria are able to derive the whole of the carbon they require for the building up of their protoplasm from compounds of great chemical simplicity, which have never formed part of any living organism, and seek for no higher source of nitrogen than ammonia. This being the case, it is more than probable that, when the growth of bacteria goes on in association with septic processes, they derive their nitrogen and carbon, not from the albuminous compounds themselves, but from the ultimate products of their disintegration. This being the case, we must regard bacterial life (in so far as it consists in the building up of new protoplasm) as a process consequent on the chemical process of putrefaction with which it is associated. For disintegration must already have proceeded as far as to the production of ammonia—in a word, must have proceeded to the last stage—before the new integration could commence.

While admitting this, it is important clearly to see that the admission does not in any way render it more or less probable that bacteria are the efficient causes of putrefaction—that without which putrefaction could not take place—for there is nothing which forbids us to regard bacterial vegetation as connected (if I may so express myself) with both ends of the chemical process of disintegration of putrescible material at the same time; not the shadow of an objection to the assumption that, on the one hand, bacteria derive material for the integration of their protoplasm from the products of *dis*integration of the soil in which they flourish, and on the other, that they produce the ferment by which disintegration is determined. There is nothing, in short, against their standing to the chemical process at the same time in the relation of antecedent and consequent.

If it should seem to you that this is a too vague way of dealing with the subject, I would ask you to consider that the question is one in respect of which caution is more than usually necessary; for, while theoretical explanations offer themselves freely on every side, experimental investigation is beset with peculiar difficulties. As regards the main question, that of the agency of bacteria in producing putrefaction, there are two extreme views, which are both clearly mistaken—the one which asserts that they have nothing to do with the septic process; the other, that the chemical phenomena of putrefaction are the mere accidents of a peculiar kind of vegetation. The truth lies without doubt between these two opposed theories; but it is not to be got at by an ingenious reconciliation of the one with the other, but by honestly opening the minds to the facts as they stand, in the confidence that, if they are allowed fair play, they will eventually shape themselves into a general conception, in accordance with their true relation. So long as uncertainty exists, there is nothing to be so much avoided as that sort of clearness which consists in concealing difficulties and overlooking ambiguities.

[Since this lecture was delivered, an important contribution to the elucidation of this question has been made by Dr. Hiller of Berlin (*'Der Antheil der Bacterien am Fäulnissprocess,' Centralblatt*, No. 54, Nov. 14th, 1874). Starting from the fact observed by himself (to the accuracy of which I can testify from my own observation) that, in the "alkaline fermentation" of urine, the splitting of urea into ammonic carbonate is not in relation with the abundant development of septic bacteria in the liquid, he made experiments which showed that in urine, bacteria do not derive their nitrogen from urea, but from other sources; and that, if ammonic tartrate be added to urine the multiplication of bacteria goes on with great activity, without any diminution of its acid reaction, *i.e.*, without any decomposition of its urea. From this result, he proceeds to similar experiments as to the influence of bacteria on egg-albumen. Having first ascertained, by careful observations, the fact familiar to the housewife that fresh eggs "turn" when put into the same basket with rotten ones, and can therefore be infected through the air, he injects a "cultivation liquid," containing bacteria, but not putrid, into the albumen of a fresh egg, with the aid of a subcutaneous syringe. The egg remains unaltered. He therefore thinks it impossible to identify multiplying bacteria with the "septic ferment"; with reference to which he thinks that the experimental investigations of the last few years have proved nothing more than "it is a particulate substance which either exists suspended in the air, or adheres to objects, and that it can be separated from the air by filtration, and can be destroyed by the temperature of ebullition." With this final statement of the case I perfectly agree, and am not at all disposed to quarrel with him because he goes on to suggest that the "particles" of which the septic ferment consists are not living beings, but *Protëinsplitterchen.*]

THE CARBONYLS, AND THE TRUE FUNCTION OF ORDINARY CAMPHOR.*

BY M. BERTHELOT.

The author proposes to institute as a new class of organic compounds, a subdivision having the general function of aldehydes, to which he proposes to give the name of carbonyls. It comprehends at present three well defined bodies, of which it systematizes the reactions. These are—ordinary camphor; oxide of allylene, or dimethylene carbonyl, discovered by the author a few years since; and the diphenylene carbonyl, obtained by the oxidation of fluorene, and designated under the name of diphenylenacetone by Fittig and Ostermayer.

Oxide of Allylene or Dimethylene Carbonyl† .	$C_6H_4O_2$ or $(C_2H_2,\ C_2H_2)\ C_2O_2$
Diphenylene Carbonyl .	$C_{26}H_8O_2$ or $(C_{12}H_4, C_{12}H_4)C_2O_2$
Camphor, or Terebutylene Carbonyl . . .	$C_{20}H_{16}O_2\ (C_{10}H_8,\ C_8H_8)\ C_2O_2$

Suberone ($C_{14}H_{12}O_2$), the author thinks, probably has a similar constitution.

These bodies, he considers, may be regarded as the types of homologous series, and of a great number of other compounds possessing the same characteristic reactions, which he describes as follows:—

(1) The carbonyls can fix hydrogen and become changed into alcohols; reciprocally the alcohols so engendered reproduce carbonyls by the loss of hydrogen.

$C_6H_4O_2 + H_2 = C_6H_4(H_2O_2)$ . . Hydrate of Allylene.
$C_{20}H_{16}O_2 + H_2 = C_{20}H_{16}(H_2O_2)$. Campholic Alcohol.

This general reaction is that which has been proposed by the author to characterize the aldehyde function; it includes the true or primary aldehydes, the secondary aldehydes or acetones, and the aldehydes having a mixed function, such as the quinones.

(2) Carbonyls can be formed directly or indirectly by the substitution of equal equivalents of oxygen for hydrogen in incomplete carbides:—

$C_{2n}H_{2(n-p)}H_2(-)$ forms	$C_2H_{2(n+p)}O_2(-)$
Propylene, $C_6H_4,H_2(-)$ forms thus .	$C_6H_4O_2(-)$
Hydride of Camphine, $C_{20}H_{16},H_2(-)$ forms	$C_{20}H_{16}O_2(-)$
Fluorene, $C_{26}H_8,H_2(-)$ forms . . .	$C_{26}H_8O_2(-)$

They can also be formed directly by oxidizing with chromic acid the still more incomplete carbides which are derived from the foregoing by loss of hydrogen.

Allylene, $C_6H_4+O_2$, forms	$C_6H_4O_2$
Camphine, $C_{20}H_{16}+O_2$, forms	$C_{20}H_{16}O_2$

* *Journal de Pharmacie et de Chimie* [4], xxi., 81.
† C = 6; O = 8.

These two modes of synthetic formation are analogous to those which are observed in the study of the aldehydes properly so-called and the secondary aldehydes or acetones. In fact, by direct oxidation by means of pure chromic acid the author has found that—

Ethylene, $C_4H_4 + O_2$, forms $C_4H_4O_2$: Ethylic Aldehyde.
Propylene, $C_6H_6 + O_2$, forms $C_6H_6O_2$: Acetone (and Propyl Aldehyde at the same time).

On the other hand, by indirect oxidation—

Hydride of Ethylene, $C_4H_4(H_2)$ forms . $C_4H_4(O_2)$.
Hydride of Propylene, $C_6H_6(H_2)$ forms . $C_6H_6(O_2)$.

But the carbides which engender the aldehydes proper and the acetones, by this latter substitution, are saturated compounds, whilst the carbides that engender similarly the carbonyls, are incomplete: this is an essential difference, which leads to important consequences in their reactions. The carbonyls, in fact, are themselves incomplete bodies, and that independently of their aldehyde function. Besides their aptitude to change into alcohols by hydrogenation, like aldehydes in general, the carbonyls present the special character of fixing by addition the elements of water, and, in principle, all other simple or compound bodies occupying the same gaseous volume.

(3) It is thus that the fixation of the elements of water changes the carbonyls into monobasic acids; it is similar to the fixation of water upon carbonic oxide by which formic acid is formed, and is effected in the same manner by the aid of alkalies.

C_2O_2 [–] + $H_2O_2 = C_2H_2O_4$. Formic Acid.
$C_{20}H_{16}O_2$ [–] + $H_2O_2 = C_{20}H_{18}O_4$. Campholic Acid.
$C_{26}H_8O_2$ [–] + $H_2O_2 = C_{26}H_{10}O_4$. Diphenyl Formic Acid.
$C_6H_4O_2$ [–] + $H_2O_2 = C_6H_6O_4$. Propionic Acid.

(4) In virtue of the same incomplete character, the carbonyls can be changed into bibasic acids by the fixation of 6 equivalents of oxygen:—

$C_{20}H_{16}O_2$ [–] + $O_6 = C_{20}H_{16}O_4,O_4$. Camphoric acid.
$C_6H_4O_2$ [–] + $O_6 = C_6H_4O_4,O_4$. Malonic acid.

This fixation may be interpreted in two ways; either that the camphor fixes at first O_2, in the manner of ordinary aldehyde, which becomes acetic acid, and that the incomplete character of the camphor would render it able to fix O_4 additional; or that the camphor tends to form at the first the two acids $C_2H_2O_4 + C_{18}H_{14}O_4$, according to the type of the oxidation of acetone, which gives rise to $C_2H_2O_4 + C_4H_4O_4$. But the two acids derived from camphor would combine together in the nascent state in consequence of the incomplete character of one of them.

(5) Carbonyls can be formed analytically by means of a single molecule of a bibasic acid, by loss of water and carbonic acid. This mode of formation recalls the acetones; but they are derived from two distinct molecules of monobasic acid which assigns to them a very different constitution, especially in view of the incomplete character of the carbonyls.

The author claims that the theory put forth by him is based upon the relations of facts, independent of all hypotheses respecting the internal constitution of carbides, aldehydes, or acids; but that it is easy to connect it with what is known of the formation of carbides themselves, without need of having recourse to radicals or even a particular symbolism.

All the carbides can be derived from formene by the successive union of that carbide to a first molecule of formene with separation of a volume of hydrogen equal or superior to that of the formene which enters into combination. The aldehydes (aldehydes proper, acetones, and carbonyls) result from the substitution of equal equivalents of oxygen for hydrogen in the carbides. It may be admitted that the aldehydes result from the oxidation of a certain molecule of formene; but their properties should vary according to the number and nature of the reactions previously accomplished upon the molecule of formene which gives them birth.

The author hopes that the institution of the class of carbonyls will put an end to controversy respecting the real function of camphor. He thus recalls the history of this question. In 1840 Pelouze discovered that ordinary camphor could be obtained by oxidizing Borneo camphor; but he took care to declare expressly that he refused to accept either the theory that looks on Borneo camphor as an alcohol or that which regards it as a hydride of camphor; the relation between the two bodies, in his opinion, not being closer than that which exists between oxalic acid and the organic matters which yield oxalic acid when treated with nitric acid. In 1859 the author, during his researches upon saccharine principles and etherification, discovered by direct synthesis the combination of Borneo camphor with acids, and demonstrated that it fulfilled the function of an alcohol. Hence it became probable that in respect to it ordinary camphor played the part of an aldehyde, and he succeeded in effecting the synthesis of Borneo camphor by the hydrogenation of ordinary camphor, and ascertained that a camphor isomeric with ordinary camphor could be obtained by oxidizing crystallized camphine.

The author, however, distinguishes camphor from the aldehydes, properly so called, by the fact that its direct oxidation does not furnish a monobasic acid, comparable to acetic acid; and from the acetones by its oxidation yielding a single bibasic acid, without breaking up into two distinct acids, comparable to the two derived from acetones. The aptitude of camphor to fix the elements of water and become converted into a monobasic acid, also differs from the properties of acetones. So long as camphor appeared to stand alone the author hesitated to make it the type of a new class of compounds; but since the discovery of new bodies possessing analogous reactions has cleared up apparent anomalies, he considers himself justified in establishing a new class of aldehydes, which he proposes to call carbonyls.

NORWICH CHEMISTS' ASSOCIATION.

Some four years since, the chemists' assistants and apprentices in Norwich formed an association for the purpose of aiding them in the acquisition of the necessary technical knowledge to enable them to pass the Minor and Major examinations of their profession. Classes were instituted and much good resulted from them. Last year a more comprehensive character was given to the Association by the admission of principals to full membership, and by its re-construction under the above title. It has received a grant from the Pharmaceutical Society of Great Britain, and, besides placing at the service of the members a library and museum, it offers the advantages to be derived from class studies, under competent teachers, of chemistry, botany, and materia medica. All that is required is increased support to enable it fully to accomplish the object for which it is established. One of the principal founders of the Association, and its late president, Mr. Nuthall (assistant to Mr. F. Sutton), being about to leave Norwich, having taken a business in the county, the members, in his honour as well as for the good of the society, instead of a private annual dinner among themselves, gave a semi-public dinner at their rooms in Duke's Palace, on Thursday evening, February 18, which was exceedingly well attended, covers being laid for fifty gentlemen. The chair was occupied by Mr. Corder, the president. Mr. W. K. Cooke (vice-president) filled the vice-chair. After the usual loyal and patriotic toasts,

The President said he had great pleasure in proposing the health of his friend Mr. Nuthall, and only regretted that this was the first, and he was afraid might be the last, time he should have that pleasure. Mr. Nuthall had been amongst them for many years, and, so far as that association was concerned, there was no man who had done so much, so well, and so heartily, for it; and if any one had not passed his examination, or acquitted himself so well as he should have done, the fault did not rest with Mr. Nuthall. In leaving them, the members would, he was sure, wish him every success in his undertaking, with health and prosperity.

Mr. Nuthall said what he had done for the society had been a pleasure to him, and he only regretted that recently it had not met with more support from that class for whom it was particularly intended—the apprentices. Since the Association had been in existence he had always met with every assistance from the employers who were members, and also from the more advanced of the students who had succeeded in passing their examinations; but when he turned to what should be the apprentices' class he found a coldness difficult to account for, but which he hoped that meeting would do something towards breaking down. He hoped that the employers present would endeavour to create among their apprentices and assistants a greater warmth in pharmaceutical study and education, and also direct their attention to this society as a means of acquiring the same. One of the things that caused him much regret in leaving Norwich was the breaking of his connection with this society. He had been associated with most of the members, either on committee or as a teacher, for four years, and he assured them it was with the deepest regret that his connection with them would now be severed. But wherever he should be the Association would have his best wishes, and he hoped at times to be able to come amongst them.

Mr. Pitts, in giving "Prosperity to the Pharmaceutical Society of England," spoke of the giant strides that Society had made in the country, and the advantages now enjoyed by young men compared with those of thirty or forty years ago, when the hours of business were much longer. He hoped these advantages would be turned to the best account, and that the chemists of the next generation would make better men than those of the present and the past. With the toast he coupled the health of Mr. Cubitt, the first Local Secretary to the Pharmaceutical Society.

Mr. Cubitt responded. He said that sixty years had passed since he made his commencement in business, and although he should himself never be a partaker of the benefits of the Pharmaceutical Society, he could see plainly and clearly that it would be a great boon to those who availed themselves of it. He called attention to the advantages now enjoyed by chemists' apprentices and assistants compared with the state of things years ago, and dwelt upon the importance of pupils acquiring in addition to a mechanical knowledge of their business an accurate knowledge of accounts, which at present many of them were unacquainted with, thus falling into difficulties which otherwise they might steer clear of.

Dr. Pitt, in acknowledging the toast of "The Medical Profession," said he believed the medical profession had always been on very good terms with this society and with all chemists. From his own knowledge he was able to say that chemists had been a great assistance to medicine, and he believed he might add that medicine had been a great assistance to them. As secretary to the British Medical Association at its meeting in Norwich, he had the greatest pleasure in affording them a good opportunity of exhibiting their specimens in chemistry and materia medica, and it was a source of pride to the medical profession to have such an exhibition in connection with that society. As a body, he believed there existed great unanimity of feeling both among medical men and chemists, and without that kindness of feeling they would not be able to get on as they did.

Dr. Beverley endorsed what Dr. Pitt had said, more especially with regard to what he trusted would always be an intimate connection between the calling of the chemist and the doctor; because for the good working of either there must always be unanimity of feeling between the medical profession and that of the pharmaceutical chemists. He was glad to find that in both professions alike they were advancing with rapid strides. At one time, many years ago, any man could practise the profession of a surgeon, or even of a physician, without passing an examination, and the same unsatisfactory state of things existed with regard to chemists; but now, he was glad to say, no one could deal in drugs without having his knowledge tested by a practical examination. The members of both professions were servants of the public, and the public had a right to expect from them that knowledge which could only be secured by practical examinations. Dr. Beverley having expressed his satisfaction at learning from the President that the pharmaceutical examination was a very practical one indeed, proceeded to express his concurrence with what fell from Mr. Nuthall as to the very few members attending the classes in this room. He regretted this, because he had seen the table covered with some very beautiful specimens, and had listened with great interest to one gentleman dissecting plants and teaching a botanical class as carefully and accurately as he (Dr. Beverley) was taught himself; and it was a pity that the medical students of Norwich were not present to hear him. In conclusion, he hoped with this inauguration dinner the Association would enter upon a more satisfactory state of things, and that, although they were losing the valuable assistance of Mr. Nuthall, they would, one and all, put their shoulders to the wheel and carry on the Association with more vigour than hitherto.

Mr. Thompson proposed "The Health of the President of the Association and one of the Examiners of the Pharmaceutical Society." Mr. Thompson, in the course of some practical observations, urged upon apprentices the importance of not deferring their studies till they were assistants.

The President (Mr. Corder) acknowledged the compliment. He said that since he had been on the Board of Examiners, in London, the young men who had come up from Norwich, who had studied in this Association, had all, with one exception, passed the examination. This showed the use of these associations, if only they were properly attended. Young men who came up from these associations were better prepared than those who studied in London, and it only stood to reason that three months "cram" in London could not possibly make up for four years wasted in the country. Not only was it important to the profession of pharmaceutical chemistry that the examinations should be passed, but the medical profession and the public expected that the chemists and druggists of the present day would advance as every other profession was advancing. Our chemists and druggists were far below those of the continent, for in France, Germany, and Italy the examinations were much more stringent, and it was impossible for a man to enter the business unless he passed those examinations. He trusted this Association would not die out, but would have more vigour as time went on, and that young men who wished to take a position in business would see that study must be made, and that they must not blame the Pharmaceutical Society or the examiners if they did not pass the examinations, which were well and properly conducted. He (the President) much regretted that their Local Secretary, Mr. F. Sutton, was unable to be present. His absence was not owing to any lack of sympathy, but to his having been unexpectedly called away that day to attend a council meeting of public analysts.

After the health of the Vice-President had been drunk, Mr. Woodhouse proposed "The Norwich Chemists' Association.

Mr. Butler, the treasurer, in returning thanks, spoke upon the numerical and financial condition of the Association; both of which, he said, required improvement. The subscription was only 10*s*. a year, and although there was a balance in hand the state of the funds would have been different but for their science and art classes in connection with South Kensington. As the President had said, those who had gone up from the Association to London had been successful with one exception, and some of them had obtained honours. He suggested whether it would not be possible to extend the Association to the county and thus make it "The Norfolk and Norwich Chemists' Society."

Mr. T. Pitts (the secretary) also acknowledged the toast. Several other toasts were subsequently drunk.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 27, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PROSPECTS OF PHARMACY IN IRELAND.

AT the moment of going to press, we learn that, in addition to the Bill which Sir MICHAEL HICKS BEACH has announced that it is the intention of the Government to bring in during the present session with the object of regulating the practice of Pharmacy in Ireland, there is a probability that at least another Bill on the same subject will be introduced into Parliament. According to a communication we have just received from Dublin, a deputation from the Society of Chemists and Druggists of Ireland has recently waited on Sir DOMINIC CORRIGAN, in reference to the subject of pharmaceutical legislation for Ireland, and a special meeting of the Society was held last Tuesday evening for the purpose of receiving a report from the deputation. The President, Mr. E. M. HODGSON, said that the deputation was cordially received by Sir DOMINIC, and that the matter in question w[illegible] [illegible]lly discussed. The opinion of Sir DOMINIC was that the subject would be taken up in the present Parliament, and so far it is in accordance with the announcement that appeared last week in our paper,* as well as in most of the daily and weekly papers. Sir DOMINIC also expressed the opinion that if the ranks of pharmacists in Ireland were to be augmented, it must be from the body of chemists and druggists. In this respect, also, we are happy to find that the views we have from time to time put forward on the subject of Irish pharmacy are in accordance with those of Sir DOMINIC CORRIGAN.

According to our judgment nothing can be more appropriate or more consistent with the spirit of the age than the severance of pharmaceutical from medical duties as well in Ireland as in this country. We believe that this opinion will be generally shared not only by those who think on what is good for the interests of pharmacy, but that it would also be admitted as correct by those who are still subject to the trammels of habitual usage which had led their practice in the opposite direction before they had opportunity of considering both sides of the question, provided they would give due attention to the matter. The realization of this object will, however, be a work of time; but it may be materially facilitated by legislative action, and we still hope that it will receive that aid.

* See *Pharm. Journ., ante,* p. 67

We have always held, moreover, that it would be highly conducive to the interests of the public at large, as well as of pharmaceutical practice, if the obsolete *régime* of the Apothecaries' Hall of Ireland, in regard to pharmacy, were superseded, and if the competently qualified chemists and druggists of the sister country were permitted to perform the functions they are well able to perform, in dispensing medicines with advantage to themselves no less than with convenience to the public. The dearth of provision for the requirements of the public in this respect seems unquestionable, for it is unequivocally admitted by all parties, and we see no other means of providing for the deficiency than the removal of those disabilities which now prevent the educated chemist and druggist from doing the work he is well able to do.

Sir DOMINIC CORRIGAN seems to hold similar opinions, and consistently enough he recommended the Society of Chemists and Druggists in Ireland to draw up a Bill and ask the Government to introduce it. Nothing could be more fitting than that those who suffer under the legal disqualification for practically carrying out the main part of their business should undertake the task of drafting a measure by which they should be relieved from this unjust restriction. We heartily concur with Sir DOMINIC's further recommendation that Irish pharmacists should act independently in this matter by establishing an independent Irish Pharmaceutical Society or College of Pharmacy, complementary to the existing Colleges of Physicians and Surgeons, and we have nothing to urge against the opinion he expressed that Irel should have its own Pharmaceutical Society.

In the endeavour to attain this object Irish Pharmacists would have the advantage of the example that has been set by their brethren in Great Britain; we have every desire to see them soon actively at work in this direction, and we wish them all success in their labours.

As a first step we may record that at the meeting last Tuesday in Dublin, a resolution was passed on the motion of Professor TICHBORNE, seconded by Mr. STANLEY OLDHAM, that Messrs. E. M. HODGSON, Professor TICHBORNE, WM. HAYES, J. GOODWIN, W. ALLEN, A. DORAN, STANLEY OLDHAM, and R. SIMPSON, should form a Committee to frame a Bill and submit it to Sir DOMINIC CORRIGAN for his opinion and advice.

THE ADULTERATION BILL.

THERE can be little doubt if the Bill now before the House of Commons should become law without much alteration, that it will be effectual in repealing the existing Act, and will not leave much room for complaint on the part of the retail dealer. But whether it would in the same degree provide better for the sale of food and drugs in a pure state does not seem so evident. To judge from the speeches of some honourable Members last Friday, it would seem that there will be considerable opposition to the Bill in Committee, and we look forward with interest to the discussion of its several clauses. We trust, however, that legislation on a subject of so much importance to the general public and to traders may not be influenced by such out-of-date statements as were put forward in the discussion last Friday. We refer more especially to Dr. PLAYFAIR'S remarks as to the practice of drug-grinding which have called forth repudiations from several wholesale druggists and drug-grinders. We are surprised that Dr. PLAYFAIR'S usual shrewdness and caution should have been got the better of by a mere piece of antiquarian scandal, which we have every reason to believe has long ceased to have any application, thanks to the improved system of education that has been introduced during the last twenty years. We are, however, glad to note that Dr. PLAYFAIR endorsed Mr. PELL'S objections to the ridiculous fees proposed to be paid to analysts. As a distinguished chemist, no less than as a Member of Parliament, he had a special right to speak dogmatically on this point, and, in doing so, he honourably acquitted himself of a duty he owed to the followers of a profession to which he has himself belonged. If the public good requires the services of chemists as analysts, the remuneration of such services should be sufficiently ample to ensure competent skill and due care on the part of the analyst, so that while the public is well protected the trader shall not be unduly prejudiced.

IMPORTANT LEGISLATION RESPECTING PHARMACY IN CANADA.

RECENT advices from the Dominion show that there is a probability of pharmacy in Upper and Lower Canada soon being regulated and protected by legislation equal in stringency to that existing on the subject in any part of the world. In the province of Ontario, pharmacy is at present regulated by an Act, passed in 1871, an abstract of which has been given in this Journal.* This Act having been found defective, an attempt was made during the last session of the Ontario Legislature to modify some of its provisions, but without success, principally in consequence of the opposition of the medical profession to a proposition to repeal that section of the present Act which gives to the members of the College of Physicians and Surgeons the right to carry on the business of a chemist and druggist without registration. The Bill is, however, to be brought forward again, and it is hoped that the misunderstanding which gave rise to this opposition will be removed.

Another important feature of the proposed Bill is, that it renders compulsory the passing of an examination and connection with the Ontario College of Pharmacy previous to entering the respective stages of "apprentice," "assistant," and "pharmaceutical chemist." The "apprentice," before the term of his indenture commences, is to produce to the Registrar a certificate showing that he has attained a creditable degree of proficiency in the subjects of examination for admission of pupils to high schools or collegiate institutes, or else he must pass a "Preliminary" examination settled by the Ontario College. Further, he is to pay annually the sum of one dollar to the Registrar, which is to entitle him to receive the Journal and Proceedings of the College. Before entering on the duties of an "assistant," the "apprentice" is to present satisfactory evidence of his having served a term of three years' apprenticeship, and to pass a "Minor" examination, for which he is to pay a fee of four dollars. He will then be entitled to registration as an "Associate" of the College, and be considered qualified to dispense the prescriptions of legally qualified practitioners conditionally upon his paying annually the sum of two dollars to the Registrar. An "Associate" desirous of being registered as a Member of the College, or of commencing business as a "pharmaceutical chemist" (the only class entitled under the present Act to carry on the business), must pass a "Major" examination, for which he is to pay a fee of four dollars, and is to pay a further fee of four dollars annually as long as he carries on the business of a pharmaceutical chemist. The right to registration of persons engaged in the capacity of apprentices or assistants at the time of the passing of the Act is provided for, and, after a certain date it is to be unlawful for any person carrying on the business of a chemist and druggist to employ in such business an apprentice or assistant who has not been registered under the Act.

A clause specially interesting to British pharmacists enacts that persons holding the diploma of the Pharmaceutical Society of Great Britain, the Pharmaceutical Association of Quebec, or the Philadelphia College of Pharmacy, and all persons registered under the Pharmacy Act of Great Britain, 1868, are to be entitled to registration as members of the Ontario College of Pharmacy without undergoing examination.

In the province of Quebec, the regulation of pharmacy has been for some time in a very unsatisfactory state, in consequence of it having been vested in the hands of the College of Physicians and Surgeons, and the opposition by the College to fresh legislation on the subject. According to the *Canadian Pharmaceutical Journal*,* however, a hastily drafted Bill, based upon the Ontario Act, and embodying the above amendments, has recently been passed rapidly through the Legislature and become law. The three grades in Quebec are to be termed "apprentices," "certified clerks," and "licentiates in pharmacy."

* See vol. i., pp. 752 and 772.

* See vol. i. (1870), p. 21.

THE SCHOOL OF PHARMACY.

THE courses of lectures on chemistry and pharmacy, and materia medica and botany, in connection with the Pharmaceutical Society's School of Pharmacy, Bloomsbury Square, will recommence on Monday, March 1st. Students who have but a limited time at their disposal would find the ensuing five months to be a very favourable time for studying at the School; for between the 1st of March and the 31st of July, they would have the opportunity of not only attending in the laboratory, and at the usual courses of chemistry and pharmacy, and botany and materia medica, but also the summer course of systematic and practical botany, at the Royal Botanic Society's Gardens, in Regent's Park.

AT the meeting of the Committee of the Chemists' Ball, held on Monday last, it was decided to hand over to the Benevolent Fund of the Pharmaceutical Society the sum of Twenty Guineas.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

On Wednesday evening, the 17th inst., a *soirée* was given by the Council of this Association to the members, in the Rooms, Music Hall, Surrey Street. The President, Mr. G. A. Cubley, in the chair. After the covers had been removed, "The Queen" was given by the chair, and duly honoured.

The President in announcing that the annual meeting would then be held, said that he could not congratulate the Association on the progress it had made during his year of office, but from the meeting that night and the support lately offered to them, he had no doubt that under the rule of his successor their affairs would take a brighter turn. It was especially necessary that they should be a united body, so that they might defend the interests of the trade, and again take up the question of education at a favourable opportunity.

The Honorary Secretary, Mr. E. R. Learoyd, read the report for the past year, which was of a somewhat discouraging character, showing an apparent decreasing of interest exhibited by the young men in attending the classes formed under the auspices of the Association, but a hope was held out that a want may arise which will result in the formation of regular classes and scholarships.

The Treasurer having given a statement of accounts for the past year, it was proposed by the Chairman and seconded by Mr. W. V. Radley, that Mr. H. W. Maleham should be President for the ensuing year. This was unanimously carried.

The President elect, having taken the chair, gave the following address to the members present:—

"Gentlemen,—The honour you have been pleased to confer upon me by electing me as your president is another proof of the confidence you have invariably placed in those who since the foundation of this Association have strenuously endeavoured to promote its welfare and prosperity, and through its operations benefit the trade generally in this town and district. It is, however, with very mingled feelings that I accept such a responsibility, and I feel sure in giving me your votes this evening, you deeply sympathize with me in thus being placed in the unfortunate and unenviable position of president of an Association neglected and maligned by those who ought to feel most interested in its welfare, and its very existence in such jeopardy as to cause the Council gravely to consider whether the Society should cease to exist, or another effort be made to fan the flickering flame into increased vitality.

"I am not prepared to give you an elaborate inaugural address; inability and the state of the Association will not permit of it, but I would take this opportunity to appeal earnestly to those who by their apathy have reduced the Association to its present position. Possessed of an able and devoted Council, a hard-working and zealous Secretary, and every appliance for the successful working of an institution like this, we only want the sympathy, personal co-operation, and pecuniary assistance of every principal and every assistant and apprentice in this town to render the Sheffield Pharmaceutical and Chemical Association second to none in the kingdom. It was formed at a time when legislation closely affecting our interests, both beneficially and otherwise, was rife, rendering it highly important that as provincial chemists we should raise our powerful voice against oppressive measures, and assist by our support the successful carrying out of those most conducive to the preservation of our rights and interests, and the elevation of our body to a higher standard. This Association was therefore formed, as were many others throughout the country, for this object, to promote education and conduce to mutual goodwill. I am happy to say we *have* done good, we *have* made our voice heard, notwithstanding those who have decried our usefulness and held themselves aloof from us. We have spent much time and money in supplying our apprentices and assistants with means, in the nature of library, lectures, and classes, for preparing for those examinations which are the tests of their fitness to take upon themselves the responsibilities of masters of establishments, and though it has pained us to see these opportunities disregarded and neglected in a great degree, I feel sure I am speaking the sentiments of my brethren of the Council as well as my own, in saying that the time and money has not entirely been thrown away, and that there are young men in this town and neighbourhood who would gladly testify to the advantages they have derived from this Association. I am not at all disposed to lay the entire blame upon the young men themselves. If masters have been blind to the benefits and privileges of an organization like ours, and by their absence from our meetings and deliberations shown little encouragement to those in their employ, it cannot be surprising the latter should be careless and indifferent. By the gradual withdrawal of subscriptions, as the reports from year to year have testified, they have withheld from us the means of cheapening the price of education, which in this town is very costly, to those who are disposed to do their utmost to deserve and appreciate it. Unquestionably the gauge of prosperity must be looked for in the subscriptions and fees, and as I have already stated, under this head there has been a great falling off. Why is this? We issue annual reports that I fear are more frequently thrown into the waste paper basket than read, or it could not be so frequently thrown into our teeth,—What are you doing for us? My answer has always been, Read the report, and come and see for yourselves. We are charged with not taking measures to prevent unqualified men from selling poisons and dispensing drugs. Our answer to this is, the Council is zealously working in that direction, and has already done much to put a stop to such practices, and though we may all individually do much, it is only organized bodies like this that can effectually deal with such a difficult matter. Then there is the early closing question. We are charged with neglecting that. We are all too much interested to permit this society to do that. If there were the slightest chance of any good coming from its interference, no one more than myself would wish to see the hours of business curtailed and labour lessened, but I am strongly of opinion that it does not come within the province of the Association. Nothing would be more calculated to bring discord amongst us, or interfere with our usefulness in other ways. We may each do much by example in our neighbourhoods, but I am sure it is quite out of character, in a large town like this, for residents in one quarter to attempt to legislate for those in another. Gentlemen, I have given you a very discouraging sketch of our position, but I trust better times are in store for us; there never was a period in our history when the existence of our society was of such importance to us as the present. An Adulteration Act is now in force, and from the differences of opinion existing amongst analysts as to what really constitutes adulteration of drugs, it acts very oppressively, and much vexation and injury has been experienced by chemists in different parts of the country by proceedings being taken against them on the most frivolous grounds. I am not inclined to dispute the existence of such abuses as adulterations, nor of the importance of enactments being in force to suppress them. Fortunately for us in Sheffield we have experienced much immunity from such annoyances as the Leeds "Milk of Sulphur" cases and others of a similar nature, owing to the intimate knowledge our borough analyst has of drugs and the customs of the trade. But our time may come notwithstanding, for although we may ourselves test in some measure the quality of our drugs, we must place a certain amount of confidence in the wholesale houses,—and what could be a greater comfort than to have an association like this to take up our defence? Undoubtedly, if it has the means, it ought to lend a helping hand to its members in such sore strait. I, therefore, in the name of the Council, appeal to you who have seceded from us, and you who have not yet joined us, to come forward at once, and with your subscriptions and personal support assist in keeping this Association together, and performing the work that is laid out for us. In conclusion, gentlemen, I thank you for the honour you have done me this evening, and taking my predecessors as models, I trust I shall merit the confidence you have placed in me, and that, when I vacate this chair, I may be able to congratulate you upon the prosperity of this Association, and that I shall see around me faces that have long been strangers to this room. Since arriving here this evening, I have been pleased to learn that the result of the canvass in the different districts by the members of the Council, has resulted in a considerable addition to our numbers, and in congratulating you, I do hope we shall put our shoulders to the wheel, and make it the most successful year we have ever had."

After a vote of thanks had been accorded to Mr. Cubley for the efficient manner in which he had filled the office of President for the past session, and duly responded to, Messrs. Ellinor and Jervis were elected Vice-Presidents, and after a vote of thanks had been given to the retiring Council and other officers, the following gentlemen were elected as Council for the ensuing year:—Messrs. Cubley, Ward, Learoyd, Cocking, A. J. Appleton, Hudson, Dunnill, and Otley; after which Mr. Radley was re-elected Treasurer. On the motion of Mr. Cocking, Mr. J. H. D. Jenkinson was elected Honorary Secretary in the room of Mr. Learoyd who for several years has successfully held that office. A vote of thanks having been given to Mr. Learoyd for his services and suitably replied to, Messrs. Priestley and Crawshaw were elected Auditors for the coming year. During the meeting a general discussion took place on the advisability of forming a trade protection section for mutual assistance in case of unjust prosecution under the Adulteration Act, also upon the desirability of a greater uniformity of charges being adopted for prescriptions and for the higher drugs and chemicals. These subjects were referred for full discussion at a future meeting. The President announced that Mr. Ward, F.C.S., would read a paper at the next monthly meeting of the Association. Fifteen gentlemen were proposed as members of this Association, which brought to a close a very successful and agreeable meeting.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 18th February, 1875. Professor Odling, F.R.S., in the chair. The minutes of the previous meeting having been read, Professor Clerk Maxwell delivered a lecture "On the Dynamical Evidence of the Molecular Constitution of Bodies." The lecturer, after some preliminary remarks, proceeded to discuss the dynamical method of studying a system of molecules, with especial reference to that elaborated by Clausius, showing how it would explain the variations from Boyle's law observed in dense gases. He then deduced from the kinetic theory that the number of molecules in a unit of volume of two gases must be the same, which coincides with Gay Lussac's law of equivalent volumes. The difficulties which at present beset the atomic structure of the molecule were then stated, as also those connected with the transparency of gases and their electric phenomena. After a vote of thanks to the lecturer the meeting was adjourned until Thursday, 4th March, when there will be papers "On Some Constituents of the Brain," by Dr. Thudicum; "On the Dissociation of Nitric Acid," by P. Graham and J. W. Gatehouse; "On Calcic Hypochlorite from Bleaching Powder," by C. Kingzette; and "On a Simple Method of Determining Iron," by W. Noel Hartley. The Faraday lecture "On Liebig's Contributions to Experimental Chemistry," will be delivered on Thursday, 18th March, by Dr. A. W. Hofmann, F.R.S.

PHILADELPHIA COLLEGE OF PHARMACY.

The fourth meeting of the session was held January 19th, 1875, Dr. Wilson H. Pile in the chair. The minutes of the previous meeting were read and approved.

Professor Maisch, from the collection of the late Professor Procter, presented *Penghawar Djambi*, portions of the stipes, with the hair-like chaff still attached, of ferns from the East Indian Islands, the hairs being used as a hæmostatic, acting mechanically; also, from Dr. J. W. Eckfeldt, a portion of the large root of *Populus monilifera*, from Delaware County, Pa., where it is grown as a shade-tree. It was very evident that the false cotton-root bark, described at the previous meeting is not derived from this species.

Three samples of fluid extract of cotton-root bark were shown by Mr. Blair. Two had the characteristic red colour of this fluid extract, while the third was more of a greenish-brown colour, caused by heat being used in a part of the process, which seemed to entirely destroy the red colour.

Professor Maisch said he had prepared tinctures of both the true and false bark, that of the latter being destitute of the peculiar red colour.

Dr. A. W. Miller presented specimens of glucose, of American manufacture. Commercially, the term glucose is applied to the liquid form, and grape sugar to the solid. The samples shown were considered of good quality, and to compare favourably with the imported article. They were made from corn starch, by the well-known process with sulphuric acid. Glucose is largely used by brewers in the United States as a substitute for malt. A very handsome specimen of white grape sugar, of American manufacture, was shown, and stated to have been made from wheat starch.

Mr. J. L. Lemberger, of Lebanon, Pa., presented yellow beeswax, of unexceptional quality, purified, by himself, by filtration through paper. He said that with proper arrangements, fifty pounds of wax may readily be filtered in a day.

The Chairman asked for information as to the difference between light and heavy oil of cinnamon, which are quoted at different prices.

Professor Maisch suggested the probability of the light oil and the impure oil being derived from cinnamon leaves, which are said to have an odour somewhat reminding of cloves.

Anilin Inks.

Dr. Bridges exhibited a large collection of anilin colours, and Dr. Miller a specimen of anilin black, soluble in water, and writing ink made from it by dissolving 1½ ounce of the former and 1½ fluidounce of mucilage of gum arabic in one gallon of water.

The practical uses to which anilin colours had been put for colouring candies, syrups, liquors, hair-oils and the like were commented upon by several speakers, and attention was drawn to the following formulæ for inks by C. H. Viedt.

C. H. Viedt objects to the use of fuchsin and other anilin colours, which are insoluble in water, and recommends the employment of those colours only as are soluble in water. Such inks do not require the addition of gum arabic or dextrin, except for slow and heavy writers, and should be so far diluted that the writing, when dry, is free from the metallic lustre of the anilin colours. The author recommends the following proportions:—

For *red ink*, dissolve 1 part of diamond-fuchsin in 150 to 200 parts of boiling water.

For *blue ink*, take 1 part of bleu de nuit (anilin blue, soluble in water) to 200 or 250 parts of boiling water.

For *violet ink*, 1 part of the colour is dissolved in about 300 parts of water. This ink is very easily affected by ordinary black copying ink, a pen containing some of the latter rendering the former at once very pale and granular.

Green anilin ink is the handsomest, but also the dearest, of all anilin inks. It is prepared by dissolving 1 part of so-called iodine green, which is soluble in water only, in 100 or 110 parts of boiling water. The writing is of a blue-green colour; if a more yellowish-green shade is desired, a little picric acid should be added.

Yellow anilin ink cannot be recommended. A solution of 1 part of picric acid in 120 or 140 parts of water is better and cheaper.

Insoluble anilin black is used for indelible stencil inks and for calico printing.

Mr. E. M. Boring exhibited ointment of mercuric nitrate, made by the formula of Mr. Rother.* This specimen, although one month old, and exposed in an ordinary dispensing jar in the shop for that time, still retained its citrine colour. and looked as nicely as when first made. Dr. Pile said he had used this formula for some time, and excepting a little alteration in the temperature when making large quantities, had found it satisfactory.

Mr. Boring also exhibited glyconin, made of five parts of glycerin and four parts of the yolks of eggs, by weight; also samples of emulsion of cod-liver oil, made with it.† The oil emulsions were made by emulsifying four parts of oil with one of glyconin, and diluting so that the emulsions contain respectively 50 and 66⅔ per cent. of oil. The former is quite mobile, while the latter has about the consistence of a 50 per cent. emulsion made with gum arabic and sugar.

Suppositories.

A paper, by George W. Kennedy, on suppositories, was read of which the following represents the principal points:—

"I do not wish to be understood as advocating the turning out of suppositories quickly, and lacking in medicinal strength or uniformity, but simply to stand by the quickest way of making them, so as to contain exactly what the physician expects them to contain. The process by moulding may answer the purpose of manufacturers of pharmaceutical preparations, who make them in large quantities and in a hurry, regardless of the equal distribution of the medicament. They are put up neatly, look elegantly, and the manufacturers are largely rewarded for their labour, but never once think of the poor sufferer, who expects immediate relief only to be disappointed, if the suppository is not of the strength represented. Some kinds are not used often, and, when stored away on the shelves for a long time, will absorb oxygen and become rancid, fatty acids being liberated, which are irritants and render such suppositories, therefore, unfit to be applied. Another objection is raised: when made with English narcotic extracts, such as hyoscyamus, belladonna, and others, such extracts contain moisture, and the suppositories, if kept for some time, mould, and are then likewise unfit for use. This proves the necessity that every pharmacist should make all suppositories fresh as wanted. I, for one, wish suppository-moulds had never been introduced, then manufacturers of the like would never have made them, as they would not be sufficiently compensated for their time and trouble, and all retail pharmacists would be compelled to make them as wanted.

"Many apothecaries favour the addition to suppositories of some hardening material, while they differ vastly what that ingredient should be, and also what quantity to be added, some advocating the use of paraffin, spermaceti, wax or Japan wax. I beg to differ with all those who favour the addition of any substance for the purpose of giving the suppository a greater degree of stiffness; it is not necessary. I never use anything but cacao butter, and while I have prepared a large number of suppositories, I have experienced no difficulty whatever. Occasionally I have heard of complaints by pharmacists that suppositories, when made of cacao butter alone, will lose their shape, and have been returned to them in a soft condition to be remade. This might, perhaps, occur when they are placed in a very warm room or near a fire; but I have never known suppositories made of commercial cacao butter to lose their shape, or even found their surface to yield to the temperature of the room where they were kept, and I have had sufficient experience in their manufacture to know that they will keep during the hottest summer months in our climate. There are some few substances that act like camphor on fats, which are quite troublesome to make; but even for suppositories of this character I use nothing but oil of theobroma. There is no doubt but much of the cacao butter, as found in the United States market, is adulterated with fats having low fusing points, and this would account for some suppositories losing their shape and becoming soft.

"Of the many excipients that have been introduced since the time when suppositories were first recommended, none appears to answer the requirement so well as cacao butter; it is decidedly the best, and, to my knowledge, no other substance or composition has been proposed that can well be substituted for it in its singular use as a medicine and vehicle.

"In using medicines by suppository, their action must be quick, and the only way to procure this is to use an excipient that will melt rapidly and uniformly. Physicians object to the use of many of the hardening ingredients in suppositories—wax, for example—because the temperature of the body will not overcome their higher melting-point; they are thus left behind, unmelted, in the rectum, in this condition they are very apt to produce local irritation, and are therefore unfit to enter into the composition of suppositories.

"This reminds me of a little incident which occurred in our town two years ago. A physician was sent for in haste to see a very sick person, and prescribed suppositories, the composition of which I cannot recall at present, with the exception of one of the ingredients, which was carbolic acid; the prescription was dispensed by a druggist, and one applied as directed. After remaining in the rectum a short time, it was discharged, and exhibited nearly the same appearance as when introduced; a second one was applied with the same result. The medical attendant examined the suppositories more closely, and found they would not yield even to the warmth of the hands, and inferred from that that a large percentage of wax had been used in their preparation. He wrote another prescription, and had them compounded elsewhere; they were applied and had the desired effect. The balance of the first box was brought to my shop, and upon examination I found the fusing point to be 120° F.

"In the opinion of the writer, the best mode of dispensing suppositories with dispatch, insuring at the same time a perfect distribution of their medicinal ingredients, avoiding all foreign matter for the purpose of hardening, and giving the satisfaction to know that the cones will melt at animal heat, is the following:

"Take of cacao butter a sufficient quantity, powder in a wedgewood mortar by first striking the butter gently until it is broken up into quite small pieces, a little care being required so as not to strike too hard, otherwise the friction produced would have a tendency to soften the butter, making it a little more difficult to manipulate; then add the medicinal ingredient, and rub all together, forming a plastic mass to be rolled out into a suitable length, and cut up into as many pieces as suppositories have been directed, each piece to be formed by the fingers and a spatula into a conical shape. It is advisable to sprinkle a little lycopodium over the fingers to prevent contact of heat from the fingers, which would soften the mass during the necessary manipulation. If made in winter, when cacao butter is much harder, by the addition of one drop of glycerin to each suppository, a mass can be formed in a much shorter time."

Mr. Mattison objected to the opinion expressed by the

* See *Pharm. Journ.*, Aug. 6, 1870, p. 107.
† See *Pharm. Journ.*, Oct. 24, 1874, p. 339.

author as to manufactured goods, as entirely too general; his experience with suppositories was in favour of moulds. Mr. Boring had used the process described, and found a piece of linen advantageous in avoiding contact with the hands. Professor Remington had made suppositories by hand, and failed to see matters in the same light as the writer of the paper, the suppositories being brittle. Mr. Shinn urged that small lumps of cacao butter could be avoided only with difficulty. To prevent this, Mr. Lemberger called attention to grating the oil of theobroma previous to admixture with the other ingredients. Mr. McIntyre believed that the process possessed sufficient merits to warrant attention to it. It was safe to say that in cases where the activity will admit of nothing but positive equal distribution, or the call is very urgent, it is possible to prepare, in from five to ten minutes, a few suppositories in condition for immediate use, which, for shape and utility will be in keeping with all requirements. By proper attention to all the details of this process, and by inserting the cones prepared with the fingers and a spatula, while yet plastic, into a hinged mould, which has previously been well cleaned and dusted with powdered arrowroot or lycopodium, and pressing them well home, after a few moments they can be readily detached from the opened mould by pressure upon the end of each suppository.

Dr. A. W. Miller read a paper on the orthography of asa fœtida.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture III.

(Concluded from page 675.)

It will seem at first sight almost incredible that such an excess of work could be put upon the heart, but it is perfectly credible when all the facts are known. The heart of an adult man makes, as we see above, 73·57 strokes per minute. This number multiplied by sixty for the hour, and again by twenty-four hours for the entire day, would give nearly 106,000 as the number of strokes per day. There is, however, a reduction of stroke produced by assuming the recumbent position and by sleep, so that for simplicity's sake we may take off the 6,000 strokes, and speaking generally may put the average at 100,000 in the entire day. With each of these strokes the two ventricles of the heart, as they contract, lift up into their respective vessels three ounces of blood each, that is to say, six ounces with the combined stroke, or 600,000 in the twenty-four hours, The equivalent of work rendered by this simpler calculation would be 116 foot tons; and if we estimate the increase of work induced by alcohol we shall find that four ounces of spirit increase it one-eighth part; six ounces, one-sixth part; and eight ounces, a fourth part.

The stage of primary excitement of the circulation thus induced lasts for a considerable time, but at length the heart flags from its over action, and requires the stimulus of more spirit to carry it on in its work. Let us take what we may call a moderate amount of alcohol, say two ounces by volume, in form of wine or beer, or spirits. What is called strong sherry or port may contain as much as twenty-five per cent. by volume. Brandy over fifty, gin, thirty-eight; rum, forty-eight; whiskey, forty-three; vin ordinaire, eight; strong ale, fourteen; champagne, ten to eleven; it matters not which, if the quantity of alcohol be regulated by the amount present in the liquor imbibed. When we reach the two ounces, a distinct physiological effect follows, bringing on that first stage of excitement with which we are now conversant. The reception of the spirit arrested at this point, there need be no important mischief done to the organism; but, if the quantity imbibed be increased, further changes quickly occur. We have seen that all the organs of the body are built upon the vascular structures, and therefore it follows that a prolonged paralysis of the minute circulation must of necessity lead to disturbance in other organs than the heart.

By common observation the flush seen on the cheek during the first stage of alcoholic excitation is presumed to extend merely to the parts actually exposed to view. It cannot, however, be too forcibly impressed that the condition is universal in the body. If the lungs could be seen, they too would be found with their vessels injected; if the brain and spinal cord could be laid open to view, they would be discovered in the same condition; if the stomach, the liver, the spleen, the kidneys, or any other vascular organs or parts could be exposed the vascular enlargement would be equally manifest. In the lower animals I have been able to witness this extreme vascular condition in the lungs, and there are here presented to you two drawings from nature, showing, one the lungs in a natural state of an animal killed by a sudden blow, the other the lungs of an animal killed equally suddenly, but at a time when it was under the influence of alcohol. You will see, as if you were looking at the structures themselves, how different they are in respect to the blood which they contained, how intensely charged with blood is the lung in which the vessels had been paralysed by the alcoholic spirit.

I once had the unusual, though unhappy opportunity of observing the same phenomenon in the brain-structure of a man, who in a paroxysm of alcoholic excitement, decapitated himself under the wheel of a railway carriage, and whose brain was instantaneously evolved from the skull by the crash. The brain itself, entire, was before me within three minutes after the death. It exhaled the odour of spirit most distinctly, and its membranes and minute structure were vascular in the extreme. It looked as if it had been recently injected with vermilion. The white matter of the cerebrum, studded with red points, could scarcely be distinguished, when it was incised, by the natural whiteness; and the pia mater, or internal vascular membrane covering the brain, resembled a delicate web of coagulated red blood, so tensely were its fine vessels engorged.

I should add that this condition extended through both the larger and the smaller brain, the cerebrum and cerebellum, but was not so marked in the medulla or commencing portion of the spinal cord.

The action of alcohol continued beyond the first stage, the function of the spinal cord is influenced. Through this part of the nervous system we are accustomed, in health, to perform automatic acts of a mechanical kind, which proceed systematically even when we are thinking or speaking on other subjects. Thus a skilled workman will continue his mechanical work perfectly, while his mind is bent on some other subject; and thus we all perform various acts in a purely automatic way, without calling in the aid of the higher centres, except something more than ordinary occurs to demand their service, upon which we think before we perform. Under alcohol, as the spinal centres become influenced, these pure automatic acts cease to be correctly carried on. That the hand may reach any object, or the foot be correctly planted, the higher intellectual centre must be invoked to make the proceeding secure. There follows quickly upon this a deficient power of co-ordination of muscular movement. The nervous control of certain of the muscles is lost, and the nervous stimulus is more or less enfeebled. The muscles of the lower lip in the human subject usually fail first of all, then the muscles of the lower limbs, and it is worthy of remark that the extensor muscles give way earlier than the flexors. The muscles themselves by this time are also failing in power; they respond more feebly than is natural to the galvanic stimulus; they, too, are coming under the depressing influence of the paralysing agent, their structure is temporarily deranged, and their contractile power reduced.

This modification of the animal functions under alcohol marks the second degree of its action. In young sub-

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts*.

jects there is now, usually, vomiting with faintness, and gradual relief from the burden of the poison.

The alcoholic spirit carried yet a further degree, the cerebral or brain centres become influenced; they are reduced in power, and the controlling influences of will and of judgment are lost. As these centres are unbalanced and thrown into chaos, the rational part of the nature of the man gives way before the emotional, passional, or organic part. The reason is now off duty, or is fooling with duty, and all the mere animal instincts and sentiments are laid atrociously bare. The coward shows up more craven, the braggart more boastful, the cruel more merciless, the untruthful more false, the carnal more degraded. "*In vino veritas*" expresses even indeed to physiological accuracy, the true condition. The reason, the emotions, the instincts, are all in a state of carnival, and in chaotic feebleness.

Finally, the action of the alcohol still extending, the superior brain centres are overpowered; the senses are beclouded, the voluntary muscular prostration is perfected, sensibility is lost, and the body lies a mere log, dead all but two-thirds, on which alone its life hangs. The heart still remains true to its duty, and while it just lives it feeds the breathing power. And so the circulation and the respiration, in the otherwise inert mass, keeps the mass within the bare domain of life until the poison begins to pass away, and the nervous centres to revive again. It is happy for the inebriate that, as a rule, the brain fails so long before the heart, that he has neither the power nor the sense to continue his process of destruction up to the act of death of his circulation. Therefore he lives to die another day.

Thus there are four stages of alcoholic action in the primary form:—(*a*) A stage of vascular excitement and exhaustion; (*b*) a stage of excitement and exhaustion of the spinal cord, with muscular perturbation; (*c*) a stage of unbalanced reasoning power and of volition; (*d*) a stage of complete nervous collapse of function.

Such is an outline of the primary action of alcohol on those who may be said to be unaccustomed to it, or who have not yet fallen into a fixed habit of taking it. For a long time the organism will bear these perversions of its functions without apparent injury, but if the experiment be repeated too often and too long, if it be continued after the term of life when the body is fully developed, when the elasticity of the membranes and of the blood vessels is lessened, and when the tone of the muscular fibre is reduced, then organic series of structural changes, so characteristic of the persistent effects of spirit, become prominent and permanent. Then the external surface becomes darkened and congested, its vessels in parts visibly large; the skin becomes blotched, the proverbial red nose is defined, and those other striking vascular changes which disfigure many who may probably be called moderate alcoholics, are developed. These changes, belonging as they do to external parts, come under direct observation; they are accompanied with certain other changes in the internal organs, which we shall perhaps discover in a future lecture to be more destructive.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Adulteration of Food and Drugs Bill.

On Friday, Feb. 19, Mr. Sclater-Booth moved the second reading of this Bill. He said that the first Act upon the subject was passed in 1860, in consequence of frequent complaints of purchasers from retail tradesmen of the injury to which they were subjected by the prevalence of adulteration. After being in operation for twelve years, it was entirely recast. In the second Act the appointment of an analyst was made *quasi*-compulsory on the authorities who had to do with it, and the law had a sanitary object. The language of the Act was founded on the idea of adulteration, which was to be prohibited, not only because it was a fraud upon the purchaser, but also because it was an injury done to the community. But this Act was soon found to be attended in its working with serious difficulties, partly caused by the want of any definition of the word "adulteration" in the Bill. Judges differed and magistrates were unable to understand what was exactly meant by the word. Again, there were some obscurities in certain operative clauses of the Bill which brought about failure on the one side and on the other gave rise to serious heartburnings. When he came into office therefore he found that though the Act was of so recent a date the time had arrived for re-considering it. Consequently about a year ago he asked the House to appoint a Select Committee with a view to some amendments during the last session of Parliament. The Committee found their labours grew upon them, time went on, and the report was not in his hand early enough to enable legislation to be pressed on last year. Having to consider the matter during the recess, the first question was whether the new Bill should be laid down on the same lines as the old, and whether the same language should be used in its operative clauses. The experienced draughtsman to whom the preparation of the Bill was entrusted had the recommendations of the Select Committee before him, but found it impossible with satisfaction to himself or with any assistance which he (Mr. Sclater-Booth) could give, to frame such a definition of the word "adulteration" as could be relied upon as the basis of permanent legislation on the subject. The consequence was that what would be regarded as the operative clauses of the Bill had been drawn up in a different way, and an attempt had been made to lay down in the clauses the things exactly prohibited and the exceptions which might fairly release the trader from penalty. By an unfortunate error of the printer, the measure was still an Adulteration of Food Bill, but it was obvious that its title should be "The Sale of Food and Drugs Bill." The Bill was arranged in five parts, it described the offences prohibited, laid down rules for the appointment and duties of analysts, and regulated the proceedings against offenders; then there were some special provisions with regard to certain offences, and some important clauses with reference to the new duties imposed on those who were to carry out the measure. It prohibited the admixture with food and drugs of any ingredient injurious to health, or the sale of any article not of the nature demanded by the purchaser, with certain exceptions. Opinions might vary as to the value of the list of exceptions which had been made, but in Committee he would be happy to hear what might be said on the subject, and accept of amendments which might appear to be reasonable. It was provided that if articles were mixed, whether in accordance with the custom of trade or the convenience of the consumer or seller, they should be mixed in proper proportions, and it would be for the seller to show that this was done. Under the old Act, the seller of retailed articles was obliged to declare orally to his customers if there had been any admixture. That provision had been seriously complained of, and it was obvious that in any shop where a large business was done, this express notice could not be given or insisted on. It was therefore now proposed that it would be sufficient if a label stating the fact was affixed to the article. The Select Committee had recommended that the appointment of analysts should be made compulsory on the authorities. But the number of candidates for these appointments was not very considerable, and great difficulty had been experienced in getting competent analysts. Then, though you might make an authority appoint an officer you could not without stringent legislation make it put the officer in motion. He knew from the experience he had in other branches of administration how easy it was to make a colourable appointment and then to take care that the person appointed should not do that which the law contemplated. Further, he did not think it advisable that the appointments should be too numerous if a smaller number would be sufficient. It was clearly desirable that a small borough, for instance, should have inducements held out to appoint the same person as had been appointed in a large borough or town in the same county to discharge the duties rather than to have separate analysts for each separate town. A refusal on the part of a dealer to allow samples of his goods to be taken for analysis was made a punishable offence. As a matter of common justice, the dealer and his wife would be admitted to give evidence at their trial. This led him to a provision to which he had given anxious consideration—namely, that if the defendant in any prosecution produced a warrant of the purity of the article from the person of whom he had bought it, and also proved to the satisfaction of the justices that he sold it in the same state as when it came into his hands, he should be discharged. Proceedings, however, might be taken against the person who had given such a warrant in the event of the article proving to be adulterated. The fines obtained from prosecutions would in future go to the authorities who were charged with the carrying out of the Act, instead of to the police, and it was hoped that this would prove an inducement to those authorities to have the provisions of the Act strictly enforced. There was an important provision that tea should be examined by the Customs on importation. Any tea pronounced by the Customs' analyst to be unfit for human consumption would be forfeited and destroyed. Altogether, he believed that if the Act was properly enforced the adulteration of food and drugs would be reduced within very narrow limits. Already analysts had been appointed in 34 out of 54 counties, and he had no doubt that under the present Bill the number of such appointments would be largely increased. The Committee were strongly of opinion that mixtures of coffee, cocoa, mustard, etc., which were expressly labelled as mixtures, should be allowed for the sake of the public taste, and their recommendation on this point had been adopted in the Bill. If the consumer desired those articles mixed, and they were harmless, there seemed no reason for prohibiting their sale. At prosecutions it would not be necessary for the analyst to attend unless his presence was expressly desired, and samples for analysis might be sent through the post. A body of gentlemen representing the public analysts had, he was happy to say, expressed approval of the general principles of the Bill, though of course they had suggestions to make in their own interest, some of which he should be able to accept. He hoped the local authorities would take steps to secure prompt execution of the Bill in case it passed into law, and at the same time to insure fair hearings for all persons concerned in cases of prosecution. He believed the provisions contained in the measure would tend to the great advantage of the public, and would at the same time do no real harm to the trading classes. All the clauses of the Bill had been carefully drawn and considered with a sole desire to provide an effective security for the purchasing public, and at the same time to remove what was a reproach to the existing law—namely, that it was gratuitously injurious to the trading classes.

Mr. Sandford thought this Bill was framed rather in the interest of the wholesale dealer than in the interest of the public. In its present form, at all events, it would lead to a very considerable adulteration of goods. He looked with considerable alarm on any measure that would lead to a restoration of the old state of things. Although the great grievance at the present moment was that adulteration was not properly defined, this Bill did not attempt to define adulteration. It left unredressed that which was admitted to be the great grievance of the present state of things. According to the 5th and 6th clauses, in order to procure the conviction of a person who sold adulterated goods it must be proved that he had full knowledge that they were adulterated. Now it was notorious that when proof of such knowledge was required it was impossible to get a conviction. As the Bill at present stood, Clause 7, was the single clause under which a conviction could be obtained, and it would have to be considered in connection with some previous exceptions, so that it would be most perplexing for any magistrate to decide upon. In amending the Act the first thing to do was to provide that a better description of analysts should be appointed. He believed that if England were divided into three or four portions, and one able analyst were appointed for each of those divisions, that number of analysts would be quite sufficient. As a member of the Committee, he examined almost every witness upon that point, and they told him, he believed unanimously, that almost every article could be sent to an analyst, no matter how distant, from one end of England to another. He was not going to mention names, but he would say that in certain towns analysts were appointed with the express understanding that they should take no action against any person in the town. Municipal councils, especially in large towns, were to a great extent composed of the very class of persons to be proceeded against. Therefore he thought the appointment of analysts ought not to be left in their hands. There was no doubt that the Act had pressed hardly upon some retail dealers, and he thought it was of very great importance that retail dealers should be enabled in some more expeditious way to proceed against wholesale dealers for having sold to them adulterated goods. If the House wished to put down adulteration, if they wished at the same time not to press heavily upon retail dealers, the persons whom they ought to endeavour to punish were the wholesale dealers. But, if one class of persons was favoured more than another by this Bill, it was the wholesale dealers. He was opposed to an inspection of tea in bond. He did not like to throw that duty on the Government. He thought it was the duty of the wholesale dealer to take care that he did not import an adulterated article. Wholesale dealers were not such poor people that they could not pay the expense of an inspection of goods which they imported into this country in order to ascertain whether they were adulterated or not. He thought that on them lay the responsibility of not introducing into this country an adulterated article. If the system of inspection of tea was to be introduced the principle should be extended to every article of food.

Mr. Muntz observed as to the word "knowingly," if it were retained in the Bill, all attempts to check adulteration would be hopeless. There was in the Bill another clause which provided that if a defendant proved he had sold the article in the same state in which he had purchased it, and with a warranty in writing to that effect, he should be discharged. It was obvious, however, that, even if there were a warranty, it would afford no evidence that the article had not been wilfully adulterated, because the warranty might have been given by a man of straw. The recommendations of the Committee were that if a warranty in writing were produced by a defendant the case should be adjourned, and that the justices should direct a summons to be issued against the person or persons from whom the defendant has purchased the articles, who, if found guilty of adulteration, should be liable to the penalties imposed. Certainly the wholesale dealer ought to be held responsible if it were clearly proved that the retailer purchased the articles of him in an adulterated state. If this alteration were made in the Bill it would be a most valuable one In Birmingham and the neighbourhood there was a large number of respectable grocers who wanted a Bill against adulteration to be passed, though they were averse from being annoyed by petty analysts who did not understand their work. If tea were to be inspected in bond, why should not wine be inspected also? More persons were poisoned by wine than by tea, and what the Committee heard about Hamburg sherry was enough to make people turn teetotallers next morning.

Mr. Pell said under the Bill no fewer than 292 separate authorities would have the power, if they chose to exercise it, of appointing a petty officer to undertake very important duties. This number of authorities was far too large. If, however, the local authority in a small place were prevented from appointing an analyst, it would have to rely on the services of the analyst appointed for the surrounding district, who, while being paid by one authority, would thus have to work for another without remuneration. Under the 10th clause 10*s.* 6*d.* was the outside sum to be paid by a person who required an analysis, and this charge, he maintained, was far too low. The amount was to be made up by the salary of the analyst, and where was the salary to come from? It was to come from one portion only of the community—those unhappy people who up to the present moment had borne many charges which ought to have fallen on the community generally. He should propose an amendment to remove this *maximum* amount to be paid for an analysis. He suggested that at all events a portion of the analyst's salary should be met from the Imperial Exchequer. There was a danger, also, that without some considerable amount of central control no analyst would be appointed at all. It ought not to be left to the option of 280 local authorities to make this appointment or not, and some provision should also be made for filling it up to the satisfaction of the central authority. If the Government exercised any supervision they should be prepared to contribute annually towards the cost of these officials.

Sir H. Peek said he had been in the tea trade all his life, and he believed that not one ounce in a ton of all the tea which came into England was adulterated here. A number of foreign substances were, unfortunately, put into tea elsewhere, but that the importers could not help. The examination of tea by sample might be very easily effected. Five samples taken from 1,000 lb. weight would be quite sufficient, and if one of those samples was found to contain matters injurious to the human organs it would not be difficult to ensure its destruction. Some of the analysts went as far as to say that all green tea was adulterated with deleterious matter, and a gentleman who was High Sheriff of Anglesey had been fined a large sum for importing the very finest green tea procurable. The fact was, that analysts wished to make themselves out exceedingly clever, and made the most of the very least quantities of foreign matters they discovered in the various samples submitted to them. With regard to the custom of the trade it was very difficult to say what should or what should not be allowed. It was a monstrous thing that the Government should be permitted to prepare their cocoa and mustard in a manner that would subject a private dealer to punishment for selling an adulterated article. When the proper time arrived he should be able, on the part of the trade, to show how the Bill might be considerably improved.

Mr. Garnier expressed his opinion that this Bill would remedy all the grievances of traders while it gave increased protection to the public. Cocoa and mustard must always be sold as mixtures, the first being mixed with farina and the latter with wheat flour coloured with turmeric. He thought it a pity that the retail trader should not be allowed to show that the article complained of was in the same state in which he had received it from the wholesale trader and so throw the liability on the latter, because although the retail dealer had at present the common law right of proceeding against the wholesale trader, the cost of taking proceedings was so great as practically to debar him from the exercise of that right.

Mr. Read remarked that under the 4th clause the offence of selling articles adulterated with poisonous matter was very severely dealt with, the penalty being £50 for the first offence, and six months' imprisonment for any subsequent offences, and there were no exceptions whatever to the operation of the clause. The reason why tea was the only article that had been, so to say, taken under the protection of the Government on being imported, was that it was the only article which had been represented as coming into this country in an adulterated state. The hon. member for Birmingham said that there was some sort of doctoring of tea in England. That might be, but the extent of such adulteration was really very trifling. It was very different with wine, which after its import was mixed and adulterated by the trade.

Dr. Playfair said it was to the operation of the existing Adulteration Acts that the people owed pure milk, pure bread, and tea of much better quality than had formerly been sold. In regard to these great staple articles of food their operation had been very beneficial, and the question was whether this Bill, while removing some of the grievances of which traders complained, would give the public the same protection as they now enjoyed. His own impression was that the Bill would not, unless they made serious alterations in it in Committee. His hon. friend (Mr. C. S. Read) said they had not given definitions, but they had given a definition of food which a lawyer would easily pull to pieces. Food was defined "every article eaten or drunk by man other than drugs." Neither tea nor coffee was eaten or drunk. It was an infusion of these articles, but this error could of course easily be remedied. This Bill said that ignorance instead of knowledge was to be required of the retailer. He was not to know his business at all, for the words of the clause were "if he knowingly"—that meant, if he dealt in milk, that he need not know his business sufficiently to know that he was selling skim milk. He of course would say he did not know the cream was away. Thus the word "knowingly" would destroy all the use of the Bill. Then there was another great exception which he must take to the Bill, and that was that the seller was to be governed by the usage of trade. Before the Act of 1872 it was the usage of trade to mix 25 per cent. of water with milk; that was the usage of the trade, and therefore anyone who did no more than that could not be punished. Then as to drugs—at one time the druggist would send his bark or other drugs to be ground, and he would get back exactly the same weight, and nothing would be charged for grinding. Why? Because the grinder abstracted a certain portion of the genuine article and adulterated what was left to make up the weight. That was formerly the usage of the trade, and that was yet done to several drugs, though not to the same extent. It was formerly the usage of the trade to mix oil of vitriol with vinegar. It made it stronger, and if there was not too much it was not injurious to health, but it was adulteration. It was the usage to mix alum with inferior flour, flour which no longer possessed any nutritive qualities at all. These "usages" would reappear, he feared, under this Bill, and if "usage of the trade" was to be allowed they might drive a coach through any part of it. The hon. member for South Leicestershire (Mr. Pell) hit a great blot in the Bill with regard to the analyst's fee. He could speak dogmatically on the point, for he was a professor of chemistry, and he affirmed that it was perfectly impossible to get an efficient analysis for 10*s.* 6*d.* If the clause remained, it simply meant that the analyst was to get 10*s.* 6*d.* from the consumer *plus* the salary he received. Scotland and Ireland were excluded from the measure, but that, he understood, would be rectified.

Mr. Salt wished to know how the Act would benefit the consumer, and how he would make use of it. It should be chiefly valuable for the poor persons, who were most affected by adulterated food and drugs, and who were absolutely at the mercy of the retail trader. The poor man might take the article he had bought to the analyst, and have it analysed on payment of 10*s.* 6*d.* But he would have no knowledge of the analyst, and was he likely to be in a position to pay 10*s.* 6*d.* for an analysis of his small purchase of flour, coffee, tea, or sugar? By the 14th clause it was provided that if a person went to a trader with the intention of having the substance that he purchased analysed, he must give notice of his intention and divide his purchase into thirds, one of which he was to leave with the dealer and another to retain for himself. Was not such a proceeding beyond the capacity of the poor man, especially as no means were provided for bringing him into direct contact with any of the officers?

Mr. Colman said that the recommendations of the Select Committee had the full support of the trade, and whatever responsibility formerly attached to the manufacturers still remained with their full consent. Objection had been taken to the expression "the usage of trade." There were certain articles—mustard being one—in regard to which there was not much difficulty in knowing what was the usage of trade. The Blue-book referred to the usages in the manufacture of mustard, and it was rather hard that the traders should be fined for selling the articles which the Government itself made for the public service. He had no doubt that, with certain amendments, the Bill might be made fair to the consumer and the retail dealer, and not unjust to the manufacturer.

Mr. Mundella inferred, from the evidence taken by the Committee, that there was very little adulteration on the part of retailers in this country, and that this was due, not so much to the Adulteration Acts as to the improvement of our fiscal system and the abolition of excessive duties the existence of which made it profitable to adulterate. Some sensational letters which had appeared in the papers were traceable to adulterators who wished to advertise their own speciality. This Bill, with a few amendments, would remove those vexations which were rendering the law nugatory. The appointment of analysts ought to be made compulsory, for the temptations to adulterate were perhaps greatest in the small places where it was difficult to make the appointments.

Mr. Ramsay said there ought to be some means of determining the chemical knowledge and acquirements of analysts, who at present differed in their opinions as to the tests to be employed in detecting the presence of certain substances in different ingredients.

Mr. Sclater-Booth explained, with reference to the objection that the poor man who could not pay 10*s* 6*d*. to an analyst had not been considered, that the police and public officer would be in duty bound to take care of such cases. He admitted that the term "knowingly" was used too frequently in the 9th clause, and he would consider whether it should not, in some instances at least, be struck out. With reference to the complaint of the hon. member for Leicester, that in addition to the charge of 10*s*. 6*d*. for analysis a supplementary charge was raised out of the rates, he could not help thinking if any charge on the rates was reasonable this was a charge of that kind. He thanked hon. members for the various suggestions which had been made, and he could assure the House they would all be considered by him with every anxiety to make the Bill as perfect as possible.

The Bill was then read a second time and ordered to be committed on Thursday, March 4.

Prosecutions under the Adulteration Act.

Adulterated Sarsaparilla.

The Town Clerk appeared on Friday the 19th inst. at the Bradford Borough Court, to prosecute several tradesmen for selling adulterated articles of food and drink. Henry Brown, a man occupying a stall in Godwin Street, was charged with having sold sarsaparilla which was adulterated.

Mr. Rimmington, the public analyst, said that there was not much sarsaparilla in the compound, but it was mixed with liquorice.

Brown was fined £1 and 8*s*. costs.

Adulterated Ginger.

Wm. Standing, shop-keeper, Manchester Road, was charged with having sold two ounces of ginger which was adulterated.

The defendant said that when he was told that the ginger was going to be analysed he told the inspector that he would not guarantee that it was pure ginger.

The Town Clerk: But that was too late; you should have done so before.

Mr. Rimmington said that the ginger was adulterated to the extent of one-third with plaster of Paris—a material which would not dissolve.

The defendant said that he sold it as he bought it himself. He was fined 10*s*., and 8*s*. costs.

Catherine Wainwright, 58, Leeds Road, was charged on two summonses with selling ginger and arrowroot which were adulterated. The "ginger" contained scarcely any ginger, but was composed principally of wheat flour, ground rice, white pepper and turmeric. The arrowroot was not injurious to health, but was adulterated with tapioca flour.

Mrs. Wainwright made the defence that she had bought the articles of some other person.

The magistrates instructed all those who made that defence to get a guarantee with the articles, and then they would have a cause of action against those from whom they bought their goods, and could compel them to pay their fines. Mrs. Wainwright was fined 10*s*. and costs in each case.

Milk Prosecutions in Dundee.

Several prosecutions for the sale of adulterated milk have recently taken place in Dundee Police Court. In one, Alexander Scott, a farmer, was charged with having supplied to a dealer milk which had been adulterated.

In the course of his evidence, Mr. Macdougald, the public analyst, stated that the milk in question contained only 10·65 per cent. of total solids. His standard for normal milk was 3 per cent. of fat, and 12 per cent. of total solids. He had fixed upon that standard after a number of experiments tried on cows in Edinburgh. He arrived at it by striking an average, and then making a reduction so as to be certain of ensuring milk dealers full justice. There might have been one or two below the average. The solids not fat varied very little. The cows experimented on were fed on hay, potatoes, draff, and turnips. He thought 12 per cent, a very reasonable standard. Professor Wanklyn took 12·5 per cent. Referred to a standard reported to have been fixed by the Society of Public Analysts that milk should contain "not less than" 9 per cent. by weight of solids not fat, and 2·5 per cent. of butter fat, Mr. Macdougald said that was the minimum, and a very poor one. His reading of the article was that 9 per cent. of solids not fat and 2·5 per cent. of fat was the lowest milk that should be allowed to pass.

For the defence, Mr. Frank W. Young, analytical chemist, deposed that in his opinion 12 per cent. was too high a standard. Milk possessing 11·5 of solids would certainly pass as good average milk. There had been samples of pure milk with much less total solids. Were he to get such a sample of milk he would assume it to be pure milk, and all public analysts in the country would do the same. He had met with pure milk containing as low as 11 per cent. total solids. He considered it probable that a sample with 9·10 of solids, might have come pure and unadulterated from the cow. Such cows were exceptional, and probably it was soon after calving. A good deal depended upon feeding, and also upon the way the cows are kept, in producing quality. Milk with 10·65 of solids would probably be unadulterated.

The Baillie decided that the milk had been adulterated, and inflicted a penalty of 50*s*.

Supposed Poisoning by Aquafortis.

On Monday the 15th instant, an inquest was held at Wycombe Marsh, Bucks, to investigate the circumstances attending the death of Silas Gill. It appeared that in consequence of the deceased having been taken ill and stating that he had swallowed about half-a-quartern of aquafortis, a medical man was sent for who found him suffering very severely. Some salad oil was procured, of which deceased was induced to swallow about two ounces. The surface of the body was then quite cold, but he was quite sensible. He said he was tired of his life, and had been out of work.

It was proved that deceased had previously attempted to commit suicide, and the jury returned a verdict that he died from the effects of poison taken while in a fit of temporary insanity.

Review.

COMMENTARY ON THE BRITISH PHARMACOPŒIA. By WALTER G. SMITH, M.D., Dublin, etc., etc. London: Smith, Elder and Co. 1875.

With the new year, appeared a volume from the pen of a Dublin physician, whose frequent contributions to this Journal must have made his name familiar to pharmacists.

The author's main object was (to quote from the preface) "to supply practitioners and students with an explanatory commentary on the drugs and preparations of the British Pharmacopœia."

In the introduction he alludes to a feature for which he claims special advantage—viz.: "having kept the book within reasonable limits, and avoided the needless repetition of the characters given in the Pharmacopœia."

He seems to have recognized the difficulty in condensing pharmacy, materia medica, botany, chemistry, and medicine, as well as remarks upon *fashionable* remedies, not yet sufficiently established to find a place in the national pharmacopœia, into a volume of *seven hundred pages*, with the use of a type similar to that of Attfield's 'Chemistry'—of which latter work the commentary, *externally*, is almost a *fac simile*.

The author having expressed his determination for brevity upon unimportant matters, we cannot refrain from remarking that we are surprised that he did not discard the mention altogether of such nostrums as "liq. carbonis detergens," "nepenthe," Holloway's pills and ointment, Dalby's carminative, etc.; for the bare recognition accords to them undesirable prominence, and certainly does not aid the cause of true pharmacy.

The general arrangement of the work is alphabetical, and the order of the British Pharmacopœia is maintained throughout; the commentary upon each drug being subdivided into "origin, characters, and tests," and "uses in pharmacy and medicine."

All necessary details of such indigenous plants as are the source of officinal drugs are given at length, while those from foreign sources are described as briefly as possible, leaving space, as the author remarks, for "the introduction of more useful matter."

The botanical origin is not always followed by the geographical source; which might, with advantage, have been included in every case without fear of increasing the size of the volume to an extent that would have been necessary had the history, production, and commerce been commented upon.

We are not at all prepared to cede that the description of certain officinal drugs by the author is in all cases equal to the clear and concise language of the Pharmacopœia. For instance, Almonds are thus described:—"Bitter almonds are distinguished from sweet almonds by being shorter and thicker—they should be entire, white, and brittle; when injured by keeping, or of bad quality, they are soft, flexible, and translucent."

This is not a clear description of the bitter and sweet almond to our mind; neither is it sufficiently explicit to put into the hands of a student, for no allusion to the actual shape or length of either variety is made; neither is the presence or absence of odour under certain circumstances made a distinguishing feature. Indeed, as it stands, the description of the almond as "entire" is superfluous, and certainly inaccurate when giving the colour as "white," unless it be followed by the word *internally*; for almonds have a cinnamon-brown seed coat.

It may be argued that a student ignorant of materia medica would know an almond, and also distinguish the bitter from the sweet variety; the former, doubtless, most would be capable of doing, the latter, however, is at times exceedingly difficult. Upon the almond and its products the author is "at sea," for "oleum amygdalæ" is said to be made by pressing the bitter or sweet almond in bags between plates *slightly warmed.*

Now if there is one practice more than any other that is discountenanced in this country, it is the use of heat in the expression of almond oil.

The yield of fixed oil is stated from bitter almonds as 28 per cent., and from sweet almonds 54 per cent.; by what means, whether hydraulic pressure or by ether, is not stated. If pressure be intended we imagine 43 to 44 per cent. from both varieties of almond would have more accurately represented the yield, and if by ether as a menstruum, then upwards of 50 per cent. might have been stated—certainly not 28 per cent., by either process, or from either variety.

But a few pages beyond the note upon almonds it is stated "nutmeg is the only officinal drug from which is derived both a fixed and a volatile oil."

Had this statement been made with the substitution of the words "*in which exists*," for "from which is derived," we would not have dissented; but as it reads we must say that we remember another officinal drug from which is derived both a fixed and volatile oil, viz., bitter almond.

It would have been possible in a short description of some of the interesting drugs to have added something in addition to a condensed paraphrase of the pharmacopœial description. Essence of lemon, for instance, is said to be one of the few essential oils made "by simple expression" as well as distillation. This does not convey much information to a student, for the ordinary press is not used, but a process of actual squeezing by the hand is resorted to, the essence being absorbed by a sponge. In short that portion of the work devoted to fixed and volatile oils has not had the care bestowed upon it evident elsewhere, for in addition to the errors to which we have alluded there are discrepancies in the specific gravities, percentage yield, and other minor points which render the work inadmissible as one of reference upon this subject.

The commerce of drugs cannot be properly handled by strangers to the port of London who necessarily know nothing of the special trading attached thereto; we must therefore excuse the author's statement that Chinese, *Russian*, and European rhubarbs are the principal commercial varieties. We imagined it was very generally known by this time that Russian, or the so-called "Turkey rhubarb," has for some years past been entirely absent from commerce.

The pharmacy portion of the work has been written with considerable care, and is sufficiently explicit for the use of students in medicine, who cannot wish to be experts in this art.

Here again, we notice some few errors and misapplied terms. Aromatic sulphuric acid of the Pharmacopœia is made synonymous with "Mynsicht" elixir, quite contrary to usual practice in pharmacy, and is therefore liable to mislead. Also, when the author states the amount of extract yielded by certain fresh plants, roots, etc., he is not always accurate.

Extract belladonna from the fresh herb is said to be yielded in the proportion of 5 to 10 per cent. (should have been 5 to 6 per cent.); extract opium as 66 per cent. (B.P. gives 50 per cent.); extract of nux vomica as 7·8 per cent. (should have been about 12 per cent.), and so on.

Reference is also made to "the coagulation" of the colouring matter in making green extracts. Is it coagulated or separated?

Upon that portion of the work devoted to chemistry, the best results have been achieved, and good use has been made of the space afforded for the subject.

The introduction, under each of the principal metals, of "a pedigree or genealogical table" of its preparations is a very excellent feature, as a student is thereby enabled at a glance to see the derivation of a series of preparations.

Those desirous of gaining information upon the manipulation necessary for the manufacture of the officinal acids, oxides, salts, etc., will, in this work, find very excellent general ideas upon the subject, quite sufficient, we should say, for a student of medicine, although insufficient for one desirous of becoming *thoroughly* conversant with pharmaceutical chemistry.

Many minor points in connection with this subject are hardly in accordance with our views and observations. Certain figures also will bear correction; of these some are typographical errors, as when the atomic weight of iodine is put at 1·27.

As the recent British Pharmacopœia addendum has been included in the commentary, we should have preferred to have seen some of the preparations there enumerated more enlarged upon, whereas many have been dismissed in a few lines.

Adulteration is so frequently alluded to, that we cannot pass the remarks made under this head without notice. The importance of calling the special attention of medical practitioners, pharmacists, and others, to means by which they may detect impurities and check fraudulent sophistications, cannot be overrated; but at the same time we must protest against those spurious lists of substances said to be liable to adulteration, which it is customary for authors now-a-days to parade, upon the authority of writers of the first half of this century.

We will give a few quotations from the list before us:—

Citric acid. "Most common impurity, tartaric acid and lime."

Belladonna leaves. "Attention to the character of the leaves, ovate, acute, entire, smooth, will distinguish them from any of the adulterations that have been practised, such as *Digitalis purpurea* (foxglove), *Solanum nigrum* (woody nightshade), *S. Dulcamara* (bittersweet), *Verbascum Thapsus* (mullein), *Hyoscyamus niger* (henbane)."

Powdered capsicum "is adulterated with red oxide of lead, and with coloured sawdust."

Aniseed oil, "in consequence of its high price, is sometimes adulterated with spermaceti, wax, camphor, or alcohol."

Cajeput oil, "from its high price (?), is occasionally adulterated with oil of turpentine or other oils."

Castor oil "is adulterated with other fixed oils (olive oil, etc.), and a most dangerous fraud consists in the addition of a small quantity of croton oil to it with a view of increasing its activity."

Anyone who has taken the trouble to examine the substances enumerated as now met with in trade in Great Britain, must know, that in the main the above statements are without foundation.

The recent 'Pharmacographia' by Hanbury and Flückiger is a master-piece upon this as upon other matters, and we cannot remember that reference is made in that work to the fraudulent adulterations of the drugs we have mentioned and in the way indicated. We would strongly recommend authors when commenting upon adulterations to make such statements as are based on their own observations only, and also in addition to be so charitable as to believe that there are to be found honest traders in physic as in other wares.

Surely it is the duty of an author when making assertions, which he personally cannot verify, to append by footnote or otherwise his authority for the statement.

Having then hastily glanced at the work before us from a pharmacist's point of view, in closing our remarks we would not, in justice to the author, lose sight of the special object for which he designed the book, viz., "to supply practitioners and students with an explanatory commentary on the drugs and preparations of the British Pharmacopœia."

To these gentlemen for whom the work was designed we commend it for perusal, and in the hands of medical practitioners leave that portion specially devoted to "the uses in medicine" of the many substances of the officinal materia medica, a subject upon which we do not feel competent, neither is it within our province to offer authoritative opinions.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The London and Edinburgh Board of Examiners.

Sir,—I am afraid the members of the Scottish Examining Board will not feel flattered by the remarks made at the last meeting of the Council, and by some of the correspondence in the Journal. Frequently of late I have heard various members and associates of our Society decrying other members and associates who have "only passed in Edinburgh." Invariably, however, I have found these men of the class who are for ever parading themselves before the public as members, etc., "By Examination," and who never forget to add M.P.S., M.P.S.G.B., or some other string of letters, to their signatures. Nothing, in my opinion, tends to degrade our calling so much as this. The public are becoming aware that a man may be an M.P.S. and yet not be an educated man, and they instinctively condemn the whole for the shortcomings of the few. When people place a lot of initials after their names, and are always reminding one of their never-to-be-forgotten examination, is it to be wondered at that they should be expected to possess considerably more knowledge than they are ever found to do?

My reason, however, for writing to you, Mr. Editor, is to explain why at least some of our young men go to Edinburgh rather than to London. To begin with myself, I passed my Minor in London, and my Major in Edinburgh, and for these reasons:—First, I had a decided objection to the manner in which I had been spoken to and watched by at least one of the examiners of the London board, and being of a somewhat nervous temperament I felt a peculiar dread of going there again. I must add, however, that the majority of the examiners were extremely courteous and kind. Second, I had several times been in London, and had never been in Scotland, and therefore I decided on Edinburgh.

Of course, whilst there, I was brought in contact with others who had come for a like purpose, and from the conversation I had with them I learnt the reasons why several had given the preference to Edinburgh.

More than one was of opinion that the number of candidates for examination in London was so numerous that it was utterly impossible for them all to be fairly tried. The examiners could not devote sufficient time to each subject; this haste and the excitement together completely unnerves many of the candidates, more especially those who have not had the advantage of a course at some of the London establishments, and who have little or no real idea as to what the examination is like. Consequently the poor lad who has studied hard in some sequestered little town, with only the aid of his books, is plucked, whilst the numbskulls who can afford to have a carefully selected stock of knowledge driven into them, carry all before them. The former, unconscious of the value of his knowledge, is nervous, and fails; the latter, blissful in his ignorance, fears nothing, and wins.

Other candidates had heard so much about the so-called catch questions, and the severity of the examiners, from those who had been plucked in London, that they had decided to submit themselves to the board about which they knew that at least they would not be more severely handled than in London.

One candidate only acknowledged that he had come to Edinburgh because he had been previously plucked in London.

I cannot myself judge of the relative stringency of the examinations in London and Edinburgh, but when I went for the Minor in London, I found the examination much less stringent than I expected; whereas, the Major in Edinburgh proved much more severe than I had anticipated. By each and all of the members of that board the candidates are treated with every consideration, and I shall always remember with pleasure the hours I spent in their company, and the kind words of encouragement addressed to me by Dr. Maclagan.

Some member of the Council lately asserted that Dr. Maclagan examined the candidates as to their microscopical knowledge. This I believe to be incorrect. Dr. Maclagan certainly conversed with me on the subject, and I examined various objects with the microscope, but I never understood that that was any portion of my examination.

I, however, must conclude; but will add that I think the greatest average of candidates who pass in Edinburgh arises from two causes: the better men preferring Edinburgh, and the greater amount of care taken by that board of examiners to thoroughly test the capabilities of the candidates. I only wonder more do not avail themselves of the opportunity of visiting Scotland, and I am confident this would be the case if a lot of the "students" only thought they would be more likely to pass there than in London.

England.

February 23, 1875.

Adulteration of Food and Drugs Bill.

Sir,—This Bill has now been read a second time before the House of Commons and promises speedily to become law. It is as well, therefore, for all who are interested or concerned in its working to give the subject their careful consideration, for the purpose of pointing out defects and remedying errors.

I have watched the operations of the present Act, and have been attempting to discern in the future the results which will follow the enforcement of the new Bill. My first impression is that there will be a scarcity of suitable men to fill the appointments which will have to be made, and my second, that no body of men can be so readily fitted to occupy these posts as pharmaceutical chemists. It will be as well, therefore, for these gentlemen to devote as much attention as possible to the subject, so as to be enabled to seize the advantages that may be offered them of thus adding to their incomes.

I think the new Act more clearly defines the duties, etc., of the analyst, and it will not be quite so perplexing to magistrates, who may, therefore, be able to arrive at decisions not quite so diverse as heretofore. The parts of the Act treating of the "proceedings against offenders," "expenses of executing the Act," and the "special provision as to tea," will ultimately greatly facilitate its working, and will at once remove or prevent the infliction of such hardships as the retailer has had to suffer where the present Act has been strictly enforced.

In the future, vendors of articles of foods and drugs will certainly not be able to grumble at the definition of adulteration which is given by this Act. The person who adds salt to his cayenne may claim that it is added to improve its appearance, and consequently that it comes under the exceptions of clause 6. If lead is found in a mineral water, the manufacturer may plead that it has not knowingly been added. These exceptions under clause 6 are the weak points in the Bill, affording numberless pretexts and excuses to the fraudulent adulterator. Yet possibly it may be better that the Act should be too lenient than too severe. Clause 7, however, will afford many analysts an opportunity of certifying an adulteration, and may cause many frivolous and vexatious prosecutions. On the whole, however, I think the Act may work as satisfactorily as it is possible for any Act to do which has to deal with so subtle and complex a subject. My prognostications, however, are not worth much, for experience only can fairly prove the merits and demerits of such a Bill.

I almost think "adulteration" could have been more clearly defined by the following clauses:—

1. The addition to any article of food or to any drug of any ingredient for the purpose of increasing its weight or bulk so as thereby to yield an increased profit to the vendor and mixer.
2. The addition to any article of food or to any drug of any colouring or other matter for the purpose of imparting to an article of inferior value the appearance of one of better quality.
3. The abstraction from any article of food or from any drug of any ingredient whereby its value as a dietetic or as a medicine shall be impaired.
4. The partial or complete substitution of any substance for any article of food or for any drug.
5. The presence in any article of food or in any drug of any deleterious substance, either purposely added, or arising from imperfect purification, or from defects in the method of preparation.

No person should, however, be guilty of an offence who, selling any article of food or drug mixed with any substance not positively injurious to health, duly labels the same at time of sale with the names of the ingredients contained in the mixture. Should, however, any deleterious substance be present, the vendor should be liable to the full penalty of the law.

J. C. Thresh.

Buxton.

The Chemistry of the "Tar Antiseptics."

Sir,—In the *Pharmaceutical Journal* of 13th inst. a letter appears by Mr. C. Lowe which contains some strictures on a paper of mine on the chemistry of the tar antiseptics, published in your issue of the 9th ult. I should not have noticed a communication so manifestly biassed were it not that the statements made therein, whilst professing to correct error and convey true information, are in reality of a most careless and unguarded character.

Mr. Lowe states that I began by giving a much too general outline of the process of coal gas tar distillation. In other words, if Mr. Lowe had had the conduct of the paper he would have occupied the time of the evening with discursive and needless details upon matters indirectly connected with the subject in hand. My time being limited it was necessary to give most of the processes in outline only, and Mr. Lowe's insinuation that the phenol I described might contain various impurities is inconsistent with the words I used and is, I fear, suggested by something other than a desire to convey correct information. Several instances occur where the ideas objected to are not found in the words I employed. Mr. Lowe builds a structure of imaginary errors by spelling me backwards a little, and then manfully charges at them and dissipates them. Of this character is the charge that I claim the merit of having discovered pure carbolic acid because I recommended a name less misleading than the term acid. The phrase "absolute phenol" was proposed, and the granular form of this product suggested by me as likely to prove useful, and the suggestion has been amply justified. To the discovery of pure carbolic acid I made no claim, for the reason (sufficient for me) that I did not discover it. The idea is not suggested by my paper, but is the offspring of Mr. Lowe's ready invention.

Mr. Lowe, for the most part, avoids the actual subject of the paper, and points to the necessary want of detail in matters that are briefly named: he objects to my process for preparing rosolic acid, and states that the greater portion of the phenol is not present as sulphophenic acid. I can only say that if Mr. Lowe does not bring the greater portion of the phenol into that form he works in a crude and wasteful manner. My statement that rosolic acid could be obtained in a crystalline form from the aurin of commerce when freed from (not "by the removal of," as Mr. Lowe misquotes) excess of phenol is described as incorrect. Without wishing to give the "reply churlish," I will merely repeat my statement. I referred at Liverpool to Messrs. Dale and Schorlemmer's paper for the details which, as in other cases, it was impossible to enlarge upon. With reference to the nonformation of rosolic acid under the conditions described by Smith and Jourdin, I accept the more recent results of Caro.

Mr. Lowe is also querulous on the process given for producing picric acid, although it is strictly accurate; but for reasons already given, the modifications and minutiæ necessary for economic production on a manufacturing scale were not described in detail.

Mr. Lowe approaches the actual subject of the paper where he treats of my description of pure phenol—and here, at last, two statements which I have distinctly made, are distinctly impugned and correct information volunteered. I state that the boiling point of pure phenol is 184° C., whilst Mr. Lowe states it to be 182°; and further adds, that these two degrees of boiling point indicate a material impurity in the acid boiling at 184° C. In another place Mr. Lowe refers to Messrs. Dale and Schorlemmer as trustworthy authorities, and I should be equally willing to accept their statements on a scientific point. In the *Journal of the Chemical Society* for 1873, p.441, these gentlemen in speaking of their experiments on aurin, say, "We therefore prepared the colouring matter from pure phenol boiling quite constantly at 184° C., and melting at 42°, a large quantity of which was kindly placed at our disposal by Messrs. Chas. Lowe and Co." Mr. Lowe must either admit that 184° is the correct boiling point, or that his "pure" phenol contains a material amount of impurity.

I also state that pure phenol is not deliquescent, and this statement is improved by Mr. Lowe as follows:—"As regards the non-deliquescent properties of pure phenol, Mr. Bickerdike does not seem to have recognized the fact that pure phenol attracts moisture from the air like pure cresol, the hydrate in the one case being solid and in the other case liquid at ordinary temperature, etc." I certainly do not recognize the similarity which Mr. Lowe describes; the absorption of moisture in the case of phenol being extremely slow as compared with cresol and the non-deliquescence of pure phenol is one of its most conspicuous properties, distinguishing it from the qualities contaminated with cresol.

The above remarks, which include all the objections enumerated, will enable your readers to estimate the value of Mr. Lowe's critical method, which would doubtless be more effective if it were rather more guarded and less impetuous.

W. E. Bickerdike.

Eagle Chemical Works, Church, near Accrington, February 16, 1875.

Sir,—In your Journal of the 13th inst., there appears a letter signed "Chas. Lowe," purporting to be a criticism of a paper read before the Liverpool Chemist's Association, by Mr. W. E. Bickerdike, on "The Chemistry of the Tar Antiseptics." In this letter the following paragraph appears:—"Mr. Bickerdike's partner, Mr. Bowdler (a chemist for some time in the employ of the late Dr. Calvert), should have been able to give him more correct and extended information with regard to pure carbolic acid and its properties than is displayed in his paper."

I have carefully perused the paper of Mr. Bickerdike, and as your readers will note, no reference whatever is made to my name or to the name of our firm, which appears to have been studiously avoided by Mr. Bickerdike, and very properly so, as it was given at request and not for trade purposes. Mr. Chas. Lowe (like myself, a chemist formerly in the employ of the late Dr. Calvert, as he chooses to express it), is, therefore, making an unwarrantable use of my name in thus introducing it into his letter.

With the paper of Mr. Bickerdike I have had nothing whatever to do, and as he is well qualified to reply to Mr. Lowe's insinuations, I have no doubt he will do so.

Mr. Lowe having referred to my connection with the late Dr. Calvert, I may add that having had the management of the works of Messrs. F. C. Calvert and Co. in my hands, I am acquainted with the growth and development of this branch of manufacture, and it would have given me some satisfaction to have read the generous admission of Mr. Lowe, that pure carbolic acid "is well known in the trade, being manufactured by our firm (C. L. and Co.), and that of F. C. Calvert and Co.," were I not informed that Messrs. Lowe and Co. have recently acquired the name and use of the works of Messrs. F. C. Calvert and Co.

Mr. Lowe further says, that a full description of the product and process of its manufacture was published simultaneously by the late Dr. F. C. Calvert and himself in 1867; but Dr. Calvert had already. in 1865, published a paper which appears in the Chemical Society's Journal for that year, "On a Crystallized Hydrate of Phenylic Alcohol," in which, singularly enough, no reference whatever is made to Mr. Chas. Lowe, and yet this preparation of a crystallized hydrate and its subsequent purification is the subject of C. L. and Co's. specification dated April 24, 1874, and constitutes "the letters patent" to which he refers.

My attention has recently been drawn to a printed price list of Messrs. F. C. Calvert and Co., dated October 1st, 1872, to which has been added a note in red ink dated January 1st, 1875, to the effect "that pure carbolic acid can only be obtained from F. C. C. and Co., as the manufacture and sale of this product is fully protected by patent and trade mark."

As the purpose of this is so manifest and calculated to mislead, I may state for the information of your readers, that I know of no bar whatever to prevent any person from carrying on the manufacture of pure carbolic acid if they can do so with any profit and can supply a satisfactory product.

We have done this for the last seven years according to the process of the late Dr. Calvert with such modifications and improvements as experience has suggested.

Perhaps the fact that the manufacture of some considerable quantity of carbolic acid has been placed in our hands, may account for this unnecessary attack upon myself; if so I would simply commend to Mr. Lowe's attention, what is applicable to business as well as to life, namely Darwin's doctrine of "the survival of the fittest."

Arthur C. Bowdler.

Church, February 16, 1875.

F. Balkwill.—"Ess. Amygd. Amar." is generally made by mixing one part fluid of the essential oil of almonds, freed from prussic acid, with seven parts of spirit of wine, 56 O.P.

J. P. A.—There is no "Irish Pharmacy Act." The only persons at present entitled to dispense the prescriptions of qualified practitioners in Ireland are the Licentiates of the Apothecaries' Hall of Dublin. The Government has promised, if possible, to bring forward, during the present session of Parliament, a Bill, having for its object the remedy of the inconveniences resulting from this state of the law.

A. B.—Resin of guaiacum can be detected by its alcoholic solution rendering the fresh-cut surface of a potatoe *blue.* We know of no reliable test that will distinguish resin of scammony as obtained from scammony of trade by means of ether, from resin of scammony made direct from the root by alcohol.

"*Country.*"—Neither Members nor Associates have a right to make use of the arms of the Society in their individual capacity.

E. J.—The label does not appear to be liable to a stamp, but we are unable to state positively that this would be the view of the excise authorities.

C. D.—(1) Apply to the Secretary of the University, Mr. Thomas Gilbert. (2) We have no knowledge of such a book.

Giving Copies of Prescriptions.—"*Desideratum*" complains of what he considers to be a growing evil, of persons asking for copies of prescriptions that have been entered in the books of one establishment, for the purpose of taking them to another to be dispensed, and suggests that in such cases a charge should be made. The necessity for such a course is obvious, unless, indeed, it would not be better to refuse to supply such copies at all.

"*Minor.*"—Undoubtedly the dispensing of medicines by medical men, and the cutting down of prices by some chemists and druggists, are evils to be regretted; but we fail to see that those practices would justify a chemist and druggist in attempting the performance of duties for which he is unqualified.

T. Walton.—The study of books alone will not be "sufficient" to enable you to pass the examination in the subjects mentioned. With this qualification the books referred to are well adapted for the purpose; but it is not advisable to confine your reading to a single author. (2) A formula for Syr. Ferri et Calcis Lacto-Phosp. will be found in the *Pharm. Journ.* for Jan. 31, 1874, p. 610. (3) The following has been published as the formula of "Composition Powder" (Dr. Coffin's):—

℞ Pulv.	Bacc. Lauri.	℥iv.
	Zingib. Opt.	℥ij.
	Pini Canadensis	℥j.
	Caryophyllarum.	
	Pip. Cayenne, ana	℥ij.

Mix. Dose: a teaspoonful in a cup of hot water, sweetened.

H. F.—The prescription is one concerning which, if you have any doubt, it would be advisable to communicate with the prescriber.

T. Randall.—Some of the anilin dyes would probably answer your purpose. See p. 690.

"*Français.*"—With the first preparation we are unacquainted; the second is a proprietary article, the composition of which we are unable to state.

W. G. W.—The Registrar will deal with such cases as they arise.

J. Whitfield.—We are informed by the Assistant-Solicitor of Inland Revenue that the article recommended in the handbill forwarded by you is liable to the medicine stamp duty.

Communications, Letters, etc., have been received from Mr. J. Farmer, Mr. Bell, Mr. Candy, Mr. Rimmington, Mr. Learoyd, Mr. Chipperfield, Professor Flückiger, Inquirer, Common Sense, A Working Assistant, A. A., G. F., (Vienna), M. P. S.

LEAD PLASTER.*

BY CHAS. UMNEY.

At the meeting of the British Pharmaceutical Conference held in London last year, a most interesting paper upon the official plasters was read by Mr. A. W. Gerrard,† who, in commenting upon lead plaster, is reported to have said that it was "too soft and sticky;" in which statement he was corroborated, in the discussion that ensued, by several pharmacists.

At that meeting I said that I looked upon the proportions given in the British Pharmacopœia as a mistake, also that the formula of the London Pharmacopœia ordering a larger quantity of litharge would produce a better lead plaster than that made by the official formula.

Professor Redwood argued in the opposite direction, and said the alteration to the present proportions had been made with the express object of making the plaster more sticky, also, that the amended formula closely approximated that used some years ago by Dr. Scott, who was "a medical man celebrated in wound cases at that period."

Mr. Giles following Professor Redwood said:—

"I think what has been said is a very sufficient answer to the remarks made with regard to emplastrum plumbi, as a plaster standing by itself, but it leaves us in the same embarrassment, with reference to the production of this plaster as a basis for other plasters. Undoubtedly the consequence of the change has been to make the other plasters of the Pharmacopœia inconveniently sticky, and, as a matter of fact, I believe, wholesale houses have modified the form, and that we do not now get them strictly according to the B. P. I do not know that there is any harm in that, but in a future edition it might be advisable to introduce an emplastrum adhesivum, where a sticky plaster is required, and the old emplastrum plumbi, as a basis for other plasters."

Here the discussion dropped, but only to be renewed in the correspondence columns of the *Pharmaceutical Journal* of September (page 240) and October following (page 319), by writers who strongly upheld the superiority of a plaster made with a quantity of litharge equal to, or even in excess of, that of the London Pharmacopœia.

As it appeared that the views I held and expressed at the Conference meeting were also shared by others, notwithstanding the contrary opinion Professor Redwood then expressed, I determined to make further experiments, and test the accuracy of my former conclusions.

Accordingly, in the early autumn, I went through the same process I had used ten years previously when the first British Pharmacopœia (1864) was introduced (in which the formula was first altered), and manufactured both on the small and large scale.

The plaster produced on the small scale (7lbs.) was made strictly in accordance with every direction, as was that on a large scale (150lbs.), save the time it was boiled—six hours, at least, being devoted to the making and final heating of the plaster, with a pressure of steam ranging from one to one and a half atmospheres.

The product in appearance was not dissimilar to lead plaster properly made by other formulæ, but the manipulation was difficult, and it was soon discovered, by those accustomed to shape the plaster, that some alteration had been made in the proportions of ingredients.

Even at that season (September) it was impossible for the plaster to be used for some days. Eventually it was disposed of, with a result corresponding to that so well remembered ten years previously, viz.. *complaints and disappointments*, anything but satisfactory from a commercial point of view.

Fearing there might be a prejudice on my part against the official formula, I determined to submit specimen rolls of both British Pharmacopœia and London Pharmacopœia plasters to a few pharmacists, without any remark or identification than distinguishing letters, asking their opinions upon them as adhesive plasters, and also their suitability as a basis for other plasters.

The replies I received in favour of the London Pharmacopœia plaster were six, one only giving preference to that of the British Pharmacopœia, appending to his remarks "that he had only had an opportunity of experimenting upon it as adhesive plaster, and not as a basis for other plasters."

I will not trouble you by reading these communications, for I see some of the gentlemen who kindly favoured me with their opinions are here this evening: with your permission, however, I will read you *three* extracts from their letters.

(*a*) "The samples are not difficult to distinguish, no doubt the one marked 'A' is the B. P. judging from its softness and the greasy stain it imparts to the wrapper, which is due to uncombined oil.

"The spread plaster of this has more the character of a resin ointment than lead plaster, so that when applied to a limb it does not impart firmness, but soon gets out of place; on the other hand the plaster marked 'E,' (P. L.) is firmly adhesive, retaining its position and supporting the parts to which it is applied."

(*b*) "The B. P. plaster, when spread, took longer in hardening or drying, and is now, after six days, unfit for folding or rolling up, except in cold weather. For the commercial plaster manufacturers P. L. would be preferable to B. P."

(*c*) "The B. P. is undoubtedly more "sticky" when cold and fresh than the P. L., but the latter has the advantage of being firm when cold, and equally sticky when warmed.

"After application the B. P. gets so soft from warmth that it slips, and will not keep the edges of wounds together."

"These experiences are partly those of medical men."

"A much more satisfactory plaster can be made when using alcoholic extracts of aconite and belladonna, with the P. L. emp. plumbi, as a basis."

So much then for the opinion of these gentlemen upon the plaster I forwarded to them for experiment. Just one opinion more, from one who has been occupied at least a quarter of a century in the manufacture of pharmaceutical preparations on a large scale.

He writes—"Tried to supply the B. P. article at first, but finding it was not satisfactory, we adhered to our old form and shall continue to do so, unless some evident improvement be suggested. Practical men know that it would be absurd to attempt the supply of the B. P. plaster during the heat of summer."

Enough has been said to show that the lead plaster of the British Pharmacopœia is not generally approved, and that in trade it is still the custom

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, March 3, 1875.

† *Pharm. Journ.*, Aug. 29th, 1874.

to use a formula approximating, if not coinciding with that of the last London Pharmacopœia.

Lead plaster, as you know, is neither a novelty nor is its use confined to Great Britain, for it has stood the test of at least two centuries, and is now used throughout the civilized world.

I would ask you to glance at a table I have prepared showing the proportions of litharge to *one hundred parts* by weight of olive oil, or of lard and oil, or lard only, as formerly used in Great Britain and Ireland, when we had three Pharmacopœias, and as now used on the continents of Europe and America.

Pharmacopœia.	Olive Oil.	Lard.	Litharge.
London, 1746	100	...	56·0
„ 1824	100	...	56·0
„ 1851	100	...	53·8
Dublin, 1850	100	...	54·5
Edinburgh	100	...	49·9
United States......	100	...	53·5
France..............	50	50	50·0
Germany............	50	50	50·0
Austria	...	100	50·0
Greece	100	...	55·5
British, 1864 & 1867	100	...	43·6

It would seem from this table that the amount of litharge did, and now does, vary from 50 to 56 parts to 100 by weight of oil, or a mixture of lard and oil, as in France and Germany, or lard only, as in Austria, and as far as I have been able to ascertain, no official formula in any Pharmacopœia has given a proportion of litharge so small as that of the British Pharmacopœias.

The custom of the trade in this as in most matters, must be of considerable importance in deciding the question at issue.

From inquiry I have made, not only in London but in other cities, I find that emp. plumbi is seldom made on a large scale by the official formula for druggists' use, but that from 50 parts to 60 parts of litharge to 100 parts by weight of oil is more generally adopted, and that in no case (as far as I have been able to ascertain) do the manufacturers of the adhesive plaster of surgery and trade, which is spread in hundreds of thousands of yards annually, use the lead plaster of the British Pharmacopœia.

The composition of the British Pharmacopœia plaster may be described as a lead soap, with undecomposed olive oil.

To support this statement I would refer to the greasy appearance presented by a piece of paper when the British Pharmacopœia plaster is spread, also to its great proneness to rancidity upon keeping, and to the following experiment:—

10 grammes of lead plaster of the London Pharmacopœia was thoroughly beaten with 5 grammes of hydrated carbonate of potassium, and treated to exhaustion with alcohol (·825), the measure being finally made to 1 litre.

The B. P. plaster was treated by precisely the same method.

The resulting solutions of potash soap (Clarke's soap test) were then estimated by a solution of chloride of calcium (= ·0001 gramme $CaCO_3$ to each c. c.).

I found that while 17 c.c. of the soap solution made from the P. L. plaster produced a perfect lather with 100 c.c. of the lime test, it took 18·5 c.c. from the B. P. plaster to produce a like result, showing that there was in the latter an insufficiency of litharge to convert the whole of the oil present into a lead soap; for had sufficient been present then the British Pharmacopœia plaster, containing as it does 69·6 per cent. of soap-forming material (oil) against 65 per cent. of the London Pharmacopœia, would have produced a soap test of as much greater strength as compared to that from the London Pharmacopœia plaster, as 69·6 : 65 = 6·6 per cent. stronger.

Of course I do not for one moment pretend that the proportions for lead plaster can be calculated, but if these figures mean anything, according to my view they prove that free oil is unmistakably present in the British Pharmacopœia lead plaster.

The questions before us then are these:—Is it desirable, knowing how prone olive oil is to rancidity after protracted boiling and exposure to air, to have any excess present in adhesive plaster?

Is it desirable to have a plaster as near neutral as possible?

Granted, that a plaster with a larger proportion of litharge than the B. P. directs is not as "sticky," in the first instance, as the B. P. plaster itself; but when once attached possesses sufficient adhesiveness to maintain itself and the surface to which it has been applied with rigidity,—is not such a plaster preferable to one that does not possess sufficient permanent adhesiveness, but soon becomes detached?

Is it desirable in the publication of a formula for lead plaster to insert such a one as is opposed to the usages of trade, which manufacturers of an adhesive plaster cannot use?

Is it not desirable to adopt a formula which is almost identical in the proportion of litharge throughout the world?

These are matters for discussion, and upon them I ask your opinion this evening.

The emplastra are not held in the esteem they were in the first half of this century, although the Committee of the proposed International Pharmacopœia would lead us to believe, from the number they purpose introducing into that work, that in some countries plasters are fashionable remedies.

Still it is, I imagine, advisable that while we are called upon to produce plasters, and notably lead plaster, the basis of so many others, we should prepare them in the most desirable form.

My own experience (and in this opinion I know I am not alone) is, that the simple formula of

Litharge . . . one part,
Olive Oil . . . two parts

would be the best under all circumstances for our national Pharmacopœia.

[*The discussion on this paper is printed at p.* 716].

THE ESTIMATION OF FAT IN MILK.*

BY EDWARD LAWRANCE CLEAVER.

The method of milk analysis now generally adopted by analysts for determining whether milk has been adulterated by the admixture of water, is based on the fact that the amount of "solid matter not fat" in milk is very constant, and therefore all samples of milk in which the "solid matter not fat" falls below a recognized standard are to be considered as admixed with water, regard, of course, being paid to the total solid matter in the case of milks exceptionally rich in fat.

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, March 3, 1875.

The determination therefore whether milk has or has not been adulterated with water depends mainly on the accuracy with which the fat has been estimated, and the object of this paper is to compare the processes now in use for that purpose, to point out their defects, and to provide a means by which those defects may be greatly, if not entirely, remedied.

The processes in general use are as follows :—

1. A large quantity of milk, say 1000 grains, is evaporated to dryness with constant stirring, in order to prevent the residues from adhering to the sides and to obtain them in a granular condition. These residues are then transferred to an apparatus similar to that used for the estimation of oil in cake, meal, etc., and the operation is conducted in the usual manner. This process is amongst the most accurate, but the time occupied in its performance constitutes a great objection.

2. A smaller quantity than the preceding, say 200 grains, is evaporated to dryness as above, weighed, and the residue macerated with cold ether ; this ether is then poured off, evaporated to dryness, and the resulting fat weighed, or the fat is calculated from the loss in weight sustained by the solid matter. The objections to this process are numerous. Firstly, the fat cannot be extracted from milk solids by cold ether, especially when they are in the hard granular condition produced by evaporation to complete dryness. Secondly, the ether, unless filtered, will hold in suspension innumerable fine particles of the solid matter, and although the ether may appear perfectly clear when poured off, yet, on being left at rest a short time, a deposit will be found upon the bottom of the containing vessel. Thirdly, on drying the residues the ether mechanically enclosed causes them to decrepitate and fly about. The evaporation of the ether is also worthy of some attention, for when ether is evaporated over a water-bath, the ether is almost certain to enter into ebullition, and the bubbles of vapour in escaping carry off with them a large quantity of the fat.

3. The milk is evaporated to a pasty condition and treated with warm ether, the ether poured off, evaporated to dryness, and the resulting fat weighed. This method is open to the same objections as the preceding.

4. The method proposed by Mr. Horsley, of Cheltenham, is the next I have to consider. It is based on the principle that the butter fat can be dissolved out from milk by agitation with ether, and can be set free from solution by the addition of alcohol, its volume is then ascertained and the weight calculated from that volume. There are, however, some objections to this method. 1st—The precipitate caused by the addition of the alcohol forms a mass which encloses the fat mechanically within it, and therefore prevents it from rising to the surface. 2nd—If the temperature be low, the globules of fat solidify and these solid particles do not rise so readily as when liquid, and the fat takes some hours to completely rise to the top of the liquid. These two difficulties can be, however, overcome by adding 5 or 6 drops of a 10 per cent. solution of caustic soda to the milk before agitation, and after the alcohol has been added placing the tube in warm water in order to keep the fat in a liquid condition.

When making use of this method at first, I found that I always obtained a higher percentage of fat than by other plans, and thinking, therefore, that the instrument might have been improperly graduated I proceeded to ascertain if that was the case. I found that when a known amount of pure dry butter was placed in one of these tubes and the operation performed as with milk, the volume of fat set free exactly corresponded with the weight added, but that if, when operating on milk, the fat was removed from the tube by a pipette, and estimated by evaporation and weighing, I never obtained the quantity indicated by the volume ; and I am, therefore, led to the conclusion that, although the instrument has been graduated correctly when butter has been taken as the standard, yet owing to the condition in which the fat in milk is (namely, that of an emulsion), a larger quantity of ether is retained by the fat, and consequently the amount indicated is too high ; each division, in fact, should correspond to 3·8 grs., by weight, of fat, instead of 4·15 grs. Further experiments on this point are, however, perhaps desirable. The points I have established during my experiments on the above processes are as follows :—

1. *Cold ether* will not dissolve out the entire amount of fat from dry milk residues.

2. *Boiling ether* will not dissolve out the entire amount of fat from milk residues when in a pasty condition.

3. *The residues should be in a state* of fine powder, and must be boiled three or four times with successive portions of ether in order to thoroughly extract the fat ; the ether being always passed through a small filter before evaporating.

4. *During evaporation care* should be taken not to allow the ether to enter into ebullition.

Bearing these points in mind, I have endeavoured to devise a process in which the loss of fat is reduced to a minimum. It is as follows : Ten grammes of milk, or 10 cub. cent., are put into a small dish and evaporated to complete dryness, constantly stirring towards the end of the process with a glass rod enlarged at the end so as to break up all small lumps to obtain the residues in a fine powder. The residues are then transferred to a long narrow tube ; one of Mr. Horsley's tubes answering well for the purpose. The dish is then rinsed with ether and the ether added to the residues in the tube.

A piece of damp cloth is held round the top of the tube, the mouth being closed by the thumb of the operator. On immersing the tube in a water-bath the ether begins to boil, and the pressure can be so regulated by the thumb of the operator that the ether may be kept in gentle ebullition, although at a temperature considerably above its boiling point. The ether is then poured off through a filter, and the operation repeated several times, not less than four, as I have frequently, in the *fourth* treatment, obtained as much as one-eighth part of the whole quantity of fat previously extracted. The filter is then washed with a small quantity of ether, and the evaporation proceeded with. This I effect by directing on to the surface a current of air from a bellows or foot blower, either warm or cold ; completing the operation by a few minutes over a water-bath. Two fluid-ounces of ether can easily, by this means, be evaporated off in ten minutes without any fear of loss by ebullition. By this method I am enabled to extract from ·5 to 1 per cent. more fat than by other methods ; and, in fact, to nearly approach the amount shown by Mr. Horsley's lactometer ; and it will, in practice, be found to be very little more trouble than the ordinary methods, whilst on the score of accuracy, it leaves but little to be desired.

[*The discussion on this paper is printed at p.* 718.]

NOTES ON SOME UNITED STATES' DRUGS.*

Bitter Principle of Wild Cherry Bark. By John L. Williams, Ph. G.—The author did not succeed in completely isolating the bitter principle of wild cherry bark. The following process gave the most satisfactory results:—

An aqueous infusion of the bark was concentrated, filtered, mixed with an equal volume of alcohol, and, after standing for twelve hours, filtered. The liquid was treated with milk of lime, the filtrate evaporated to a syrupy consistence, a large quantity of alcohol added and the filtrate evaporated. The residue was exhausted with boiling alcohol, which on spontaneous evaporation yielded a transparent brownish residue, of a somewhat gelatinous aspect. It possessed a bitter taste, was insoluble in ether, soluble to a limited extent in water, more soluble in alcohol, particularly if heated. Concentrated sulphuric acid coloured it brown red; cold nitric acid had but little effect upon it.

Actæa alba, Bigelow. By William Dilmore, Ph. G.—This plant is popularly known under the name of white cohosh, white beads, Noah's ark, and necklace weed. The rhizome with the rootlets, which is the portion medicinally employed, has at first a sweetish-bitter, afterwards acrid taste, followed by a peculiar irritating sensation upon the fauces.

The distillate with water possessed the odour of the root and a slight taste. The infusion and decoction were found to contain albumen, gum, sugar, starch, and extractive, but neither tannin nor gallic acid. The alcoholic tincture contains two resins having the acrid taste of the root, both of which are soluble in alkalies and reprecipitated by acids, while ether dissolves one only. After the concentrated tincture has been precipitated by water, and the resins filtered off, the liquid froths considerably on agitation, and contains a principle analogous to saponin, which may be obtained in a still impure condition by evaporating the liquid, extracting the residue with diluted alcohol, decolorizing by animal charcoal, and agitating with ether, which on spontaneous evaporation yields a brown, translucent and brittle substance, having a bitter and acrid taste. It is soluble in alkalies, water, diluted and strong alcohol, assumes with warm sulphuric acid a rose colour, changing to purple, and finally violet.

Cypripedium acaule, Lin. By H. Northam Bryan, Ph. G.—The attention of the author was attracted to this plant from observing persons engaged in collecting its subterraneous portion, and, upon inquiry, being informed that it was to be used as an emmenagogue; afterwards, the effects of this rhizome with rootlets were observed, tested in several instances with apparent success. The drug, when fresh, has a rather strong and heavy odour and a bitter taste, and in the dry state is of a dark-brown colour.

Only a limited quantity of the material could be procured for experimental purposes, from the results of which it appears that it yields, on distillation with water, a minute quantity of volatile oil; to carbon bisulphide and to alcohol, some resinous matter, which is wholly soluble in ether, and to ether about ten per cent. of solid matter, which is only partially dissolved by alcohol, the insoluble portion giving a blood-red colour with sulphuric acid. The presence of tannin, sugar, and starch was likewise proved.

NATURAL PRODUCTS OF PERSIA.

In a paper printed in the last number of the *Journal of the Linnean Society*, "Some Observations on the Vegetable Productions and the Rural Economy of the Province of Baghdad," Surgeon-Major W. H. Colvill gives some interesting particulars of the flora of the strip of alluvial land watered by the Euphrates and the Tigris, and lying between the Arabian desert and the tableland of Persia, once the garden of the world, but now possessing an extremely poor flora; after a diligent search the writer could not succeed in collecting more than 100 species. There is in this district not a hollow to shade a plant or retain moisture; there is no land of intermediate character between the dry level plain and the reedy swamp. It produces grapes, but remarkable neither for appearance nor variety: the chief grains are barley and wheat, three varieties of each. The same land yields also, when irrigated, a summer crop of onions, beet-root, turnips, melons, cucumbers, brinjals, and bamias (*Abelmoschus esculentus*). Three varieties of rice are grown, as well as millet (*Panicum miliaceum*) and ethera (*Sorghum vulgare*) in small quantities. The only palm is the date-palm, and that requires very careful cultivation, and is commonly grafted, it being very rare to find one that has been grown from seed. The sex cannot be ascertained till they are a year old. There are at least twenty-six different varieties, the best coming from Il Hissah and Shitolah, oases in the desert watered by perennial springs. Among Rhamnads the Mabk is doubtfully indigenous; it is the largest tree in the country, flowering twice in the year. At the end of July it produces fœtid flowers and fruit ripening in September or October, but full of worms and quite uneatable; in February it again produces flowers, which are scentless; the fruit, the size of a large filbert, ripens in April, when it is considered to be in perfection, having much the flavour of a wizened apple. The tamarisk forms the chief part of the brushwood which fringes the banks of the rivers, and is the chief source of charcoal and household fuel. It does not appear to produce manna. Of plants yielding drugs there are only two in the whole country. One of these is the caper-bush, from the young shoots and delicate leaves of which a decoction is made and taken as an aperient and anthelmintic, being used with good effect in cases of round worm. Another plant which the writer was unable to determine was made use of by burning the root and branches, the dark ash being employed in medicine and soap-making. It consists chiefly of soda or potash, and is called "kali," obviously the origin of our word alkali.

* Abstracts from Essays presented to the Philadelphia College of Pharmacy; from the *Amer. Journ. Phar.*

COLOURED INKS.

The following recipes are stated by the Boston *Journal of Chemistry* to have been well tested and to be recommended by good authorities as preferable to the solutions of aniline dyes which are now so extensively used as coloured inks:—

Green.—Two parts of acetate of copper, one part carbonate of potash, and eight parts water. Boil till half is evaporated, and filter.

Blue.—Three parts Prussian blue, one part oxalic acid, and thirty parts of water. When dissolved, add one part of gum-arabic.

Yellow.—One part fine orpiment, well rubbed up with four parts thick gum-water.

Red.—With the aid of a gentle heat, dissolve four grains of carmine in one ounce of aqua ammonia, and add six grains of gum-arabic.

Gold.—Rub gold-leaf, such as is used by bookbinders, with honey, till it forms a uniform mixture. When the honey has been washed out with water, the gold powder will settle at the bottom, and must be mixed with gum-water in sufficient quantity.

Silver.—Silver-leaf treated in precisely the same manner gives a silver ink. Both these inks may, when dry, be polished with ivory.

Black.—Three ounces crushed gall-nuts, two ounces crystallized sulphate of iron, two ounces gum-arabic, and twenty-four ounces water.

White.—Fine French zinc-white, or white-lead, rubbed up with gum-water to the proper consistency.

The Pharmaceutical Journal.

SATURDAY, MARCH 6, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF FOOD AND DRUGS BILL. DEPUTATION TO THE LOCAL GOVERNMENT BOARD.

In pursuance of the instruction given by the Council the Parliamentary Committee met on Thursday morning, and the President, the Treasurer, Messrs. Greenish, Owen, and Sandford, accompanied by the Secretary, proceeded to the Local Government Board and had an interview with Mr. Clare Read and Mr. Lambert, the Permanent Secretary to the Board.

It was emphatically represented to these gentlemen that one of the chief objects of the Pharmaceutical Society from its commencement had been to secure greater purity in drugs, not only by drawing attention from time to time to adulterations which might be discovered, but also by advancing the education of chemists and druggists, thus rendering them better able to judge of their quality; that the Society would in no way lend itself to the perpetuation of such frauds as the Adulteration Act was intended to prevent; but that so many cases of injustice had arisen in carrying out the present Act, either through its defective wording or misinterpretation, that they felt bound to thank the Government for the evident spirit shown in the new Bill to render the law less obnoxious in its operation.

It was pointed out that the proposed amendments appearing on the notice paper of the House of Commons included one to erase the word "knowingly" in almost every case in which it occurs in the Bill. The injustice of doing this, so far as regards the retailer, was urgently represented, and great stress was laid on maintaining the principle expressed by that word in the Bill. The word should be properly interpreted *fraudulently,* and it should certainly be open to an accused party to prove that he had not been guilty of fraud. He might do this in various ways; one being a *proof* that he bought his drugs in the best market, at a fair price, and with a reasonable belief in their purity; and *proving* this he should be regarded as an innocent man.

It was further urged that the difficulty of discovering some adulterations was so great that even skilled analysts varied respecting them, and that it was not fair, therefore, to convict an ordinary dealer on an *implied* knowledge of them. Attention was also drawn by the deputation to the necessity of great care being taken in the appointment of analysts, that it was not always the most celebrated chemist who would be the most trustworthy public analyst for the purpose of the Act, inasmuch as a certain knowledge of the ordinary condition of articles was required to enable a man to judge fairly.

The question of penalties was discussed, 50*l.* for a first offence, and six months' imprisonment *with hard labour* for a second being considered excessive.

Certain amendments were suggested by the deputation in various parts of the Bill where words occur which would materially interfere with the every day compounding of drugs and possibly with the manufacture of "proprietary medicines."

Both Mr. Clare Read and Mr. Lambert treated the deputation with the greatest courtesy, took notes of the suggestions offered and promised to give full consideration thereto.

On Thursday evening the House of Commons went into Committee *pro formâ,* but immediately reported after ordering the Bill to be reprinted, and as amended it is to be recommitted on Friday, the 19th of March.

THE HULL "MORNING TONIC" CASE.

On behalf of the Commissioners of Inland Revenue, the Collector of Inland Revenue at Hull has waited on Mr. Travis, the magistrate who heard the recent case against Mr. Staning for an alleged breach of the law in the sale of "morning tonic," and informed him that having regard to the able and satisfactory exposition of the law on the subject given by Mr. Travis in court, the Commissioners acquiesced in his desire that the case should now end.

EFFECT OF JABORANDI ON THE TEMPERATURE OF THE BODY.

In the description by Mr. Martindale of the effects following the taking of a dose of infusion of Jaborandi, he stated that the temperature was not taken, but that a slight shivering was experienced. This evidence that the drug does not act by increasing the temperature is confirmed by some notes, placed at our disposal by Mr. R. Cory, Surgeon, of Carlisle, who swallowed the infusion and dregs of half a drachm of Jaborandi, and then carefully noted the varying temperatures in the right and left axillæ. The dose was taken at 12.15 a.m., when the average temperature of the two axillæ was 35·2°. In fifteen minutes the temperature had risen to 36°, the highest point reached; it then gradually fell to 35·15, the lowest point, at 1.30 a.m., and by 2.15 a.m. it had risen to 35·35. The pulse increased from 60 at 12.15 a.m. to 74 at 2.0 a.m., at which time the secretion of saliva seemed to be diminishing; the whole quantity expectorated amounted to five ounces. The drug had no diaphoretic or diuretic action on Mr. Cory, neither did it affect his sight or pupils; probably, he thinks, because the dose was not sufficiently large.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

In connection with the above Association, arrangements have been made for holding afternoon classes in the various subjects required by the Board of Examiners, the afternoon being thought to be a convenient time for many persons who are engaged in retail business. An examination is to be held at the end of each term, and prizes will be awarded to the students most distinguishing themselves in the respective courses. Particulars may be obtained by application to the President of the Association, Mr. T. Barclay, 17, Bull Street, Birmingham.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 3rd, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Frazer, Greenish, Hampson, Owen, Radley, Rimmington, Robbins, Sandford, Savage, Schacht, Shaw, Sutton, and Williams.

The minutes of the previous meeting were read and confirmed.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Chamberlain, Arthur Garratt...Rugby.
Corks, Arthur Brownhill.........Worthing.
Stacey, Henry George ....London.
Stamps, Frederick..................West Bromwich.

Chemists and Druggists.

Campkin, Algernon S. ....Cambridge.
Green, Isaac ....Birmingham.
Hall, Thomas... ....Lowestoft.
Spencer, William George.........Wimbledon.
Wood, Jacob ....393, Commercial Rd.

Mr. Henry Walker, of London, an Associate of the Society before 1842, was elected a Member.

ASSOCIATES.

The following having passed their respective examinations were elected "Associates in Business" of the Society:—

Minor.

Barton, William ....Stoney Stratford.
Bracher, Walter Phipps ....33, Euston Square.
Evans, Evan Thomas ....Mountain Ash.
Llewellyn, John ....Cowbridge.
Mellor, Thomas.....................Elton, Bury.
Price, James ....Llangollen.
Sneath, Thomas Dixon .. ..Newark-on-Trent.
Warrior, Henry........................Northallerton.

Modified.

Barnard, Alfred Philip.............Stamford Hill.
Bathe, Robert Samuel ....Notting Hill.
Lambert, George Pitt ....Maidstone.
Martin, Amelius Hare.............Edgware Road.
Mason, Frederick ....Rotherham.
Pearson, Edward ....Nottingham.
Stevenson, Richard Walter......Tetbury.

The following having passed their respective examinations were elected "Associates" of the Society.

Minor.

Attwood, Henry Ernest ... .Edinburgh.
Fletcher, Howard Bennett ......Leicester.
Gilkes, Frederick George.........Banbury.
Moon, Murray James ....Godalming.
Morrison, William Hay ....Aberdeen.
Outred, Thomas Benjamin ......Colchester.
Pell, John ....Market Harborough.
Perry, George Edward............Clapham.
Porter, Albert ....Abingdon.
Walker, Benjamin ....Sheffield,

Modified.

Andrews, John William ....Burslem.
Littlejohn, Alexander ....Aberdeen.
Saunders, John ....Leather Lane.
Wright, Herbert ....Burton-on-Trent.

APPRENTICES.

The following having passed the Preliminary examination were elected "Apprentices or Students" of the Society:—

Ball, Henry Simpson ....Nottingham.
Beken, Alfred Edward............Canterbury.
Bessell, James Walter ....Ludlow.
Boorne, Charles James............Reading.
Elton, Thomas Francis......... ..Cirencester.
Hinkley, Edward ....Newcastle-under-Lyne.
Hudson, William ....Sunderland.
Laing, Richard William ... .Cape Town.
Lee, William Frederick ....Clifton.
Longman, John Ham ....Exeter.
McBoyle, John ....London.
Maggs, Frederick Richard ......Yeovil.
Millen, Herbert Alfred ....Peckham.
Padley, William ....Goole.
Pickles, George William ....Bradford.
Roe, Robert ....Lancaster.
Rogers, Stephen ....Manningtree.
Senier, Alfred, jun. ....Finsbury Park.
Senier, Harold ....Finsbury Park.
Thornber, William .... Preston.
Wills, Andover Vincent ....Blaenavon.
Young, Pelham Charles ....Salisbury.

Several persons were restored to their former status in the Society on payment of a fine and the current year's subscription.

The name of Joseph Charles Nicholls, of 49, Chippenham Road, Harrow Road, was ordered to be restored to the Register of Chemists and Druggists.

Finance.

The report of this Committee was read and adopted, and various accounts were ordered for payment; amongst others, £113 for furnishing and fitting the rooms of the North British Branch, and a sum of £100 for the current expenses of the Branch.

Auditors' Report.

This report, with the financial statement for the past year, was presented.

Mr. Williams said that during the year it appeared that they had received altogether £9500, and had spent it all, allowing for £200 owing to the builders, within £600, which was running rather close. There were certain items which looked rather startling; for instance, the cost of examinations had increased by £450. The Journal, on the other hand, was paying a little better, as it only cost £866 instead of £1000, without, of course, reckoning anything for the cost of the Journals supplied to the members. He hoped that in time the Journal would again show a profit as it did when it was issued monthly, not that he meant to say they did not get value for the £800, but that was the amount required to be provided for.

Mr. Greenish said if the cost of the Journals supplied to persons connected with the Society were charged against the general account, there would be a profit shown.

Mr. Williams continued—According to the Financial Statement, there was only apparently £168 spent on the library, but to that sum must be added the £245 salary of the Librarian and his assistant, which thus brought up the real cost to £413; the general charge for clerks and servants being of course diminished by a similar amount. He thought, therefore, that the Council had acted liberally towards the library this year.

Mr. Savage said there were one or two points which struck him as worthy of remark, and he thought their thanks were due to the Secretary for the admirable details which he had supplied. It appeared that whilst there had been an increase of the Society in the aggregate from pharmaceutical chemists and chemists and druggists to the number of 336, when they came to look at examination statistics, they found that, although 365 more candidates presented themselves this year than in the preceding, there was a diminution of 271 in the number which passed.

Probably the year might be taken as an exceptional one, in consequence of many crowding in to avoid the more strict examination which was expected. The expense for furniture and fixtures, and the house expenses had increased, and also those for repairs and alterations, but that probably arose last year in part from the extensive alterations made in the library.

Mr. SCHACHT said the great fact which struck him was the absence of a certain line in this balance-sheet which appeared in the previous year—namely, the purchase of Government securities to the amount of £2,500. Of course there was something on the contrary side in that year, bringing the amount actually invested to something like £1,500, but on the present occasion there was nothing of the sort. This was worthy of consideration at a time when they were supposed to have reduced their expenses in the teaching department very considerably. These expenses seemed to be distributed over a number of different items, all of which were gradually increasing.

The SECRETARY said he was glad this fact had been called attention to, because it would be necessary to look at it seriously in coming years. The income was now approaching £2,500 from voluntary subscriptions of members who were pharmaceutical chemists and chemists and druggists. The latter description of members would, in course of time, cease to exist, and that source of income, which was now £850, would be cut off. The pharmaceutical chemist members also would materially diminish.

Mr. SANDFORD asked whether there would not be the associates in business coming in to take the place of the members who were dropping off.

The SECRETARY said he did not think they would make up for the loss of members.

Some further discussion ensued as to the amount which had been expended on the alterations and repairs of the Society's premises.

Mr. WILLIAMS then said the most striking increase in the expenditure was in the cost of the examinations, which, in fact, just balanced the amount saved on the school.

The SECRETARY said he had had a statement prepared showing the amount expended from the year 1868 on any particular item for each year. With regard to the house, it was in a very good condition, and would not want much spent upon it for several years to come.

Mr. WILLIAMS was quite satisfied the Society had done well in spending money on its own premises. They had now been made, what they were not formerly, properly adapted to the requirements of the Society.

In reply to questions as to the financial position of the Society,

The SECRETARY said that the actual difference between the receipts and expenditure for the past year was about £300 to the Society's credit. He did not see any probability of a larger surplus for the next seven years, and therefore he thought they should look forward to a diminished income, and cut down the expenses as much as possible.

Mr. WILLIAMS thought it desirable to encourage young men to become members, or associates. Unfortunately, a great number of those who took advantage of the establishment did not connect themselves with the Society. He knew of a case in which a Bell Scholar, who had actually received great benefits from the Society, was not now in any way associated with it by membership or otherwise. He thought that students should be encouraged to join the Society rather than have all the advantages of the Society given them without the payment of any subscription.

The SECRETARY said there was a difference of upwards of £1100 between the receipts from the examination in 1874 and 1873, owing to the greatly increased expenditure. He thought they would be obliged eventually to increase the examination fees.

Mr. FRAZER said he believed, on the contrary, that they would have to be reduced. He did not grudge the outlay which had been made on the Society's premises, because it was not thrown away, but they had value for their money. There had been certain exceptional expenses during the past year, such as the deputation to Scotland, that to St. Petersburg, and the Conference in August, and these matters would not occur again. With regard to the North British Branch, he was in Edinburgh the previous week and was delighted to see the state the Society's rooms were now in. It thoroughly convinced him of the wisdom of the Council in making the recent change there.

Mr. GREENISH thought it would be very much better if so large a proportion of the examination fee were not returned to the unsuccessful candidates. It was generally admitted that during the past year a great number of candidates had come up merely as an experiment, who, although paying three guineas each, had two guineas returned to them on their rejection.

Mr. RADLEY thought it would be a great improvement if the accounts included a statement of the liabilities as well as the income of the Society, simply for the use of the Council, and for comparison. He would move that this be done.

Mr. HAMPSON seconded the motion. It had been done on one or two occasions, and he was under the impression it would be continued.

Mr. BETTY said he should be sorry to see the expense incurred in calling in the assistance of a professional accountant thrown away by not continuing the system which he recommended, and which had been adopted as a good one.

The SECRETARY said the balance-sheet had not been produced this year, because it was useless to present it before the auditors, as they would not pass it, but it was already prepared in detail, in accordance with the accountant's recommendation, and a copy of it should be supplied to each member of the Council, or the Finance Committee might examine it for themselves. The balance-sheet would be in the hands of every member of the Council in the course of three or four days.

After some further conversation Mr. Radley's motion was withdrawn, and it was resolved that the report be received and adopted.

BENEVOLENT FUND.

The Committee reported that it had met, and having considered several applications for relief, recommended that the following grants be made:—

15*l.* to the widow of a pharmaceutical chemist, late of Brighton, having three children dependent upon her. It was recommended that the money should be placed in the hands of a gentleman named, to be expended weekly.

10*l.* to the widow of a member, late of London, aged 59

10*l.* to the widow of a registered chemist and druggist at Bermondsey.

10*l.* to a registered chemist and druggist at Wells, Norfolk, who had been suffering for some time from spinal paralysis, and was entirely dependent on his friends. (*Second grant.*)

10*l.* to a chemist and druggist who had been for two years an unsuccessful candidate for an annuity. (*Second grant.*)

10*l.* to the widow of a chemist and druggist at Birmingham, having three children dependent upon her.

Another case was stated to have been deferred for further inquiries, the letters of inquiry sent not having been answered.

Mr. OWEN said he understood the latter application was altogether rejected, as the party applying was evidently not a proper subject for relief from the Benevolent Fund.

Mr. GREENISH said the minute was quite correct, because the information required had not been sent. The application would no doubt be formally disposed of at the next meeting of the Committee.

With reference to the £10 placed in the Secretary's hands last month for expenditure if his inquiries were satisfactorily met, he reported that he had for the present withheld the money.

The report and recommendations were unanimously adopted, and the name of one of the above mentioned applicants for relief was placed on the list of approved candidates for an annuity.

Library, Museum, and Laboratory.

The Committee recommended the purchase of the following books for the library:—Griffith and Henry's 'Micrographic Dictionary,' third edition; Flückiger and Hanbury's 'Pharmacographia,' a third copy. The circulation of books during the past month had been—in town, 134; in the country, 47, to 26 places. The attendance in the library had been on the average, during the day, 13·2; evening, 9·5. Attendance in the conversation room, 6·85.

The Committee had considered the possibility of allowing applicants for books to have more than two volumes at a time; and also the question of admitting associates to the privilege of borrowing books, and recommended that the library regulations be slightly altered. It did not, however, recommend that associates be allowed to borrow books on their own responsibility. The alteration in the rules consisted in erasing the words from Rule 5 applying to valuable works, distinguished in the catalogue by an asterisk, "except by special permission of the Committee," and inserting a fresh rule as follows:—"If, under special circumstances, more than the stipulated number of volumes, or the loan of any volume marked with an asterisk in the catalogue, be required, application must be made to the Librarian, who should submit the same to the Committee.

Professor Attfield had reported that there had been 74 entries in the laboratory since the commencement of the session, 53 pupils now working. He had also submitted to the Committee an altered form of advertisement of the School of Pharmacy.

The Curator of the Museum had reported that a further portion of the catalogue was ready for the printers. The attendance in the museum had been on the average, in the day, 13; evening, 3. The average of attendance by gentlemen holding tickets was 2.

Mr. Schacht was sorry the Committee could not have made a little more concession than the small one now offered. It was simply a condition which greatly limited the usefulness of the library. He suggested, that if it was not thought desirable to leave the discretionary power entirely in the hands of the Librarian, a reference to the President would be sufficient instead of waiting for a meeting of the Committee.

Mr. Williams thought any one wanting books of the class referred to, would want them for a special purpose, and would not be in a particular hurry for them.

Mr. Sutton said he had been obliged to buy a book, because he could not get the information he wanted from it in the time allowed by the library rules.

Mr. Greenish remarked that the time might have been extended by application to the Librarian if the book had not been previously engaged by another member.

Mr. Baynes understood Mr. Schacht to refer to books consisting of more than two volumes, and he had known a case in his own experience where certain information had been wanted from a work in several volumes, and it was not known in what portion it would be found. In such cases the delay requisite for obtaining the permission of the Committee would render the privilege useless,

Mr. Robbins said the Librarian was frequently applied to for a book containing particular information, and he was in the habit, in such cases, of selecting the volume containing the desired subject. If, in special cases, a member wanted more than two volumes he could get his next neighbour to join with him and ask for the remaining volumes.

Mr. Baynes said it was much the better to do the thing openly and properly than in the way which had just been suggested.

The President suggested that the application should be made to the Secretary instead of to the Committee.

Mr. Betty said the Secretary could report the matter to the next Committee meeting, so as to keep things regular.

Mr. Williams supposed no one would think of sending for the whole eighteen volumes of Gmelin's 'Chemistry:' if he did was the Secretary to send them?

Mr. Schacht said no one would send for such a work unless he really required it, because he would have to pay half the carriage; but these books were just those for which reliance was placed on lending libraries.

Mr. Sandford then moved that the report and recommendations of the Committee be received and adopted, with the exception that the appeal should be to the Secretary instead of to the Committee, the Secretary being empowered to authorize the sending of more than one volume or of books marked with an asterisk, at his discretion. There was one other matter which he wished to mention, viz., the introduction into the advertisement of the School of Pharmacy of the words "during their term of study," in the sentence stating that students unconnected with the Society might obtain, on application to the Secretary, tickets of admission to the library and museum. The words seemed to imply that such students were entitled as of right to a ticket of admission extending over the whole of their term of study; whereas he considered that there was a danger, if such were the case, of many of the students never connecting themselves with the Society.

Mr. Schacht thought young men who attended the laboratory were entitled to find, in connection with the Institution to which they paid their fees, the text-books at least of the science which they were about to study. Now there was no other library in connection with the laboratory, and therefore he hoped there would be no hindrance put in the way of students making use of the Society's library.

Mr. Williams said it was simply a question whether it should be a matter of right or of privilege. Continuing it, as it had been, a matter of favour, obliged the student to apply periodically to the Secretary for a ticket, and gave the Secretary an opportunity of conversing with him and urging him to join the Society.

After some further conversation the motion of Mr. Sandford was unanimously agreed to.

Registrar's Report.

It was resolved that the report and statistics (see opposite page) furnished by the Registrar should be published in the Journal and Transactions of the Society.

Annual Report.

The Library, Museum, and Laboratory Committee was requested to draw up the annual report.

House.

The Surveyor's report with regard to the protection of the premises against fire had been presented, and the Secretary had been requested to make further inquiries and report to the Committee at the next meeting.

The report was received and adopted.

Law and Parliamentary.

The report of this Committee stated that the solicitors had commenced proceedings against Mr. A. Fry, of 131, Matilda Street, Sheffield, for carrying on business as a chemist and druggist, he being unregistered. The defendant had paid the penalty of £5 and costs, and had been admonished as to his future conduct.

The Government Bill for the Amendment of the Adulteration Act had been discussed by the Committee, and two communications were read—one from the Liverpool Pharmaceutical Association, approving the principle of the Bill, and another from the National Chamber of Trade, asking if the Council intended to take any steps with regard to it.

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1874.

MEMBERS AND ASSOCIATES IN BUSINESS.

	Members.		Associates in Business.
	Pharmaceutical Chemists.	Chemists and Druggists.	
Number of Subscribers, 1873	1848	778	371
„ restored, 1874	1	4	1
„ elected, 1874	55	53	110
	1904	835	482
Deaths, secessions, etc.	72	24	23
Total number of Subscribers, 1874	1832	811	459
Summary:—			
1873	1848	778	371
1874	1832	811	459
Increase	...	33	88
Decrease	16	...	...

ASSOCIATES AND APPRENTICES.

	Associates.	Apprentices.
Number of Subscribers, 1873	681	727
„ „ „ 1874	819	795
Increase	138	68

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 4 YEARS: 1871-74.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1871.	1872.	1873.	1874.
Restored to Membership	6	9	8	1
Elected „	63	34	143	55
(Total additions)	69	43	151	56
Deaths, Secessions, etc.	74	74	69	72
Increase	...	...	82	...
Decrease	5	31	...	16
Total number of Subscribing Members	**1797**	**1766**	**1848**	**1832**

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1871.	1872.	1873.	1874.
Restored to Membership	1	2	2	4
Elected „	106	97	54	53
(Total additions)	107	99	56	57
Deaths, Secessions, etc.	20	19	27	24
Increase	87	80	29	33
Total number of Subscribing Members	**669**	**749**	**778**	**811**

ASSOCIATES IN BUSINESS.

	1871.	1872.	1873.	1874.
Restored	...	1	...	1
Elected	90	105	141	110
(Total additions)	90	106	141	111
Deaths, Secessions, etc.	12	19	17	23
Increase	78	87	124	88
Total number of Associates in Business	**160**	**247**	**371**	**459**

ASSOCIATES NOT IN BUSINESS.

	1871.	1872.	1873.	1874.
Increase	108	90	25	149
Total number of Associates not in Business ...	**566**	**656**	**681**	**830**

APPRENTICES OR STUDENTS.

	1871.	1872.	1873.	1874.
Increase	49	31	83	68
Total number of Apprentices or Students	**613**	**644**	**727**	**795**

LIFE MEMBERS.

	1871.	1872.	1873.	1874.
Pharmaceutical Chemists	**278**	**278**	**272**	**269**
Decrease	3	0	6	3
Chemists and Druggists	**3**	**3**	**3**	**3**

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1874.

ENGLAND AND WALES.

Number of Meetings for Major, Minor, and Modified Examinations 42
Average attendance of the Board of Examiners ... ... 14·04

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	65	48	17	11	5·90	1·54	26·15
Minor	980	300	680	41	23·92	16·58	69·38
Modified	61	33	28	2	30·52	14·00	45·90
Preliminary ...	1121	536	585	4	280·25	146·25	52·18

SCOTLAND.

Number of Meetings for Major, Minor, and Modified Examinations 16
Average attendance of the Board of Examiners ... ... 6·43

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	6	5	1	4	1·50	0·25	16·66
Minor	180	78	102	15	12·00	6·80	56·66
Modified	22	14	8	5	4·40	1·60	36·36
Preliminary ...	133	77	56	4	33·25	14·00	42·10

THE REGISTER OF CHEMISTS AND DRUGGISTS, 1874.

Additions during the year:—	
Number of persons who have passed the Modified Examination	47
Minor "	378
Major " 53*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868	22
Number of persons restored to the Register on payment of a fine	10
An Associate of the Society before the year 1842, elected a Member	1
	458

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Erasures during the year:—	
Deaths:—	
Notices from Registrars	166
Other sources	13
Erased at the request of registered persons themselves	9
Erased by the Registrar in pursuance of the provisions set forth in section 10 of the Pharmacy Act, 1868, after sending two registered letters, to which no answer has been given.	200
	388
Increase of numbers on the Register	70
	458

Number of Pharmaceutical Chemists on the Register, December 31st, 1874	2,347	
" " Chemists and Druggists	10,939	
		13,286

ANALYSED STATEMENT OF SUBSCRIPTIONS TO, AND GRANTS FROM, THE BENEVOLENT FUND.

Number of persons on the Register of Chemists and Druggists (1874)	13341	
Do. do. do. do. do. who subscribe to the Fund—exclusive of Firms and others—128	1470	
Total number of persons who do not subscribe		**11871**

Annual Subscribers of	1872. No.	1872. Amount.	1873. No.	1873. Amount.	1874. No.	1874. Amount.
£ s. d.		£ s. d.		£ s. d.		£ s. d.
0 2 6	33	4 2 6	25	3 2 6	41	5 2 6
0 5 0	266	66 10 0	274	68 10 0	480	120 0 0
0 10 0	37	18 10 0	32	16 0 0	32	16 0 0
0 10 6	607	318 13 6	595	312 7 6	695	364 17 6
1 1 0	221	232 1 0	235	246 15 0	272	285 12 0
2 2 0	30	63 0 0	28	58 16 0	33	69 6 0
3 3 0	2	6 6 0	2	6 6 0	3	9 9 0
10 10 0	...	...	...	...	1	10 10 0
Odd amounts...	24	39 19 6	37	31 14 3	41	34 6 0
	1220	749 2 6	1228	743 11 3	1598	915 3 0

Subscriptions and Donations received from the following sources during 1874:—

	£ s. d.
Members and Associates of the Society	679 5 8
Registered Chemists and Druggists, not connected with the Society	157 5 4
Persons *not* on the Register of Chemists and Druggists	29 3 6
Firms..	86 6 0
Committee of the Chemists' Ball	21 0 0
Sandford Testimonial Fund, Balance of	6 15 7
	£979 16 1

Persons connected with the Society in 1874.		Subscribers to the Fund.	Non-Subscribers to the Fund.
Members (Honorary)	47	1	46
Do. Pharmaceutical Chemists	2101	759	1342
Do. Chemists and Druggists	811	225	586
Associates in Business	459	76	383
Associates	925	53	872

TEMPORARY AID DURING 1874.

	No.	Amount.	Total of each Class. No.	Total of each Class. Amount.	Total. No.	Total. Amount.
		£ s. d.		£ s. d.		£ s. d.
Connected with the Society :—						
Members and Associates	8	95 0 0				
Widows and Orphans	9	128 12 0	17	223 12 0		
Not connected with the Society :—						
Registered Chemists and Druggists	6	90 0 0				
Widows of do. do.	8	115 5 0	14	205 5 0	31	428 17 0

Mr. WILLIAMS said, in considering the position which the Society should take with regard to the Bill now before Parliament as to the sale of food and drugs, it should be distinctly understood that they in no way wished to encourage adulteration; on the contrary, it was their strong desire to put an end to adulteration wherever it existed, and the Society had already done a great deal in that direction. Thirty or forty years ago adulteration existed to a very great extent, and one great motive for establishing the Society was to encourage purity in the sale of drugs, and its influence had been felt, perhaps, more in that way than in any other. The Society would not therefore oppose any Bill for imposing penalties on those who committed the crime of adulteration, but at the same time, it was felt that the Act, as it at present existed, caused great hardship in some respects. It was unfair in principle, because it punished the innocent in the attempt to get at the guilty. The law ought to punish those who were really the guilty persons; whereas a man who bought an inferior article and sold it in the same state, if a small amount of impurity were found in it, might be fined or punished. The present amended Bill, he believed, was one which would not pass in its present form, and in fact there were many clauses in it which opened the door to extensive adulteration and to undoing the good work which the present Act had done. The Council must therefore be very careful not to ask the Government to pass clauses which would support adulteration, whilst at the same time it should endeavour to assist Government in giving relief to the innocent trader, and securing him from punishment for that which was not his own fault. One suggestion had been that the retailer should be justified if he produced a written warranty from the wholesale dealer, but there might be difficulty in that way, the written warranty might be a mere invoice; say, for instance, in the case of arrowroot, which might turn out to be more or less adulterated, although the wholesale dealer might not have been aware of it. He would also suggest that very small amounts of articles, intended for analysis, should not be taken; it was not fair to the trade. Further, the sample taken should be divided, and sealed up at the time, in the presence of the parties. If questions could arise as to the truth of the analysis, there should be no doubt as to the second analysis being of the same sample as the first. In some cases, however, there had been some doubt on this point. With regard to the appointment of analysts, his opinion was not in accordance with that which the Bill recommended, viz., that they should be still appointed by small local bodies throughout the country. His own idea was that some half dozen properly appointed laboratories should be established in different centres, each under the superintendence of a well-paid chemist in whom public confidence could be reposed. He believed this would be more satisfactory in every respect.

Mr. RIMMINGTON said there might be some difficulty with regard to the suggestion for dividing the sample taken, and sealing it up. It might be done with parcels tolerably easily, but in the case of liquids it would be impracticable. He thought, therefore, it should be optional if the party requested it. With regard to wholesale houses, any house ought to know whether it was selling genuine arrowroot or not. He had had a great deal to do with the Adulteration Act, and it was true beyond a question that people who sold these things were often the victims of wholesale dealers. In cases where it could be proved that the retailer had been the victim of a fraud on the part of a wholesale dealer, he thought the magistrate ought to have the power of bringing that wholesale dealer before him. There might be some difficulty in carrying out such a provision, but that was really what should be aimed at. In his neighbourhood the magistrate advised every person who was fined to bring an action for damages against the wholesale dealer; but most of them were small tradesmen, and they simply compromised the matter by payment of the costs. There were two wholesale houses in his district who it was known had for years been selling pepper largely adulterated, and in consequence of their action retailers had suffered.

Mr. OWEN said the difficulty would be that there were very few retailers who did not deal with more than one wholesale house, and the wholesale dealer would not like to be made responsible for the article he supplied, when it might have been mixed with that coming from another quarter.

Mr. SUTTON said the only possible way in which this difficulty could be met was by a sample being taken at the time of each wholesale transaction and sealed up. This was evidently impracticable.

Mr. SANDFORD said that, according to the Government Bill, it was optional on the part of the persons supplying the sample to require it to be divided and sealed up.

Mr. WILLIAMS thought the party purchasing should be compelled to divide the samples.

Mr. SAVAGE said the party obtaining the article ought to know the quantity required much better than any Act of Parliament could provide. The analyst had power to ask for such a quantity as he thought sufficient for his purpose,—it might be a pound, an ounce, or a drachm. But if there was any defect it was from the analyst not asking for a sufficient quantity at the time when he sent to purchase the articles.

Mr. RIMMINGTON remarked that it was not the analyst who purchased.

Mr. SAVAGE said he meant the inspector.

Mr. WILLIAMS said if an analyst had a scruple of sulphate of quinine given him to analyse and was obliged to divide it into three portions, it would not be sufficient for his purpose.

Mr. GREENISH would like to know whether in the case of the adulterated pepper the retailers paid for it the price of genuine pepper.

Mr. RIMMINGTON could scarcely answer the question. There were some thirty tradesmen in Bradford and Leeds. These dealt with wholesale houses, who again bought from larger dealers, and they bought from the grinders, so that the article would pass through three hands before it reached the retailer. In all probability the retailer would have paid something like a fair price, but the wholesale man who supplied him probably did not.

Mr. SUTTON did not think analysts had anything to do with the price paid.

Mr. SANDFORD thought it was very important for a person accused of selling an inferior article to be able to prove that he had paid the best price, in order to establish his innocence.

Mr. SUTTON said there was no doubt of that, but he did not think the analyst had anything to do but to give his opinion as to whether the article was pure or not. Unfortunately many of the analysts asserted themselves in a way they had not the right to do.

Mr. WILLIAMS said one great difficulty was as to the meaning of the word "adulteration." He should define it as indicating that something was fraudulently added with an intent to cheat, not the mere presence of a thing either accidentally or only as an impurity. The mistake of the present Act, and of public analysts, was, that they confounded two different names or words as having the same meaning.

Mr. SUTTON said there was no doubt that some analysts considered themselves judge, jury, and everything else. He would suggest as likely to be useful that a few members of the Council should join with him on the following morning in an interview he, together with some members of the Society of Public Analysts, was to have with Mr. Clare S. Read on the subject of the present Bill.

Mr. SCHACHT said he could not possibly take part in any such deputation, because probably he should be in the unfortunate position of being almost alone in his opinions. He considered the present Act and the Bill now proposed as an illustration of the over legislation which had been going on for the last few years. The whole discussion had shown the enormous difficulty which surrounded such a position as this if they once attempted to apply it honestly and properly. His own opinion was that the buying public ought to be fined. Here was an opinion put forward that the responsibility ought to be taken from the retailer and put on the wholesale dealer, and from him to the importer, and possibly from him again to the manufacturer. But suppose you got to the manufacturer, what would be his defence? He would say that he would much rather manufacture a perfectly pure article, but he was required by his customers to produce something imperfect at a lower price. The wholesale dealer would say the same thing, and so it would go on; the retailer also would say he would much rather sell a perfectly pure article, but his customers insisted on having two penny worth of stuff for a penny, and thus he was obliged to supply them with an inferior article. That was the whole story. It was really the public who were to blame, and he thought they ought to pay the penalty of their misdeeds by being poisoned.

Mr. BETTY said the position taken up by Mr. Schacht was one which had no doubt a great deal to support it, but they had to deal not with the abstract idea of what was right or wrong, but with the actual facts at the present moment. In consequence of continued agitation and discussion there was at the present moment a Bill in the House of Commons to amend the present Act for the Adulteration of Food and Drugs, and what they had to do was to try and make the best of the Bill. This, he considered a most opportune time for the Society to entertain the question, because no definite opinions had yet been formed by the Legislature upon it, so that the opinion of the Council might exert some influence. He was very much pleased, and so was everyone having any practical knowledge of the subject, with the wise course the Government had adopted, and with the spirit in which the Bill was framed, namely, on the recommendation and almost in the words of the Select Committee of the House of Commons, which had examined witnesses on the subject. On important points justice had at last been done in this most intricate matter. The word "knowingly" was of the utmost importance. He did not think it could be retained in every instance, but it must be kept in so as to protect the retail dealer. The 25th clause, which provided that the retail dealer, being sued, could plead whether he knowingly or unknowingly had sold the adulterated article, by giving the source from which he obtained it, appeared to him common sense and justice. He hoped the Government would be prepared to abide by that principle, for it would be impossible for the retail dealer to be his own analyst with regard to every article brought before him for sale. He believed the Government were prepared to abide by the spirit of this Act, and not to allow the seller to be prosecuted when he could prove that he was not knowingly selling an article which had been mixed. That was a most important clause, as was also the 25th and, if it were carried, chemists and druggists would have no cause of complaint. As to how it was to be carried out he was not then prepared to say. The warranty might be simply the invoice, or a label stating that the article was pure; that would depend on the usage of the trade. But if a wholesale firm knew it would be liable to be included in a prosecution for any article sold to a retail dealer, he thought it would insure purity at the source, and thus relieve the retailer from the responsibility, supposing he had given a fair price, and that if the retail salesman were put in the same position, with regard to the wholesale dealer, that the public stood in with regard to the retailer, any practical difficulty in the working of the Act would be overcome.

Mr HAMPSON was of opinion that if there had not been previous legislation on this question, the present Government would not desire to initiate it, but they were in difficulty with regard to the previous Act, which they wished to make less objectionable, and that had led to the introduction of the new Bill. It was a most difficult question, however it was looked at, and it would be found utterly impossible to frame any Bill which was satisfactory. His own opinion was that such special legislation was objectionable, believing it often did more harm than good, but they must take things as they were, and, as a Council, they should endeavour to help those who desired to make the Bill as little objectionable as possible. Some of the penalties he thought much too heavy, and likely rather to defeat the ends of justice instead of bringing about convictions. He also thought with Mr. Williams that the samples should be sufficiently large to allow division. He should presently move the following resolution:—

> "That the Parliamentary Committee be requested to watch the progress of the Sale of Food and Drugs Bill, to prevent the introduction of objectionable clauses into the Bill. They are also requested to urge the insertion of a provision for properly testing the competence of analysts appointed under the Act."

The Bill as it stood would necessitate the appointment of a large number of analysts, and as Government were legislating to this extent that a person might suffer imprisonment and loss of character and position upon the opinion of a public analyst, he thought it was their duty to see that only proper persons were appointed. The truth was that the proceedings of some of these gentlemen had brought considerable discredit upon the working of the Act, and there was no guarantee that these numerous analysts to be appointed would be efficient. It struck him as most anomalous that persons who were to carry out the comparatively simple trade of chemists and druggists were subjected to examination, but the analyst who took into his crucible or scales the reputation of a respectable tradesman was not tested in any way as to his capacity for his office. He thought there should be something like a college of chemistry or some society which should grant diplomas in chemistry so that the various councils and public bodies throughout the country should have something to indicate to them that they were employing proper persons.

Mr. Greenish thought the Bill would be much simplified if the provisions with regard to food could be kept separate from those with regard to drugs, many which were applicable to one being quite inapplicable to the other.

Mr. Frazer quite agreed as to the extreme difficulty of this question and as to the fact that many hardships had arisen under the present Act, but he attributed that not so much to the law itself as to its administration. On the other hand, it had produced an immense deal of benefit to the public. For instance, in Glasgow, the late detection of lead in soda-water had caused great disturbance, and the evil had now been remedied at a great expense in almost every manufactory in Glasgow, but this had only been brought about by the action of the public analysts. There were many articles of dietary as to which the public had been greatly benefitted, and he thought they ought to continue to keep the benefit of the Act. The present Bill as it now stood was very imperfect; the Select Committee, he believed, having been overweighed by manufacturers, and the Bill, therefore, tended to protect the fraudulent dealer, and not the public in whose interest it professed to be framed. His own view was rather in accordance with that put forward in the Medical Press and Circular to the effect that the only honest method of dealing with these matters would be to allow traders to sell anything they liked so long as it was not injurious to life, but to force them to state honestly the true constituents of what they sold. Rather than pass the present Bill he should prefer to abolish the old Act and fall back on the common law, which punished imposition or misrepresentation; whereas, if the present Bill became law, he might sell scammony containing three-fourths of flour with impunity, simply because it did not contain anything injurious to health. If any resolution were passed, he should prefer one, though he did not suppose it would find a seconder, to the effect that the present Act had tended greatly to the protection of the public, and that the present Bill would lessen that protection. Any hardships which had arisen under the present Act he believed to have arisen more from its administration than its principle.

Mr. Robbins had almost hoped that he should have heard from the Council that drugs were not adulterated so largely as they formerly were. He must say the last Act of Parliament had not made the slightest difference to anything he had in his establishment. The truth was they did not get drugs of equal value in different establishments, but every man sold an article according to his class of customers; where a man could get full price he sold the best, and in that way he got a good reputation. There was a great deal of difference in drugs undoubtedly, but not generally arising from adulteration. For instance, a merchant who received a case of rhubarb picked out the choicest pieces and sold them at the highest price; then he picked out the second quality which he sold to a second class of dealers; and then he had a lot of comparative rubbish left, but which he still considered pure rhubarb, and certainly it could not be considered adulterated. The same with carbonate of soda. There were one or two firms who had a reputation for selling a very fine article, and the better class of dealers always kept it; but other manufacturers supplied carbonate of soda at about half the price, and though it was not quite so pure, no one could say it was adulterated.

Mr. Williams objected to the last clause in Mr. Hampson's resolution, for he thought many first rate chemists would decidedly object to submitting to any examination.

Mr. Owen said there was no examination mentioned.

Mr. Betty thought the clause was very important, and should be left in.

Mr. Sandford suggested that the Parliamentary Committee should meet the next morning to consider the amendments of the Bill which would then be printed.

The Report of the Parliamentary Committee having been adopted, and Mr. Hampson's resolution being put,

Mr. Williams again objected to the latter clause.

Mr. Schacht said he should particularly like those gentlemen who attended as a deputation to Mr. Clare Read to point out that the Bill would sanction the appointment of a number of men who had no proved qualification for their duties, but who would have the power of imposing heavy penalties on their fellow citizens.

Mr. Betty said this was a most important question. It was a known fact that gentlemen had come to that establishment to take a short course in the laboratory, in order to become public analysts, and had afterwards obtained appointments, and yet tradesmen were to have their reputation and purse placed at the mercy of men so qualified. How could it be said in the face of such facts that some guarantee was not required. He would also mention that as a ratepayer he had had to pay his share of the expense incurred through the blunders of a public analyst.

After some further discussion, in the course of which Mr. Sandford said he had taken a note of various points which had been mentioned for the purpose of laying them before the Government, and would also include the suggestion about the qualification of analysts,

Mr. Hampson consented to withdraw the latter part of the resolution, and it was then passed as follows unanimously:—

"That the Parliamentary Committee be requested to watch the progress of the Sale of Food and Drugs Bill, to prevent the introduction of objectionable clauses into the Bill."

The Preliminary Examination.

Mr. Atherton then moved the following resolution, of which he had given notice:—

"That the questions for the Preliminary examinations after the present year be prepared, and reported upon, by the College of Preceptors."

He did not wish in any way to depreciate the ability of the examiners or the fairness and honesty with which the examinations were conducted, but it was only fair and just to the Society that the Preliminary examinations in purely elementary scholastic subjects should be conducted by gentlemen who had received some special instruction in that direction. The question had been brought forward at the Pharmaceutical Conference at Brighton, by Mr. Atkins, who then proposed to do away with the Preliminary examinations altogether, and replace them by exacting a certificate from the College of Preceptors or Oxford and Cambridge Universities. The objection to that was, that the Society ought to have in its own hands the control of its own examinations. On that occasion Mr. Carteighe concurred in the desirability of these examinations being conducted by the College of Preceptors, and he had only to add that inquiries had been made whether that body would undertake the duties, and the reply was that they would be happy to do so, and that the fees would be about the same as those hitherto paid.

Mr. Greenish seconded the motion. He said he thought it would be admitted by every member of the Council that the Preliminary examination was, perhaps, the most important examination conducted by the Society. It was an inquiry whether the candidate had received a good early education, and to raise the status of the body it was necessary to commence with the Preliminary examination. That examinations were but imperfect tests of knowledge was admitted, and if the school education of this country were conducted on something like uniformity of plan, he would prefer as evidence of the candidate's education his having reached a certain "form," provided that "form" included classics, rather than the imperfect test of an examination. It was not intended that by the proposed change the system now in operation in regard to "centres" should be altered, but that for the present examination there should be substituted one conducted by a competent body, such as the College of Preceptors.

Mr. WILLIAMS doubted whether it was quite courteous to the Board of Examiners to pass such a resolution off hand without consulting them, and without an opportunity of considering the matter a little more. There were still eight or nine months before any step could be taken to carry it out, and he therefore suggested it should stand over for a time.

The PRESIDENT thought the course pursued a desirable one, but he doubted if this was the proper time to pass the resolution.

Mr. HAMPSON did not think there could be any offence given to the Board of Examiners, who, he should think, would rather feel it a relief than otherwise.

Mr. SCHACHT did not see any reason for making the proposed change, and thought they had better let well alone. He did not see the objections to the present system, or the advantages to be derived from that proposed. One thing was quite clear, that if they once parted with the control of these examinations they could never regain it or modify the examination. Practically, he believed there was no difficulty in the present system.

Mr. BAYNES was rather disposed to favour the view of Mr. Atherton, but he was hardly prepared to decide at that moment.

Mr. GREENISH said one of the examiners had expressed to him privately an opinion that it was the best course that could possibly be adopted.

Mr. RADLEY thought if this proposed change were to have the effect of making the examination more difficult it would be a great mistake.

Mr. SANDFORD thought the change could hardly be effected by a simple resolution.

After some furthur conversation the discussion was adjourned until next month.

CONVERSAZIONE.

Mr. WILLIAMS moved :—

"That a Conversazione be held on Wednesday the 19th of May next, and that the Secretary be instructed to apply to the Lords of Her Majesty's Council on Education, for permission to use the South Kensington Museum on the evening of that day, for such purpose."

He thought these meetings were very popular, and had been of some benefit in elevating the position and status of the trade before the medical and general public. At the same time, he must acknowledge the expenses had increased very considerably, and therefore, if they agreed to hold the Conversazione for the present year at South Kensington, the Committee should be instructed to curtail the expenditure as much as possible. He thought certain items might be reduced without interfering with the comfort of those attending. The number of admissions might also be somewhat limited. He had been informed that one member of the Society actually sent for as many as sixty tickets, and if this were the case it was certainly proper that some limit should be put.

Mr. OWEN seconded the motion.

Mr. HAMPSON said he had enjoyed the evenings at South Kensington extremely, but they were very expensive, and he did not really think the Council was justified in continuing such a large outlay.

After a discussion in which Mr. Robbins, Mr. Betty, and other members of the Council took part, the resolution was carried, and the President, Vice-President, and Treasurer, with Messrs. Sandford, Greenish, and Betty were appointed a Committee to make the necessary arrangements.

PHARMACEUTICAL MEETING.

Wednesday, March, 3, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed. The following Donations to the Library and Museum were announced, and the thanks of the Society were awarded to the donors :—

To the Library :—Hooker's 'Flora of British India,' part 3, from the India Museum, per Dr. J. Forbes Watson; 'The Pathological Significance of Nematode Hæmatozoa,' by T. R. Lewis, M.B., and 'A Report of the Microscopical and Physiological Researches into the Agent or Agents producing Cholera,' second series, by T. R. Lewis, M.B., and D. D. Cunningham, M.B., from Mr. Lewis ; 'Year Book of Pharmacy, and Transactions of the British Pharmaceutical Conference, 1874,' one copy from the Conference, and one copy from Mr. Richard Bremridge ; 'Proceedings of the American Pharmaceutical Association, 1874,' from the Association ; 'The Analyst's Annual Note-Book, 1874,' from Mr. S. W. Rich ; 'Nouvelles Recherches sur les Liquides Pathologiques de la Cavité pleurale' (donor unknown).

To the Museum :—Specimens of Salicylic Acid, from Messrs. Domeier and Co. ; specimen of Crude Stearoptene of Japanese Oil of Peppermint, from Mr. Morson ; specimen of Jaborandi Root, from Messrs. Hopkin and Williams; specimens of Carnauba Root and of Fluid Extract made from it, India Rubber Milk, and Arariba, from Dr. Symes, of Liverpool.

To the Herbarium :—Fine specimens of the species of Cinchona, yielding the Java Barks, from Mr. J. E. Howard ; specimens of *Primula scotica*, Hook., *Lepidium Draba*, L., *Paris quadrifolia*, L., *Ornithopus perpusillus*, L., *Corydalis claviculata*, D.C., from Mr. G. C. Druce, of Northampton.

Professor BENTLEY called attention to the most valuable collection of Cinchonas which had been presented by Mr. Howard. The specimens were exceedingly interesting, and illustrated a paper which Mr. Howard contributed to the *Pharmaceutical Journal* in July, 1873, on the "Cinchona Plantations of Java." The cinchona in question was *Cinchona Calisaya* var. *Ledgeriana*, and was a particular variety of Calisaya yielding a bark of exceeding richness in alkaloid, far exceeding any of the barks which had been hitherto introduced from South America. The seeds from which this was obtained were collected by Mr. Ledger, who was well known as having introduced the alpaca from Peru into Australia. When the seeds came over, the Dutch consul asked him (Professor Bentley) for information about them, and he had advised the consul to obtain some of them. Mr. Howard also strongly advised their purchase. Some of the bark obtained from these plants had yielded 10 per cent. of alkaloid, which was a very extraordinary yield. It was very interesting and important that so large an amount should be got from cultivated plants. Special thanks were due to Mr. Howard for these valuable specimens. There was also on the table a specimen of Carnauba root which had been described by Dr. Symes in a recent number of the Journal. It had been imported into Liverpool, and was the root of a kind of palm, known as *Copernicia* or *Corypha cerifera*. It was stated to be valuable as an alterative, and to have exactly the same properties as sarsaparilla ; and Dr. Symes said that it could be obtained at half the price of sarsaparilla. He would also make an observation about a kind of chiretta, which he described in the *Pharmaceutical Journal* about three months ago. The interest connected with the subject was, that up to that time no spurious chiretta had ever been described by pharmacologists. He gave full particulars about it, and described a ready means by which spurious chiretta could be distinguished. The most distinguishing characters of the true chiretta were the marked continuous pith and the rounded form of the stems. The spurious chiretta had a distinctly angular stem, and only a trace of pith in the interior. There were other distinguishing characters for which he must refer to his paper. He had every reason to believe that a very large quantity of the spurious chiretta was likely to come into the English market, and, in fact, since his paper was written a great deal had been imported. The other day he had also received from Mr. Hanbury an extract from a letter on the subject, written to him by Dr. Dymock, Professor of Materia Medica, Bombay. The extract was as follows :—

"I saw a short time ago a notice in the *Pharmaceutical Journal* of some false chiretta. You are likely to get more of it, as it is very abundant in the market this year. It has been for a long time well known here as *Meetha Chirata*, or sweet chiretta. It comes in the same bales as the bitter kind, and is sorted out for sale here."

He (Professor Bentley) had very little doubt that the chiretta mentioned in the extract was the same kind as he had lately described, although at present he had no positive evidence on the subject. Professor Bentley said he should feel much obliged, in case anyone should meet with a spurious chiretta, if he would send him a good sample for examination.

Mr. Greenish said that Mr. Holmes had furnished him with a specimen of the spurious chiretta described by Professor Bentley; and upon comparing the section under the microscope with that of the true chiretta, he had found the differences which Professor Bentley had just described.

Professor Attfield said that there was on the table another specimen presented by Dr. Symes, of Liverpool. It appeared under the name of arariba, and it was described as a species of Cæsalpinia. The specimen was a portion of some arariba which had been recently offered for sale in Liverpool. The substance had been recently the subject of a research, the results of which would be read before the North British Branch of the Pharmaceutical Society at its next meeting.

Mr. Martindale asked whether any gentleman who was present could establish the identity of ariroba with Goa powder. He believed that arariba was used in Brazil to some extent for psoriasis and other skin diseases. He was told that Goa powder was exported from Brazil to Goa, thence to Bombay, and there used for the same purpose.

Professor Attfield said that he had examined both Goa powder and ariroba, and he could state that the two were entirely distinct.

A special vote of thanks was accorded to Mr. Howard for the specimens of cinchona.

Lead Plaster.

A paper on "Lead Plaster" was read by Mr. Charles Umney. It is printed at p. 701. and gave rise to the following discussion.

Mr. Haselden said that he had experimented but little upon the plumbic plaster of the British Pharmacopœia, and had found that it was sticky, and when spread took several days to dry in the autumn of the year. The plaster prepared from the London Pharmacopœia formula dried more rapidly, and, so far, would be more useful to persons who wished to spread plasters quickly. Plasters were not of so much importance to pharmacists as medicines used internally; but, still, if a better plaster could be obtained by using only half the quantity of litharge to that of oil, that *i.e.* 1 to 2, it was desirable that the alteration should be made. No doubt those who manufactured plasters to a large extent would use the form which they found most profitable and convenient for themselves, and best adapted for general use. The firmness and time of the adhesion of a plaster depended, to some extent, upon whether it was spread upon calico or linen. Surgeons in former days had complained that resin plaster for dressing wounds was not so good spread upon calico, and they always had a preference for plasters spread upon linen. If lead plaster entered into the composition of some cerates, very likely B. P. plaster would be more useful than the London Pharmacopœia plaster, inasmuch as it would keep soft longer, only it would get rancid a little sooner. An objectionable quality in all plasters containing lead, and in all ointments containing lead, was that, in spite of being made with benzoated lard, they after a time became rancid and offensive. The B. P. plaster made a very fair plaster when spread upon leather, if it had time to dry; and in cold weather after a time it became as dry as the London Pharmacopœia plaster.

Mr. Gerrard said that having prepared some hundredweights of lead plaster, and spread some thousands of yards, he was made acquainted with the deficiency in quality of the present British Pharmacopœia plaster when it first became official; and ever since that time he had prepared plaster very nearly according to the London Pharmacopœia, but adding a little more oil. The London Pharmacopœia plaster was a little too stiff and cracky. The extra quantity of oil rendered it pliable. The B.P. plaster was too sticky for adhesion when prepared in the summer months, although it appeared to be a very nice plaster at this time of the year, when the temperature ranged low. He had with him specimens of two plasters which he had that day prepared. One was the B. P. plaster, and the other was the plaster which he was now in the habit of making, and which contained a little more oil than the London Pharmacopœia plaster. The latter had been boiled, and had the whole of the water removed, but not quite all the glycerine. He would suggest to the wholesale trade that they should evaporate more than they were in the habit of doing. Perhaps, however, if they could get 10*d*. a pound for water, it was not very likely that they would evaporate to a greater extent than they did at present. If they remembered that it was the office of a plaster to adhere to, and support, the parts to which it was attached, they would at once come to the conclusion that it should be of a nature to maintain itself upon the parts upon which it was placed, and that was what the British Pharmacopœia plaster failed to do.

Mr. Martindale said that he had had but little experience in the making the lead plasters, but he had spread a considerable quantity. He could scarcely say that he could support Mr. Umney. In fact, he should be inclined to give the Scotch verdict, "not proven." From the formula of the British Pharmacopœia he had succeeded in getting the best plaster he had ever spread. Wholesale houses generally sent out the plaster not half finished, containing a large quantity of water, etc.; what was worse—nearly all the glycerine which it was capable of containing. In his opinion the glycerine, as well as the water, must all be removed. If a plaster spreader spread either of Mr. Umney's samples, he would find that after a fortnight they would be brittle, and if spread upon ordinary glazed cloth the adhesive portion would peel off rapidly. He believed that if a lead plaster was made pliable with a sufficient amount of olive oil, it was possible to keep it for several years. The adhesive plaster which he had spread for use at University College Hospital for several years was nothing more than lead plaster washed and boiled to such an extent that the whole of the water and glycerine were driven off. In that condition it was as transparent as amber resin. It would remain pliable for a month after being spread. He was sure that the samples exhibited by Mr. Umney would not remain a week in that state. Professor Redwood had stated correctly that this plaster resembled the kind used by the late Dr. Scott, which is still in request in some of the hospitals. It was a pure lead plaster He (Mr. Martindale) entirely disagreed with Mr. Umney that the London Pharmacopœia was better than the British Pharmacopœia plaster. The British plaster was not too "sticky" if properly finished, *i. e.*, freed from both glycerine and water. It was left unfinished to suit the convenience of the wholesale manufacturers for sending out in rolls to the trade; but that was quite a different thing from being such a plaster as would adhere when spread either upon cloth or calico. Linen used to be preferred for plasters, but he supposed that plaster spreaders found it more to their advantage to use calico. It was now the custom to use calico containing a large amount of glaze, so as to prevent the plaster from soaking through the fabric; but a plaster spread upon such a material was deficient in adhering properties when applied to the edges of a wound. Plaster spread upon an unglazed material had a much better grip on the edges of a wound, and would combine them for a much longer period. He would like to ask both Mr. Umney and Mr. Gerrard, and particularly Mr. Gerrard, whether their remarks applied to an adhesive lead plaster used as such, or to the resin plaster made from it. The addition of the resin made the plaster quite a different article. It was not desirable to have resin in an adhesive plaster, and in certain constitutions it would produce an amount of eczema round the margin of the wound.

Professor Redwood said that he could hardly too strongly express his sense of appreciation of the paper which had been read. The writer had gone into the subject in a business-like way, and carried out the investigation in the very best spirit. He should, however, have appreciated the value of the communication more if Mr. Umney had more explicitly described the nature of the oil which he used in the process. Mr. Umney could not be ignorant of the fact which had been observed by plaster makers, that the self-same process occasionally gave different results. He (Professor Redwood) had on several occasions been consulted by plaster makers on account of their lead plasters becoming sticky and unusable. Mr. Squire, in his 'Companion to the British Pharmacopœia,' stated that the British Pharmacopœia plaster answered only when it was made with the best Italian olive oil. If Gallipoli or Spanish oil was used, the process was not satisfactory. He should have felt better satisfied if Mr. Umney had extended his experiments by using oils of different qualities. This was a point upon which they might clearly look for a little further investigation, and that investigation could not be in better hands than Mr. Umney's. That gentleman had referred to an opinion which he (Professor Redwood) had expressed in that room. That opinion, however, was one of very little value, because it was not founded upon his own experience. But, at the same time he had been assured, by men upon whose judgment he could place implicit reliance, that the alteration in the process was an improvement in certain respects, and that it accomplished and realized that at which medical men and pharmacists had been for some time aiming. However, he certainly considered that the subject was a perfectly open one for discussion and investigation. But he must confess that he had been rather strengthened in the opinion which he had formed in favour of the British Pharmacopœia formula by his knowledge of the circumstances under which that formula was introduced. He did not hold himself responsible for the process, for it was introduced into the British Pharmacopœia in the year 1864, when he had nothing to do with it. But though not responsible for the process he had been mixed up with its introduction. It originated from a committee appointed by the Pharmaceutical Society, at the suggestion of the London College of Physicians, with a view to making alterations in the processes contained in the Pharmacopœia. He had the honour of acting as honorary secretary to the committee; and in connection with his office he made a great many experiments upon a large number of Pharmacopœia preparations; and associated with him as members of the committee were men of great practical skill and experience as pharmacists. Among them he might mention the late Mr. Henry Deane, Mr. Peter Squire, and Mr. Thomas Herring, all of whom took a deep interest in this very question of emplastrum plumbi. It was left to Mr. Deane to make inquiry as to the process which was adopted by a well known large manufacturer who had a high reputation for adhesive lead plaster, and whose plaster was considered to be the plaster which was originally introduced by Dr. Scott of Bromley. He (Professor Redwood) was not able to say absolutely that the formula as it now stood in the Pharmacopœia was exactly the same as that which was introduced to the committee in this way; but he was quite prepared to say that it was suggested to the committee that in order to produce a plaster which should be sufficiently adhesive and sufficiently firm to answer all the purposes of strapping it was necessary to employ the very best olive oil, and to diminish the proportion of oxide of lead which was at that time ordered. The points to which the committee was directed were the quality of the oil, the diminished proportion of the oxide of lead, and long continued boiling. The boiling was to be continued even beyond the time when there was evidence of combination having taken place between the ingredients. He was not prepared at once to concede that the committee had made a mistake. It paid much attention to the subject, and went thoroughly into it, and he could perfectly well remember Mr. Thomas Herring saying afterwards that a great improvement had been effected in lead plaster by the process which had been adopted by the committee. Looking back at the circumstances under which the alteration was proposed, he felt justified in adhering to his opinion until stronger evidence was produced than that which Mr. Umney had brought forward. He freely admitted that what Mr. Umney had done was exceedingly to the purpose, and very valuable, and he esteemed it very much; but he (Professor Redwood) wanted something more to induce him to say that he would give up the process of the British Pharmacopœia, and go back to that of the London Pharmacopœia.

Mr. Wells said that, having communicated a short article to the *Pharmaceutical Journal* in October, 1874, on emplastrum plumbi, he wished to say that he not only supported Mr. Umney's statement, but was prepared to go further than he did. Professor Redwood had, very properly, alluded to the quality of the oil; but his (Mr. Wells's) experience, which was, at one time, very extensive, convinced him that the oil occupied a secondary place and the litharge a primary one. He could never make a satisfactory plaster with bad litharge and good oil; but with good litharge he could make a splendid plaster, even with Gallipoli oil. He did not defend the process which they would find in the *Pharmaceutical Journal*; but he maintained that in order to get a plaster which would fulfil the intention of the person using it, they must use considerably more litharge than the quantity ordered in the old London Pharmacopœia. The proportions were 20 parts, by weight, of litharge, and 28 parts of oil. Much depended, as Professor Redwood had justly observed, upon the length of time occupied in boiling. Twelve hours were even better than ten. And much depended upon the entire evaporation of the water. If the plaster was allowed to solidify and stand all night, there was a very large proportion of what was now known to be glycerine, floating on the top. But that was not known as glycerine at the time to which he was alluding, namely—thirty-four or thirty-five years ago. Every particle of the glycerine was removed, and the plaster was heated up again. He must confess that he had never seen a plaster which served its purpose so well as plaster so prepared. It did not get decolorized, and after keeping it for years, he had found it to be as good as at first. He would suggest to Professor Redwood, knowing what an authority he was upon such matters, whether it would not be expedient to institute some fresh experiments, and even increase the quantity of litharge, taking care, of course, that that substance was really good and pure. By the addition of liquor potassæ at the end of the process, every particle of free oil in the plaster was completely saponified. He was not entering into a medical discussion of the subject, but he was simply speaking of a product which he had never seen surpassed.

Mr. Moss said that his experience of the manufacturing of emplastrum plumbi had been limited to the British Pharmacopœia formula; but he could say that, as far as his experience went, that formula gave an excellent result. He could not at all sympathize with Mr. Umney when he spoke so feelingly of the complaints and disappointments which followered the sending out of the British Pharmacopœia emplastrum plumbi. Nor did he agree with the other remarks which had been made against it. The house with which he was connected, sent it out all the year round.

Mr. Gerrard said that he had experimented with what he believed to be pure Italian oil, and the result which he obtained quite coincided with that stated by Mr. Umney, whether he boiled the preparation for a long period or a short period. There was a very sweet and efficient oil, called nut oil, which formed an excellent plaster, and was less prone to rancidity than olive oil. He agreed with Mr. Haselden that nothing was better suited than linen as a material upon which to spread plasters. It was more free from "dress," and from the glaze of the surface which was found in ordinary diachylon plaster. Linen was also more absorbent than other materials, and this quality caused the plaster to adhere to it better. Instead of the plaster peeling off, the linen stuck to the plaster, and the plaster stuck to the patient. He quite agreed that the addition of resin to a plaster improved it, but he could not speak with reference to the potash. In all plasters which he prepared for surgeons' use he added a portion of soap and common resin; and his experience during ten years in Guy's Hospital was that surgeons held the plasters to be useless without those additions. He had introduced the same preparation in University College Hospital, and the consumption had increased 50 per cent.

Mr. Umney, in reply, said that Mr. Haselden had mentioned the use of emplastrum plumbi, B.P., when entering into the composition of a cerate. He had sent some of that plaster to a noted house to be used for the preparation of neutral cerate, which was a favourite remedy of the late Sir Benjamin Brodie, and it had been found that instead of making a neutral, it made an acid cerate. He therefore maintained that they could not use this plaster for unguentum plumbi comp. of the London Pharmacopœia, as the compound would be acid. To Mr. Gerrard's remarks he must take only one exception, and that related to the quantity of water which he imagined wholesale druggists were anxious to leave in the plaster. When he (Mr. Umney) took 100lbs. of oil and 53·8lbs. of litharge, the plaster which he produced weighed only about 156 or 157lbs., showing that there was not much desire to leave water in the preparation. With regard to Mr. Martindale's statement as to the cracking of the P.L. plaster, he (Mr. Umney) spread some of it some six months since, and up to the present time it had not cracked. It had been spread by a machine upon calico. Mr. Martindale had alluded to the admixture of resin, but the paper had not dealt with that subject. As to the quantity of water stated to be in the plaster of trade, it would be evident that if a pan was subjected to heat produced by a pressure of from one to one and a-half atmospheres of steam (temperature about 240°) for six hours, there could not be much water in the compound. The glycerine was left almost wholly in the plaster, but to go into that question would be beside the discussion. He could quite corroborate Mr. Martindale's statement that the plaster of the Pharmacopœia could be much improved; but they were dealing with the formula as it stood, and the question was whether the process was a practical one. It had been said that an ounce of practice was worth a ton of theory; and this matter was essentially a practical one. Professor Redwood had said that he should want stronger evidence before he became convinced that the British Pharmacopœia formula was not a good one. He (Mr. Umney) held in his hand some dozen letters which he should be very glad to hand to Professor Redwood after the meeting. They would give the finishing stroke to Professor Redwood's opinion on the subject, certainly as far as spread plaster was concerned. He quite agreed that it was possible to send out British Pharmacopœia plaster rolled, but not spread. Possibly Mr. Moss's experience was confined to rolled plaster. He (Mr. Umney) had had the British Pharmacopœia plaster returned to him when he had sent it instead of the P.L. plaster which he had described in the paper. As to the question of oil, he had been most particular to use the very finest olive oil which could be obtained in the city of London for his experiments. He was astounded to hear Professor Redwood adduce the opinion of the late Mr. T. Herring as to the superiority of the B. P. plaster, for the laboratory journals of Herrings and Co., as far as he (Mr. Umney) had found, contained no entry of plaster by this B. P. formula until he made it in their laboratory in 1864. He regarded the evidence of the plaster spreaders against the B. P. plaster as stronger than that of the wholesale druggists.

The President expressed the thanks of the meeting to Mr. Umney, and remarked that there was room for further experiment on the subject. Perhaps Professor Redwood would take up Mr. Wells's suggestion as to the quality of the litharge.

The Estimation of Fat in Milk.

A paper on "The Estimation of Fat in Milk" was read by Mr. E. L. Cleaver. The paper is printed at p. 702, and gave rise to the following discussion:—

The author remarked that he had been led to write this paper by the fact that in some recent analyses of milk by London analysts the fat was the point upon which they had differed. A magistrate had remarked that if analysts could differ so much, the analysis of milk was not to be depended on.

Mr. Urwick said that he had found Mr. Horsley's plan to answer very well. Invariably the number of lines read off corresponded to the fat in the proportion stated. He had never seen any remarks upon the differences of quality between specimens of milk taken from different depths in the can after the milk had been standing for an hour or two. He had found that milk at the top of the can had yielded even as much as 25 per cent. of cream, while that at the lower part would fall as low as 9 per cent.

Professor Attfield said the excessive amount of fat found in the upper portions of the milk had been referred to in some investigations which were made sufficiently long ago to be embodied in at least one book. It would be, of course, naturally expected that the cream would rise to the top of the can. He could confirm what Mr. Cleaver had said about the difficulty of extracting the fat from a milk residue. He could partially confirm what he stated respecting the loss of fat through the ebullition of the ether. But he could not altogether confirm what he stated about the loss of material by decrepitation during the evaporation of the ether. He should like Mr. Cleaver to explain whether he relied upon the volumetric method or upon the gravimetric method in estimating the fat of milk. In the early part of his paper he threw some doubt upon the volumetric method; and then in the latter part he stated that the gravimetric method as improved by himself produced nearly all the results obtained by the volumetric method.

Mr. Cleaver, in answer, said that most of his experiments had been made comparatively. He had analysed a sample both by Mr. Horsley's method and by the gravimetric method; but by his own process, he had never been able to get as much fat as Mr. Horsley's method showed. He therefore concluded that, either the fat was not all dissolved out, or else that the volume was too great. Mr Ekin, however, had stated at the British Pharmaceutical Conference that he could always get the right amount.

Professor REDWOOD said that he could not agree with Mr. Cleaver in all points, but it was nevertheless very interesting to hear the results which were obtained by different operators. As far as his experience went there was no kind of analysis in which public analysts agreed so nearly in their results as in the analysis of milk. Nearly all public analysts now adopted one common method, which was very nearly that which had been indicated in the paper. The process known as Mr. Horsley's method—which had been adopted many years before in France—was adopted by very few analysts. The process generally used was essentially that which Wanklyn had described and adopted.

Mr. CLEAVER said that Professor Redwood stated at a recent meeting of public analysts that he adopted the second process which was described in the paper. That was not the same as Mr. Wanklyn's method. If he had given up that process, was it because it did not answer?

Professor REDWOOD said that the process was the same as Mr. Wanklyn's in principle, but a little different in the mode of separating the fatty matter. Mr. Wanklyn recommended a certain amount of milk to be evaporatsd to dryness in a platinum dish. The solid residue adhered to the dish and formed a solid cake. He then added ether, and boiled the ether in it. Then he turned the mixture into a filter, and evaporated away the ether, and estimated the fat that was left. That was Mr. Wanklyn's mode. He (Professor Redwood) did not adopt it in all its details. Instead of using a platinum dish he preferred a hemispherical German porcelain dish, because he could easily separate everything which adhered to such dish; and by careful manipulation towards the latter part of the process the whole of the solid residue was brought into a perfectly fine granular condition. Every dish had its weight marked on the outside, and that weight did not vary to the extent of one-hundredth of a grain, even after five or six months' daily use, if the dish was perfectly glazed inside and out. The residue was next exhausted with ether, the ether being added in three or four successive portions. Upon the ether being added, the dish was placed upon the water-bath, but they carefully avoided boiling it, for the reason to which Mr. Cleaver had alluded, which was that the liquid was apt to spirt, and thus cause a loss. Each dish was furnished with a little glass rod, which was rounded at each end, and the whole contents of the dish were stirred together. The rod served to break down any of the larger particles of the granulated solid residue. This residue subsided with very great facility and very quickly, so that the ether was generally left transparent. This was decanted into a beaker, so that there was the means of observing whether any solid matter was decanted away or not. This treatment with the ether took place four times. The liquid never went into a filter, and the solid residue from which the result was estimated never went out of the dish. An entry was made in a book of the contents of each dish; for he might state that he sometimes had perhaps twelve or fifteen or twenty samples of milk to analyse in a day, and therefore it was necessary to be extremely careful that there was no confusion of one sample with another. Each sample was marked by a number and a letter, and that was entered in the book, and the weight of the dish was put against the entry. Each dish had a special weight, no two dishes agreeing in that respect; and hence there was no chance of one dish being mistaken for another, or of an admixture of the samples during the process of analysis. The fat was dissolved out with the ether and simply decanted off. When he was satisfied that no solid matter had been carried away with the fat, it went into a common bottle, and the ether was distilled away when a quantity had been accumulated so that it might be used over again. When the first solid residue had been evaporated to dryness, so that it lost no more weight, its weight was entered against the weight of the dish. After it had been exhausted with the ether and the fat had been taken away, the weight of the non-fatty solid residue was entered again, and the one weight deducted from the other, the difference of weight representing the fat which had been dissolved out. All these results were obtained in the dish, and the sample never went out of the dish. No other apparatus was employed in the process. The material never went into the filter. The specific gravity of the milk was taken before the process was commenced, and if there was any doubt as to the milk being genuine, there were two other operations which would be performed, in which case, certainly, the residue had to be turned out of the dish. If there was any doubt about it, the ash was determined, and for the determination of that the non-fatty solid residue was turned into a platinum dish and calcined, and then its weight taken. Then the ash was treated with distilled water. That which the water dissolved out had the chlorine estimated. Those were the only determinations that were required or resorted to, and that, he believed, was the general mode of operating that was adopted by public analysts with very few exceptions.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING FEBRUARY, 1875.

	£	s.	d.
Adams, Frank, Stoke-upon-Trent	0	10	6
Allen, A. U., High Street, Lymington	0	5	0
Anderson and Son, Messrs., 43, Lower Belgrave St., S.W.	1	1	0
Ashton, William, 77, Lord Street, Southport	0	10	6
Bailey, John B., 9, Coley Hill, Reading	1	1	0
Baker, Charles Patrick, High Street, Chelmsford	0	10	6
Baker, Garrad, High Street, Chelmsford	0	10	6
Baker, William, Market Place, Retford	0	10	6
Ball, George V., 23, Parson's Street, Banbury	0	10	6
Ballard, Arthur, Market Place, Faringdon	0	10	6
Ballard, Walter, The Square, Abingdon	0	5	0
Barnitt and Hughes, Bath	0	10	6
Bass, James T., High Street, Hemel Hempstead	0	10	6
Bayley, George Henry, Victoria Road, Saltaire, Shipley	0	10	6
Bell, Francis, 36, Tyrrel Street, Bradford	0	10	6
Bevan, Charles F., 62, Church Street, Harwich	0	10	6
Blackburn, Bailey, Millengate, Bradford, Yorks.	1	1	0
Bond, Charles, 17, Blakebrook, Kidderminster	0	10	6
Borchert, H. T. G., Royal Victoria Hospital, Netley	1	1	0
Bottle, Alexander, 37, Townwall Street, Dover	1	1	0
Bowerbank, J., 17, Market Place, Cockermouth	1	1	0
Bowring, J. W., Ringwood	0	5	0
Bradley, Edwin S., Ashbourne	0	10	6
Bradon, Wm. George, 5, Holyrood Terrace, Malvern	0	5	0
Broad, John, Rise House, Hornsey Rise	1	1	0
Brown, A. J., 55, Trafalgar Road, Greenwich	0	10	6
Buckle, C. F., 77, Gray's Inn Road, W.C.	1	1	0
Burdon, John, 14, Claypath, Durham	0	10	6
Butterfield, Richard B., 39, Otley Road, Shipley	0	5	0
Cartwright, William, Ironmarket, Newcastle-under-Lyme	0	10	6
"C. H.", High Street, Sydenham	0	10	6
Clark, W. W., Dorking	0	10	6
Clift, Joseph, Dorking	0	10	6
Cockshott, William, 32, Westgate, Bradford	0	5	0
Constance, Edward, 37, Leadenhall Street, E.C.	0	10	6
Cooke, William, 27, St. Giles' Street, Norwich	0	5	0
Cooper, William J., 17, Market Place, Cockermouth	0	5	0
Crowther, Thomas, Tickhill	0	10	6
Curtis, Theophilus, 164, High Street, Notting Hill	1	1	0
Davis, D. F., High Street, Leominster	1	1	0
Deane, H. and Co., Clapham Common, S.W.	1	1	0
Deighton, T. M., 35, High Street, Bridgnorth	0	10	0
Dunn, Henry, 39, Otley Road, Shipley	0	10	6
Dyson, W. B., 4, Gloucester Road, South Kensington	0	10	6
Else, William, 52, King's Road, Brighton	0	10	6
Ereaut, John, jun., 14, Bath Street, Jersey	1	1	0
Farmer, John, Putney	0	5	0
Fletcher, Thomas, Smallthorne	0	10	6
Forbes, W. T., Reigate	0	10	6
Forster, Robert Henry, 52, Castle Street, Dover	0	10	6
Foster, Frederick, 52, King's Road, Brighton	0	10	6
Foulkes, William H., High Street, Rhyl	0	10	6
Galloway, G. and Son, 13, Castle Street, Inverness	0	10	6
Garratt, John C., 3, Market Place, Rugby	0	5	0
Garratt, Samuel, 3, Market Place, Rugby	0	5	0
George, John Evan, Hirwain	0	10	6
Giles, Elias, Ottery St. Mary	0	5	0
Govan, Alexander, St. Andrew's	0	10	6
Griffin, Thomas, Wood Hill, Northampton	0	10	6
Grindell, John, 8, Paragon Street, Hull	0	10	6
Grindley, William, Northgate Street, Chester	0	10	6
Haffenden, Thomas, 46, Dyke Road, Brighton	0	10	6
Hambrook, John Barber, Dover	0	5	0
Hardy, George, Wheelgate, Malton	0	5	0
Harrison and Parkinson, 7, Sunbridge, Bradford	2	2	0

Heathcote, T. S., Red Lion Square, Newcastle-under-Lyme	0	10	6
Hey, David, Hebden Bridge	0	10	6
Hey, Thomas K., Hebden Bridge	0	10	6
Hick, George, 3, Broadstones, Bradford	0	10	6
Hick, Joseph, 3, Broadstones, Bradford	0	10	6
Hodder, Henry, Broad Street, Bristol	0	5	0
Hodges, William, Eastgate Street Row, Chester	0	10	6
Hooper, Bartlett, 43, King William Street, E.C.	1	1	0
Hooper, Leonard, 43, King William Street, E.C	0	10	6
Huggins, John, Alresford	0	10	6
Jackson, W. G., Hartlepool	1	1	0
Jarvis, John S., Manor Villa, Lee, S.E.	0	10	6
Kemp, John, 200, High Street, Lincoln	0	10	6
Kerruish, Edward John, Duke Street, Barrow-in Furness	0	5	0
King, William G., Market Drayton	0	10	6
Knott, Samuel, 15, Norton Folgate, E.	0	5	0
Lewis, Thomas C., Sheep Street, Rugby	0	10	6
Long, Henry, 48, High Street, Notting Hill	1	1	0
Long, John T., 14, Love Street, Hotwells, Bristol	0	10	6
Lucas, Joseph, 1, Colmore Row, Birmingham	0	10	6
McNeil, James N., 77, Victoria Street, Crewe	0	5	0
Madge, James C., Buckland, Lymington	0	10	6
Malden, W. and Co., 195, Brompton Road, S.W.	1	1	0
Manning, Henry, Fairford	0	2	6
Marsden, T. B., 12, Fern Acre, Cheetham, Manchester	0	10	6
Metcalfe, Wilson, High Street, Chelmsford	0	10	6
Millais, Thomas, 4, King Street, Jersey	1	1	0
Mills, John, Eastgate Street Row, Chester	0	5	0
Muskett, James, Harleston	0	10	6
Newbigin, James L., Narrowgate Street, Alnwick	0	10	6
Newsholme, William, 20, John Street, Bradford	0	5	0
Palmer, Robert, 35, Ovington Square, S.W.	1	1	0
Peake, Henry, Dover	0	5	0
Pearman, Henry, 11, Commercial Street, Newport, Mon.	0	10	6
Pearson, Edward, 9, Market Place, Nottingham	1	1	0
Peat, Walter, 24, High Street, Lymington	0	10	6
Plomley, James F., High Street, Rye	0	5	0
Preston, Alfred P., Abingdon	0	10	6
Proctor, B. S., 11, Grey Street, Newcastle	1	1	0
Rademacher, C. J., 17, Albion Road, Islington, N.	1	1	0
Richardson, Edward, 6, Ivegate, Bradford, Yorks.	0	10	6
Ritson, John, 160, City Road, Hulme	0	5	0
Roberts, Meshach, High Street, Bangor	1	1	0
Robinson, James, 2, Orford Hill, Norwich	0	5	0
Robinson, J. J., Compstall, near Stockport	0	2	6
Robson, J. B., Filey	0	5	0
Robson, John Crosby, 37, Linthorpe Road, Middlesboro'	0	10	6
Rogerson and Son, North Parade, Bradford, Yorks	2	2	0
Rollin, John George, 3, South Street, Durham	1	1	0
Sadler, William, 15, Norton Folgate, E.	0	10	6
Sandford, George Webb, 47, Piccadilly, W.	2	2	0
Sarsfield, William, 7, Market Place, Durham	1	1	0
Scawin and Wortley, 19, Market Place, Durham	0	10	6
Seaton, George, High Street Chelmsford	0	10	6
Sims, Joseph, Hirwain	0	10	6
Sircom, Richard, Old Market Street, Bristol	0	10	6
Sloggett, Thomas C., 5, Drake Street, Plymouth	0	5	0
"S. M.", West Derby, Liverpool	1	1	0
Smith, Alfred William, High Street, Rye	0	10	6
Smith, Allen G., Sale	0	5	0
Smith, Thomas William, St. Nicholas Street, Diss	0	5	0
Smith, William F., Bedwell Place, Abingdon	0	5	0
Sowden, S., 262, Wakefield Road, Bowling, Bradford	0	5	0
Speechly, George, Bishop Stortford	0	10	6
"S. T.", Wolverhampton	0	5	0
Stansfield, Richard, 7, Steele's Terrace, Haverstock Hill	0	5	0
Steel, Thomas, Duke Street, Barrow-in-Furness	0	10	6
Stoddart, W. W., 9, North Street, Bristol	0	10	6
Sykes, Thomas H., 201, Lord Street, Southport	0	10	6
Tomlinson, Charles K., Lincoln	0	10	6
Tomlinson, James, High Street, Chelmsford	1	1	0
Tugwell, William H., 3, Lewisham Road, Greenwich	0	10	6
Twinberrow, John, 53, Broad St., Worcester (1874 and 1875)	2	2	0
Walker, William H., 167, Lord Street, Southport	0	10	6
Warrior, William, Northallerton	0	10	6
Waters, William Allen, High Street, Rye	0	5	0
Wellington, F. G. N., South Petherton	0	5	0
White, James W., 52, Royal York Crescent, Clifton	0	10	6
Willan, Robert, Castle Street, Carlisle	0	5	0
Williams, James, Dorking	0	5	0
Williams, Thomas, Mostyn Street, Llandudno	0	10	6
Williamson, James, North Shields	0	5	0
Williamson, Joseph B., North Shields	0	5	0
Woods, William, 45, Bedford Street, Plymouth	0	10	6

Donation.

"S. M.," West Derby, Liverpool	2	10	0

Obituary.

We regret to have to announce the death, on the 20th of February, of Mr. John Palk, Pharmaceutical Chemist, of Exeter, one of the Founders of the Pharmaceutical Society, and a Life Member. Mr. Palk for many years carried on the business of a chemists' valuer, in which connection his name will be familiar to many of our readers. About two years since he retired from business. On the 20th ult. he was taken ill at Barnstaple, through which town he was passing whilst on a trip for change of air, and died three hours afterwards.

Another Founder and Life Member of the Pharmaceutical Society, has passed away in Mr. Charles Colin Luckombe, Pharmaceutical Chemist, of Radley Lodge, Wimbledon Common. In the early years of the Pharmaceutical Society, Mr. Luckombe took a great interest in its affairs and served it as an Auditor.

Notice has also been received of the death of the following:—

On January 4, 1875, Mr. Thomas Stephens, Pharmaceutical Chemist, of Merthyr Tydvil. Mr. Stephens had been a Member of the Pharmaceutical Society since 1853.

On January 11, 1875, Mr. John Dunn, Chemist and Druggist, of West Port, Selkirk.

On January 29, 1875, Mr. George Wilkes, Pharmaceutical Chemist, of Mile End Road, E. Mr. Wilkes had been a Member of the Pharmaceutical Society since 1842.

On January 31, 1875, Mr. John S. Schibild, Chemist and Druggist, of Willow Walk, S.E.

On February 3, 1875, Mr. Francis Toogood, Chemist and Druggist, of Caroline Street, Hull.

On February 11, 1875, Mr. Sylvester L'Amy, Chemist and Druggist, of Dundee.

On February 12, 1875, Mr. Stephen Langley, Chemist and Druggist, of Moor Street, Chepstow. Mr. Langley had been a Member of the Pharmaceutical Society since 1870.

On February 14, 1875, Mr. William Gordon Inglis, Chemist and Druggist, of James Street, Cardiff.

On February 15, 1875, Mr. James Wilshaw, Pharmaceutical Chemist, of Wordsley. Mr. Wilshaw had been a Member of the Pharmaceutical Society since 1853.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Year-Book of Pharmacy, comprising Abstracts of Papers relating to Pharmacy, Materia Medica, and Chemistry, contributed to British and Foreign Journals, from July 1, 1873, to June 30, 1874. With the Transactions of the British Pharmaceutical Conference at the Eleventh Annual Meeting held at London, August 1874. London: J. and A. Churchill. 1874.

Proceedings of the American Pharmaceutical Association at the Twenty-second Annual Meeting. Philadelphia. 1875.

A. A.—In the 'Additions to the British Pharmacopœia' it is recommended that Sapo Animalis should be used in preparing the Lin. Potassii Iodidi c. Sapone. When this is done the liniment forms an opaque white jelly.

C. Gerring.—Several articles on the *Eucalyptus globulus* have from time to time appeared in this Journal. See Professor Bentley's lecture in vol. iv., p. 872.

Ratæ.—April.

W. S. Hall.—The question is one that lies outside our department. You would probably obtain the information you require by application to the Secretary.

A. H. Finch.—The reference to a formula for Rubini's camphor is given quite correctly in the Year Book for 1871; viz., *Pharm. Journ.*, 3rd series, vol. i., p. 397.

W. Mount.—You cannot claim exemption on the ground of being a pharmaceutical chemist.

Percy Wells.—The Chemical Testing of Wines and Spirits by J. J. Griffin.

J. Young.—An Index to the 16th vol. of the first series of the *Pharm. Journ.* and the first eleven volumes of the second series has been published, copies of which, price 2*s.* 6*d.* each, may be obtained from the Secretary.

T. Appleton.—No binding cases are prepared.

We are compelled through want of room to defer the publication of several communications.

Communications, Letters, etc., have been received from Mr. E. Schiemann, Mr. P. Wells, Mr. J. Armstrong, Mr. E. Davies, Mr. Symes, Mr. Schorlemmer, Mr. Laird, Mr. Cope, Mr. Cocking, "Fideliter peragimus artem," "Vicar," "Semper Eadem," J. G. C., J. T. C.

A RESEARCH ON "CHRYSAROBINE."*

ARAROBA POWDER.—BAHIA POWDER.—GOA POWDER.†

BY PROFESSOR ATTFIELD,

Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain.

1. The "chrysarobine" with which this research was made was a yellow powder containing some fragments of vegetable fibre. It was sent to the writer by Mr. David Kemp, F.C.S., Bombay.

On drying at 100° C., and then burning, it yielded:—

Moisture	1·17 per cent.
Combustible Matter	98·40 "
Mineral Matter (Ash) . . .	0·43 "
	100·00

2. The ash was composed mainly of silicate of aluminium and the sulphates of potassium and sodium.

3. During the combustion for ash much yellow vapours or fumes were noticed; they were readily condensed on any cold surface.

4. Some of the "chrysarobine" was placed on a watch-glass over the smallest gas-jets of an argand-burner, and another watch-glass inverted over the first. After twelve hours the powder had lost one-tenth in weight, a very small quantity of sublimate occurring on the upper watch-glass. On raising the temperature, fumes were evolved, more sublimate obtained, and a charred residue remained.

5. Under the microscope the sublimate from the chrysarobine appeared moss-like rather than crystalline. Acids scarcely affected it; alkalies coloured it red.

6. Treatment of the chrysarobine with cold water yielded no satisfactory results.

7. Treatment of chrysarobine with hot water resulted in the ready removal of about 7 per cent. of matter; continued treatment with hot water gave a very weak solution: suggesting the idea of the presence of some substance easily dissolved by hot water, and of a substance in much larger amount and only slightly soluble in hot water.

* Read at a Meeting of the North British Branch of the Pharmaceutical Society of Great Britain, on Friday, March 5, 1875.

† *Note.*—March 10, 1875. According to Dr. J. F. Da Silva Lima, of Brazil (*Medical Times and Gazette*, March 6, 1875, reprinted at the end of this article) araroba or arariba is the name of a leguminous tree, having yellow pith. Dr. Lima, Dr. J. L. Paterson, who recently visited Bahia, and Dr. J. Fayrer, of Calcutta (*Medical Times and Gazette*, October 24, 1874), state that this yellow powder from the araroba tree has for many years been largely and successfully used for the external treatment of ringworm and other cutaneous diseases. Mr. D. S. Kemp, of Bombay, in the *Pharmaceutical Journal*, for February, 1864, described the same or an allied powder, which had long been imported through Goa, and hence termed Goa powder. Goa, it is true, seems to have produced a powder not always identical with araroba powder. One that I examined was certainly quite distinct. I am now inclined to think, however, that *true* Goa powder is identical with yellow araroba powder, though by age and the action of atmospheric ammonia it is liable to become of a reddish brown colour. Mr. Kemp's name of "Chrysarobine," literally yellow araroba, is clearly more appropriate than the synonymous Bahia powder, Goa powder, Brazil powder, ringworm powder, or even than powder of arariba or araroba, two names which according to Dr. Bomfim are used by South American Indians to indicate any "tawny-coloured" trees.—J. A.

8. The treatment with hot water was conducted in a retort with a condensing arrangement attached. The distillate was thoroughly examined, and the absence of any important amount of any kind of volatile matter in chrysarobine thereby proved.

9. The hot aqueous decoction of chrysarobine had a yellow colour and a bitter taste, was neutral to test-paper, scarcely affected by alcohol, gave no blue colour with iodine nor much red colour with potash, nor black with ferric chloride, though with ferrous sulphate and sulphuric acid it gave the black colour indicative of the presence of nitrates, and it readily reduced Fehling's copper solution.

10. Before examining the more important bulk of the chrysarobine, namely, the 90 per cent. of vegetable matter insoluble in water, the part soluble in hot water (about 7 per cent.) was subjected to investigation.

I. *Aqueous Extract of Chrysarobine.*

11. The chrysarobine was treated with hot water till the decoction ceased to taste bitter. This decoction was concentrated by evaporation. On cooling, some flocks separated which, when collected, slightly washed with cold water and examined, gave reactions similar to those afforded by the substance which sublimed when the chrysarobine was heated. Here it may be stated that the prolonged treatment of chrysarobine with hot water (after the 7 per cent. readily soluble matter is extracted) brings out only small quantities of the substance resembling the sublimate just mentioned. Postponing the examination of the sublimate and the flocks, the investigation of the 7 per cent. of readily soluble matter of chrysarobine was continued.

12. The filtered decoction was therefore precipitated by solution of acetate of lead, the filtrate from this precipitate treated with solution of sub-acetate of lead, and the filtrate from the resulting precipitate treated with sulphuretted hydrogen to remove lead, and then concentrated. Examination was then made of (*a*) the lead-acetate precipitate, (*b*) the lead-sub-acetate precipitate, and (*c*) that portion of the chrysarobine decoction not affected by acetate or by sub-acetate of lead.

13. *The lead-acetate precipitate.*—It had a reddish colour. It was washed with spirit of wine and treated with acetic acid, in which it nearly all dissolved. What little remained undissolved was found to be sulphate of lead. The acetic solution of the precipitate was saturated with sulphuretted hydrogen to remove lead, the lead sulphide separated by filtration, and the filtrate examined for chlorides, phosphates, citrates, and tartrates. Neither was present. The remaining portion was then evaporated to dryness. The red glass-like or resin-like residue was soluble in spirit, also in alkaline solutions, which yielded a precipitate when neutralized by acids.

The aqueous solution of the red body was not, apparently, very stable when subjected to prolonged evaporation. This liquid did not reduce Fehling's copper solution until after ebullition with diluted sulphuric acid, when it reduced the copper liquid readily. Of the substances present in the aqueous decoction of chrysarobine, that precipitated by lead-acetate has most of the characters of a glucoside.

14. *The lead-sub-acetate precipitate.*—It had a yellowish colour. It was separated, washed, and dissolved in acetic acid. Here also a little sulphate of lead was met with, probably protected from the

previous action of the lead-acetate by organic matter. The acetic solution contained neither chlorides, phosphates, tartrates, nor citrates. Evaporated to dryness, it afforded a residue nearly all soluble in alcohol. This constituent of chrysarobine, that is, the constituent readily removed by water, not precipitated by acetate of lead, but precipitated by subacetate of lead, is the bitter principle of chrysarobine. It is soluble in alcohol. Ether dissolved it in part. Both parts were bitter.

15. *The soluble constituent of chrysarobine decoction precipitable neither by lead-acetate nor lead-sub-acetate.*—After removal of the lead by sulphuretted hydrogen, the fluid was evaporated to a low bulk. A mass of acetates of potassium and sodium, with some nitrates crystallized out, the source of the acetic constituent being, of course, the lead-acetates, while the nitrates and the alkali metals came from the chrysarobine. The non-crystalline portion reduced Fehling's copper solution, but was not sweet to the taste.

II. *Benzolic Extract of Chrysarobine.*

16. The 90 per cent. of chrysarobine, insoluble, or almost insoluble in water, was dried and treated with benzole. About 84 of the 90 per cent. dissolved. The solution was yellow when dilute, and a deep brown when strong. On cooling a yellow granular substance separated in abundance. This substance gave all the reactions afforded by the sublimate of chrysarobine mentioned in sections 3 and 4. In alcohol it was less soluble than in benzole, still less in ether, and very slightly soluble in water. These solvents affected it more rapidly and powerfully when hot than when cold; and hot solutions deposited it on cooling. It was soluble in aqueous solution of potash, with formation of a deep red solution. Acids re-precipitated it from such alkaline solutions. If the alkaline solutions were exposed to air, some alterations went on, and the acids then gave a brown instead of a yellow precipitate. In an alcoholic solution of potash this alteration was not observed. The most minute trace of the substance gave the red coloration with potash. Heat affected it in the manner that heat affected the chrysarobine. On the addition of the solution of alum to the potash solution, a copious light brown precipitate resulted. The substance dissolved slightly in solution of ammonia, and the resulting pink solution gave a pink precipitate on the addition of alum solution, and a lilac coloured precipitate on the addition of acetate of lead. Water added to the alcoholic solution of the substance caused partial precipitation. By re-crystallization from benzole it was sometimes obtained in crystalline tufts.

17. The yellow substance (obtained on washing chrysarobine with hot water, drying it, treating the dried and now purified chrysarobine with boiling benzole, cooling the benzole and then twice re-crystallizing from alcohol the yellow substance deposited from the hot benzole) was burnt to ascertain its percentage of carbon, hydrogen, and (by difference) oxygen.

18. The same yellow body re-crystallized from ether was also burnt.

19. The similar yellow substance obtained from the washed and dried chrysarobine by alcoholic potash (in an atmosphere of hydrogen to prevent oxidation), precipitation by dilute acid and re-crystallization from hot alcohol was also burnt.

The three combustions yielded the following results:—

(17.) Yellow substance extracted by benzole and alcohol—

Carbon	75 93
Hydrogen	7·70
Oxygen	16·37
	100·00

This substance crystallized several more times from alcohol was thus purified from a resinous body — probably a hydrocarbon — and was again burnt.

(17*a.*) Yellow substance extracted by benzole and alcohol—

Carbon	72·73
Hydrogen	5·23
Oxygen	22·04
	100·00

(18 and 19.) These, corrected for moisture afterwards found to be present, yielded—

	(18)	(19)
Carbon	69·3	69·3
Hydrogen	4·6	4·3

20. The figures just given, and all the reactions already mentioned, clearly indicate that the chief constituent of chrysarobine is CHRYSOPHANIC ACID.

21. Chrysophanic acid is so called from the Greek "gold-shining" or "yellow-shining."

22. The word chrysarobine has doubtless been given in allusion to the yellow colour of this arobine or arariba. In Martius's 'Systema Materiæ Medicæ Vegetabilis Brasiliensis,' page 125, heading Leguminosæ, subheading Cæsalpineæ, I find an allusion to "other leguminous trees," including "arariba." The name chrysarobine could scarcely have been more happily chosen had the facts of this research been known before hand. Mr. Holmes, Curator of the Museum of the Pharmaceutical Society, tells me that there is in the Museum some crude Arariba from Bahia which resembles chrysarobine but contains fragments of wood, the crevices and interstices of which are filled by a powder resembling the chrysarobine itself.

This confirms a statement made by Mr. Kemp, of Bombay, in a letter to the writer, that chrysarobine is the "pith" of a tree. (See also the footnote to the former part of this paper.)

23. Chrysarobine yields—in addition to 1 per cent. of moisture, 7 per cent. of a glucoside, a bitter and a gummy matter, and over 80 per cent. of chrysophanic acid—about 10 per cent of material insoluble in water or benzole. This residual material, when dried, was digested in hot strong alcohol. The alcoholic liquid evaporated gave a reddish-yellow resin-like body from which ether extracted (and re-deposited on evaporation) a yellow resin-like substance, leaving a red resin-like matter insoluble in ether. The final residue of chrysarobine, insoluble in hot water, hot benzole, or hot alcohol, was found to be woody fibre of a red colour. Exposed portions of the cæsalpinia wood before mentioned were noticed to be red.

24. Table showing at a glance the composition of chrysarobine :—

Name of Constituent.	Amount in 100 parts.
1 Moisture	about 1
13 Glucoside	}
14 A Bitter Principle or Principles	} „ 7
15 A variety of Arabin ?	}
16 to 20 Chrysophanic Acid	„ 80 to 84
23 Resin-like Bodies	2
23 Woody Fibre	$5\frac{1}{2}$
2 Mineral Matter (Ash)	$\frac{1}{2}$
	100

25. The glucoside and the bitter principle of chrysarobine deserve further investigation. To one or both may belong a portion of any medicinal activity possessed by chrysarobine when administered internally. In point of quantity chrysophanic acid is the chief constituent of chrysarobine. Four-fifths of chrysarobine is chrysophanic acid.

General Remarks.

Chrysophanic acid, obtained by sublimation, occurs in delicate golden-yellow shining scales or short needles. From solution it is deposited in minute silky crystals, or rather moss-like crystalline groups. Occasionally it crystallizes in minute "orange-yellow six-sided plates belonging to the oblique prismatic system."

Technology of Chrysarobine.—Chrysarobine may obviously be used as a yellow or orange-yellow dye. It would probably be best so employed as a weak alkaline bath. According to Grothe chrysophanic acid may be used with tin mordants for dyeing silk, wool, and linen; and with alum for dyeing cotton.

Therapeutics of Chrysarobine.—It is possible that the glucoside or the bitter principle of chrysarobine may possess medicinal activity. This point would best be decided by direct experiment, or at all events by experiments with the aqueous infusion of chrysarobine. Chrysophanic acid, according to Schroff, "exerts a purgative action . . . weaker than that of rhubarb." Rhubarb, it should be stated, contains a considerable quantity of chrysophanic acid, and this acid, with some resins and a bitter principle, are considered to be the conjoint source of the therapeutic properties of rhubarb. Chrysarobine may possibly be destined to be a rival of rhubarb as well as an external remedy for ringworm.

Pharmacy of Chrysarobine.—The proper mode of administering chrysarobine internally cannot be conclusively decided until the therapeutic characters of its aqueous extract be ascertained. So far as its chrysophanic acid is concerned, aqueous or alcoholic preparations would scarcely be admissible; a confection, the powder itself, or pills combined with soap, would be more appropriate. For external application in cases of ringworm and other cutaneous diseases Dr. Da Silva Lima recommends a pomade formed by mixing twenty grains of the powder and ten drops of acetic acid with an ounce of benzoated lard; to be applied to the roots of the hair at the part affected, by a camel-hair pencil. Dr. Fayrer uses a thin paste formed of the chrysarobine with vinegar or lemon-juice; this is painted over the eruption and for a little distance beyond its margin on to the sound skin.

To the scientific chemist chrysarobine may be commended as a new and rich source of chrysophanic acid.

As the substance which is the subject of the foregoing research is exciting considerable attention at the present moment, we append the following article which appeared in the *Medical Times and Gazette* for March 6:—

GOA POWDER.

BY J. F. DA SILVA LIMA, M.D.

(*Translated and annotated by J. L. Paterson, M.D.*)

I have read with much interest a paper in the *Medical Times and Gazette* of October 24, by Dr. Fayrer, of Calcutta, on the treatment of Indian ringworm by Goa powder. In this valuable communication—one of many such that have justly made him an authority on subjects of tropical pathology—Dr. Fayrer makes especial mention of certain cutaneous diseases—herpes circinatus, chloasma, and intertrigo—equally common here in Brazil as in India. In reference to the treatment of these eruptions, Dr. Fayrer states that he has found no remedy so rapidly or so certainly effective as the solution in vinegar or lime-juice of a secret preparation, which he believes of vegetable origin, sold in small phials by the chemists of Calcutta and Bombay under the name of Goa powder. Dr. Fayrer speaks of another powder very similar to the former, and equally efficacious in the treatment of the same diseases, known as "Poh di Bahia"—a designation which the author believes may be of Malay derivation. Mr. D. S. Kemp, Dr. Fayrer adds, from the fact of orchella (*Lichen orcella*) being imported in large quantities from the coast of Africa, north of Mozambique, into India, considers that substance as the probable source of the Goa powder. Mr. Hanbury, F.R.S., he says, on the contrary, alleges the Goa powder to be a secret remedy, whose composition and place of manufacture are alike unknown. It is with the view of calling attention to the employment in certain cutaneous diseases of this secret, and, as he believes, native remedy, that Dr. Fayrer at considerable length lays before the profession the results of his valuable experience.

Without pretending to unravel completely the mystery that has, doubtless for interested commercial purposes, been thrown around the nature, origin, and composition of the remedy or remedies so favourably spoken of by Dr. Fayrer, I am yet, I believe, in a position to furnish him and other medical men in India with such information as will lead to the establishment of the identity of the Goa powder and the Poh di Bahia with a popular remedy for many years employed in this and in other provinces of the Brazilian empire for the cure of various cutaneous affections, and more especially of herpes circinatus, chloasma, and intertrigo. The remedy I speak of is known in the province of Bahia under the name of Araroba powder, and in the other provinces of the empire, importing it as they do from Bahia, under that of Bahia powder (*po' de Bahia*.

Araroba, or, as some call it, Arariba, is the name of a tree belonging to the *Leguminosæ*, related perhaps to the tree of the same family furnishing the "Brazil wood" of commerce; several species of the Araroba, like Brazil wood, being employed as a dye. Araroba occurs in commerce either in the form of a rough powder or in small pieces of different sizes of a light yellow colour, becoming much darker on exposure to light and moisture. The part employed is said to be the medulla of the stem and branches. Reduced to a fine powder, it is in this country employed mixed with vinegar, just as the Goa powder and the Poh di Bahia in India, and produces exactly the same effects as, according to Dr. Fayrer, are produced by these—irritating and discolouring the skin, and producing more or less heat in the part, according to the strength employed. In the same manner, the dark colour left by its application disappears after a few days, as Dr. Fayrer says occurs after the application of the Indian remedies.

I may mention in passing that the irritating effects of the Araroba on the skin and mucous membranes are such that the manipulation of it is attended with much inconvenience. The workmen employed in cutting up and pounding it are obliged to cover up very carefully their heads in order to protect their face, eyes, mouth, nostrils, and throat against its irritating effects.

The efficacy of Araroba for the cure of certain cutaneous diseases is here well known—a thing neither questioned nor questionable; and I have myself had innumerable opportunities of verifying it in the case of the diseases cited by Dr. Fayrer, as also lately in a very obstinate case of mentagra that, having proved intractable to every variety of treatment, external and internal, yielded completely in a very short time to the application twice a day, by means of a camel-hair pencil, to the roots of the affected hairs of a pomade of Araroba, consisting of twenty grains of the Araroba powder, ten drops of acetic acid, and an ounce of the unguentum benzoini. Long before reading Dr. Fayrer's paper I had already suspected that the remedy which I had heard was in some parts of India used so advantageously for the treatment of herpes circinatus, and which was sold at a high price in the shops of Saigon and Singapore as the Poh Baia, was none other than our Araroba, more or less adulterated, perhaps, with other colouring matters. My chief reason for coming to this conclusion arose from my having had the good fortune in 1872 to make the acquaintance of Dr. Palasne de Champeaux, chief surgeon on board the French war steamer *La Place*, during that vessel's visit to our port. Our conversation naturally turned on the more specially tropical diseases, and among other interesting communications he informed me that in Saigon, having on board many cases of herpes circinatus intractable to the usually employed remedies, he had been induced to try a native remedy much vaunted in such cases under the name of Poh Baia, procurable only in small quantities and at an exorbitant price (two francs a gramme). He had employed it as there recommended, mixed with vinegar, and with marvellously good result. Telling him in reply that in Brazil the popular remedy for the cure of such cutaneous affections was the Araroba powder, known in the other provinces of the empire as the Po' de Bahia, mixed also with vinegar, the coincidence alike of the name, mode of application, and favourable results struck us both as suggesting the identity of the two remedies. On his leaving for Europe, I gave Dr. Champeaux some of the Araroba powder to take with him, and he afterwards employed it with exactly the same, only somewhat stronger, physiological and therapeutical effects as he had seen follow the use of the Poh Baia. These experiments and the conclusions come to by this distinguished member of our profession may be read, and will well repay the trouble, in the May number of the *Archives de Médicine Navale* for 1873.

I would add the following reflections, going far, I believe, to prove the identity of the Araroba powder with the Goa powder, the Poh di Bahia, and the Poh Baia:—

1. For a good many years back an old and well-known firm in this place has been in the habit of executing orders for large quantities of Araroba for Portugal.

2. Araroba (at all events, under that name), so far as I am aware, is unknown alike to the chemists and the medical men of Portugal.

3. It is therefore highly probable that the Araroba is from Portugal re-exported to its colonies on the coasts of Asia and Africa.

4. This probability will appear all the more when we learn from Dr. Fayrer, on the authority of Mr. Kemp, that from the north of Mozambique, a Portuguese settlement, there is exported for India a large quantity of urzella (*Lichen orcellis*); leading him to the inference of its being the chief constituent of the Goa powder.

5. Goa, importing Araroba from Lisbon, would have given its own name to the product over the rest of India, just as Bahia has given it its name in other parts of the Brazilian empire.

6. Thus the terms Goa powder and Po' de Bahia (the *poh di Bahia* of Dr. Fayrer, the *poh Baia* of Dr. Champeaux) would designate, all of them, the same original substance, more or less altered, it may be, by adulteration in India; the name Poh di Bahia coming from the name of the Brazilian province of which it is a native, and not, as Dr. Fayrer supposes, from any Malay origin.

7. Mr. Kemp's idea that the urzella is a chief constituent of the Goa powder may arise from the circumstance of their colouring, the one and the other alike, any object, such as the skin or clothes brought in contact with them.

8. As the perfect similarity of the *modus operandi* of all three remedies would seem to point to their intrinsic identity, so would their unvarying mode of application for therapeutical purposes appear to point to a common centre whence their use had sprung.

If the preceding considerations do not fully prove the identity of the three remedies, there can, at all events, be no doubt that the Araroba powder is as effective, or even more so, than either the Goa powder or the Poh di Bahia for the cure of those cutaneous affections for which these latter have been employed. Of this opinion is also Dr. Champeaux, who in the article already quoted says—"La poudre d'araroba est un ante-herpétique aussi puissant au moins que la poudre de poh Baia, si elle ne lui est identique." To corroborate still more the Brazilian origin of the remedy, Dr. Champeaux further remarks that on questioning the person who supplied the hospital at Saigon with medicines, he, with much equivocation, confessed nevertheless that the Poh Baia was not indigenous, but came from America.

As an appendix to Dr. Silva Lima's letter, Dr. Paterson writes, "I may state that from my own experience I can fully bear out all he asserts as to the beneficial effects of the Araroba powder in the treatment of the cases indicated in his paper. During a short visit which in the beginning of last year I paid to Bahia (I had formerly been twenty-five years in practice there), I learned from Dr. Bomfim, the distinguished professor of botany, that the names *araroba* and *arariba* are of Indian—that is, South American Indian—origin, and come from a stem signifying "tawny coloured," and that the name is by the native Indians applied to a great variety of trees, some of which are described by Martius in his 'Botany of Brazil,' none of these, however, at all corresponding with the plant from which the Araroba powder is procured; that this plant has not, as far as he is aware, been as yet described by any botanist; that he himself had had some of the leaves and the wood sent him, but had never seen a specimen of the tree, growing as it does in a distant part of the province. On my return in June I brought with me a small quantity of the powder, a portion of which I shall be very glad to give to anyone desirous of affording it a trial, which I am sure it will well repay; and in a few weeks any amount of it can be obtained, as in Brazil, if secret there be in the matter, it is the "open secret," whose only keepers are ignorance and indifference. I brought with me also, in default of the seed—the seed-bearing season having already passed,—two small Araroba plants from cuttings. These are now in the Royal Botanical Gardens of Edinburgh, for transmission to Dr. Little, of Singapore, who, during a short visit to Edinburgh a year or two ago, called on me, desirous to obtain some information in regard to the Po' de Bahia, which he, as well as other medical men in the East, had found by far the most effective remedy for the treatment of many cutaneous affections, and to ask me, if possible, to procure him some seeds of the plant producing it. He must therefore have discovered or surmised that the secret remedy sold as Po' de Bahia was of Brazilian origin. He was anxious to obtain some certain information in regard to the plant producing the powder, as one possibly, could they only know it, growing at their own door, and to free themselves at all events from the doubt, uncertainty, and humiliation attending the use of every quack medicine. If the Indian remedy is the Brazilian Araroba, how comes it that it is much better known to the profession (not the people) in India than in Brazil? This seeming paradox admits, perhaps of the following explanation.

Brazil up to the present time has no official pharmacopœia of its own, being content to use those of France and Portugal. Brazilian medical men, therefore, with scarcely one exception (Dr. Silva Lima is, however, one), after the failure probably of the more classical remedies, are content to tell their patients (or accept, perhaps, the suggestion of these) to give the Araroba a trial, referring them to the apothecary for instructions as to the mode of applying it—looking down rather on the untitled *parvenu* —for the *idolum tribus* grows as rankly in Brazil as in Europe. To the people it has from time immemorial been as much a household god as brimstone and treacle are to Englishmen—though you never see them in a prescription.

But again, how did the Araroba powder reach India? Up to 1822, when Brazil achieved its independence, all its intercourse with foreign countries, according to the policy of those times, took place through the mother-country. This gave rise to a regularly organized inter-colonial trade, now extinct, between the Brazilian and Asiatic colonies of Portugal. Hence, doubtless, the first introduction of the powder among the Portuguese residents of Goa, and its gradual spread over other parts of India; hence, too, the now roundabout mode of its transmission to India, and the consequent mystery there attending its origin—the chrysalis out of which the Brazilian grub emerges the butterfly of India.

The best mode of applying the remedy is, as Dr. Silva Lima recommends, in the form of ointment—twenty to forty grains of the powder with ten drops of acetic acid to an ounce of lard. As generally recommended it is much too irritating. I speak, of course, of the pure araroba powder.

ORTHOGRAPHY OF ASAFŒTIDA.*

BY ADOLPH W. MILLER, M.D., PH.D.

The duplication of a single letter may seem to many to be a very trivial matter indeed, though when philosophically considered, it is found to be quite worthy of attention and earnest consideration. As is well known, the majority of civilized nations use the Latin language in their prescriptions, and for the purpose of expressing many scientific terms pertaining to medicine. In order, therefore, to guard against ambiguity, it becomes an object of considerable importance to preserve the purity of this tongue. If every nation, or perchance every individual, were to adopt a peculiar orthography, the value of Latin as a common scientific language would be utterly destroyed; thus depriving both physicians and pharmacists of this convenient international medium of communication.

A diversity of the above kind seems to be at present prevailing in reference to the spelling of the Latin noun *asafœtida*—the *stercus diaboli* of modern nations, the *cibus deorum* of the ancients. A semblance of authority is given to the *ss* in the word by its adoption into the British and United States Pharmacopœias; on the other hand, the Pharmacopœa Germanica and almost all the most accurate authors write it with only a single *s*. As the Germans are generally regarded as being in advance of all other nations in profound philological knowledge, it is fair to presume that they have just and logical grounds for employing this form. In addition to this, the text-book of the German empire is invested with a much higher authority than ours, as it is issued under the immediate supervision and with the sanction of the general government.

If we may credit the accounts of Murray, the word asafœtida seems to have been introduced by the monks of the famous school of Salerno in the middle ages. It is not used by the Greek and Roman writers, so that it is searched for in vain in classical dictionaries. In order, therefore, to form an intelligent opinion on the subject, it becomes necessary to inquire into the derivation of the word, and also to note the preference shown by careful and competent writers for either of the two forms.

The term *asa* has been for ages applied to two different drugs, namely, *asa dulcis* (benzoin) and *asa fœtida*. The former seems to be used in Latin only with a single consonant, while the variation occurs in the latter. This apparent inconsistency is most probably to be accounted for by the name *asa dulcis* having become obsolete before the term *assa* came into vogue.

The origin of the word *asa* is veiled in so much obscurity, that different etymologists ascribe it to four entirely distinct sources. The first of these is the Latin word *laser* or *lasar*, which was applied to the juice of the plant *Laserpitium*. This was a medicine of great renown among the Romans, who knew it also as *Laser cyrenaicum*, or *Succus cyrenaicus*, and as *Silphium*. Many authors claim that laser was identical with asafœtida, though this is hardly probable, since Theophrastus, Aristophanes, and Dioscorides assign to it a sweet and agreeable flavour. Worcester, Muspratt, and many other writers mention this derivation. The word *laser* is itself derived by some authors quoted by Flückiger from the Greek σίλφιον as follows:—*silphi', sirphi', sirpe, lac serpitium, laserpitium.* The intermediate form *sirpe* is used by Plautus, B. C. 184. Francis Gouldman's 'Dictionary,' Cambridge, 1674, says:—*Laser est decurtatum ex Laserpitio. Laser herba cujus succus primum dict. Lactir, quoniam manet in modum lactis.* The same author then quaintly defines it as being "the loathsome liquor which issueth out of the stinking *laserpitium*, and is called of the apothecaries *Asa fœtida*."

The second derivation is from the triliteral root *asa*, occurring in several oriental languages; thus, *aza*, in Persian, means mastic, *isà*, in Arabic, a remedy, and *asa* signifies healing or curing in both Hebrew and Arabic, being often used substantively for a physician. Webster, Hager, Dorvault, the Paris Medical Dictionary, and others, favour this view. My esteemed friend, Dr. J. Thomas, a diligent student of comparative philology, and author of a medical and other dictionaries, has, at my request, investigated the subject. His conclusion is that the etymology from the Arabic *ăsâ* is altogether the most satisfactory, as the derivation from *laser* appears to him to be too far fetched. This gains additional plausibility from the well known fact that the school of Salerno obtained much of its erudition from the Arabic physicians. The writings of Rhazes and Avenrois enumerate asafœtida, and Avicenna mentions both the sweet and the stinking asa.

A third etymology is given by Flückiger in his '*Pharmakognosie des Pflanzenreiches*,' Berlin, 1867. He deems it probable that our *asa* and the Chinese *awei* both originated from the word *anguzeh*, or *ungoozeb*, as the dispensatory represents it, the modern Persian name of the plant furnishing the drug. It will be noted that all the roots so far enumerated contain only a single sibilant consonant.

The fourth and last source, which the writer has found only in Chambers's 'Encyclopædia,' is from a Persian word, *ăsā*, signifying staff. The chief motive for offering this seems to be that it is synonymous with the Greek νάρθηξ and the Latin *ferula*, both of which refer to the upright stalk of the plant. This is evidently a marked characteristic, as even its present name in the Aralo-Caspian territory is stinking reed (Keurök-Kurai). Chambers' 'Encyclopædia' spells assafœtida, and renders the above Persian word into English characters as *assa*. On the other hand, Chambers's 'Etymological Dictionary,' emanating from the same firm in 1869, edited by James Donald, only mentions assa, and refers to asafœtida. Furthermore, Duncan Forbes's 'Persian Grammar and Vocabulary' represents the word in English letters by *ăsā*. Again, Catafago's 'Arabic Dictionary' contains the same word, and renders it likewise as *asa*, with a peculiar guttural sound to the first vowel.

Although the authorities in English are divided on the orthography of asafœtida, it will be found that the majority favours the use of a single consonant, provided, of

* Read at a meeting of the Philadelphia College of Pharmacy (*Amer. Journ. Pharm.* for March).

course, that those are excluded who follow the pharmacopœias, simply because they are the accepted standard. Webster's 'Dictionary' merely enumerates assafœtida, and refers to asafœtida. Johnson's 'Dictionary,' by Dr. R. G. Latham, Sheridan's 'Dictionary,' and very many others give only the form *asa*. Dunglison's 'Medical Dictionary' gives asafœtida, and following it as a synonym assafœtida, in support of which the United States' Pharmacopœia is specially quoted. Gray's 'Supplement to the Pharmacopœia,' revised by Redwood, uses only asafœtida. The 'Pharmacographia' of Flückiger and Hanbury, which has just been published, also makes use of *asa*. This testimony is particularly valuable, since etymology seems to have received special attention from these authors, as shown by the recent discussion in the *Pharm. Journ.* on the spelling of *Chondodendron* or *Chondrodendron*. In opposition to this, Worcester prefers *assa*, but enumerates and defines also asafœtida, thus showing that he considers it nearly or quite as well authorized as the other form.

In German, the equivalent name *asant* is invariably written with the single *s*. In Spanish, Russian, and Portuguese, *asa* is used to the entire exclusion of *assa*.

The French dictionaries give *assa*, yet in opposition to this, Guibourt, in 'Histoire Naturelle des Drogues Simples,' and Dorvault, in 'l'Officine,' use *asa-fetida* only, and the 'Dictionnaire des Drogues,' by A. Chevallier and A. Richard, Paris, 1827, says:—"*Assa ou mieux asafœtida.*" A. Andouard, in his 'Noveaux Éléments de Pharmacie,' Paris, 1874, also uses asafœtida.

The corruption, if it may be so termed, of asa into assa was adopted into the Edinburgh Pharmacopœia in 1805,* as that issue contains a table in which the word assafœtida is mentioned as having been changed from asafœtida of the former editions. A somewhat similar tendency appears to prevail among some of the theologists in regard to the identical word under consideration. *Asa* occurs in the Bible as the proper name of two different individuals, the more important one being the third King of Judah. Although in both instances spelled and pointed in precisely the same manner, it is variously rendered into Greek by Josephus, the 'Septuagint' and the 'Alexandrian Codex' as Ἀσά, Ἀσάνος, Ὀσσά and Ἀσσά.

We are consequently forced to conclude that neither the derivation from the Latin *laser*, nor that from the Semitic *ăsă* justifies the use of the double consonant. We also find *asa* to be in use in the greater number of languages. In addition, we have shown that the best and most accurate writers in those few languages which sanction the use of *assa*, show a decided preference for *asa*.

The only argument which we have been able to find in favour of the duplicated form, is the derivation offered by Chambers's 'Encyclopædia' from the Persian ăsā, translated as stick, staff, baton, or bludgeon. Unsupported as this seems to be by other authorities, and in view of it being in direct opposition to the fact that both Persian and Arabic dictionaries render the same term into English with a single consonant, we cannot attach any importance whatever to this assertion. As an inevitable deduction from the facts which have been stated, we feel conscientiously bound to insist on the expunction of the barbarism *assa* from pharmaceutical literature, used either as a Latin or as an English word, and to recommend its exclusive substitution by *asa*.

* *Assa Fœtida* is used in the new 'London Dispensatory,' of which we have an edition (without title-page), printed in 1676.—Ed. Am. Journ. Pharm.

BRAZIL NUTS.

The last part of the *Transactions of the Linnean Society* is occupied by Mr. Miers's monograph of the *Lecythidaceæ*. Mr. Miers follows Lindley in erecting these plants into a distinct order, separated from Myrtaceæ by their alternate impunctate leaves, epigynous instead of perigynous insertion of the stamens, the large conspicuous petaloid development peculiar to the group, and the peculiar character of the fruit and seeds. The seeds of the genus *Bertholetia* are the well-known Brazil nuts of commerce. Dr. Berg asserts that the seeds are enveloped in a yellow fleshy pulp, which by desiccation leaves each enclosed in a distinct sort of cell; but Mr. Miers states that the fruits he has examined afford no trace whatever of any such pulp; and that Bonpland, Poiteau, and Schomberg, who examined them in a living state and gave abundant details concerning them, are all silent as to the existence of this pulpy matter. We have, moreover, direct evidence on this point in a specimen belonging to the Linnean Society, where a cluster of five seeds, evidently the contents of one cell, are agglomerated very closely together upon a portion of the columelles without the slighest trace of any pulp or any funicle; and affording, therefore, strong proof of the inaccuracy of Berg's statements. The particular tree which yields the nuts is separated by Mr. Miers from the older species of Bonpland, *B. excelsa*, under the name of *Bertholetia nobilis*, distinguished by its loftier growth, its immense trunk bare to a great height, stouter branches, leaves of a more rufescent hue, with more numerous closer nerves, more reticulated, or much shorter petioles; in its broader panicle with several long branches spreading horizontally; and in the rounder and more entire lobes of the calyx.

The quantity exported from Pará alone amounted in six months of the year 1853 to 18,862 alquieres, and from Manáos, on the Rio Negro, to 9,976 alquieres. This would correspond to an average annual export of 2½ millions of the fruits, or 50 millions of the seeds, measuring about 60,000 bushels; and this does not include the large quantity exported from the Rio Orinoco, Demerara, Cayenne, Maranhao, and other places. Their value in Brazil is about 30*s.* per bushel. The hard fruits which fall to the ground are broken in the forest by Indians, where a man and a boy will break about 300 of them daily. The kernels of these nuts, broken in a similar manner, are subjected to pressure, when they yield an oil greatly esteemed for domestic purposes and for export, each pound of the kernels yielding 9 ounces of the oil, valued at 2*s.* per lb. This oil consists, according to Martius, of 74 per cent. of elæine, and 26 per cent. of stearine. The finely laminated inner bark of the trunks is also a valuable article of commerce, especially adapted for the caulking of ships and barges, being worth about 18*s.* per cwt. The tree is about 130 feet high, with a trunk 14 feet in diameter up to a height of 50 feet, and quite bare to the height of 100 feet; its leaves are from 10 to 15 inches long; the fruit globular and 6 to 6½ inches in diameter. The question naturally arises, How do the seeds germinate and strike root, confined as they are in the pyxidium as in an inextricable prison? It is evident that they cannot find an exit through the opercular opening; nor can they escape by any other means than the rotting on moist ground of the pericarp which is ¾ inch thick. It probably requires three years' exposure to the sun and moisture before so thick a shell could decay sufficiently to allow of the liberation of the seeds, and then, perhaps, another year's exposure before the thick testa of the seeds could rot sufficiently to allow the embryo to germinate. This shows an extraordinary power of vitality in the embryo, which seems to remain four or five years in a dormant state. Oily seeds are generally supposed to ferment and decay soon, but that is perhaps, Mr. Miers suggests, when the oil cells are contained in albumen; here, however, we find a reverse condition. It is stated that when an embryo of the *Bertholetia* is extricated and planted under the most favourable circumstances, it takes a whole year before it begins to germinate; this may possibly be due to the large amount of stearine in the oil-cells, which preserves it from decay.

The tree which yields the Sapucayo nuts of commerce is separated by Mr. Miers from *Lecythis ollaria* of Linnæus, and *L. Zapucayo* of Aullet, and named *Lecythis usitata*.

The Pharmaceutical Journal.

SATURDAY, MARCH 13, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTERS, THE CALENDAR, AND THE BENEVOLENT FUND.

THE publication of the elaborate tables presented by the Registrar to the Council at its meeting in February, also of the Registers of Pharmaceutical Chemists and Chemists and Druggists, and of the Calendar of the Pharmaceutical Society for 1875, affords a suitable opportunity for again directing attention to the statistical history of pharmacy in Great Britain, and of comparing the figures with those of last year.

The Registrar reports that the total number of persons on the Register of Chemists and Druggists on the last day of 1874 was 13,286, of whom 2347, or 17·66 per cent., were pharmaceutical chemists, and 10,939 were chemists and druggists. The gross total in the previous year was 13,216, of whom 2374, or 17·96 per cent., were pharmaceutical chemists. These figures show that whilst there has been a decrease of 27 pharmaceutical chemists, the chemists and druggists have increased in number by 97, or sufficient to make up the deficiency in the gross total caused by the decrease in pharmaceutical chemists, and to increase it to 70 beyond that of the previous year. The total number of persons added to the Register during 1874 was 103 less than in the previous year, being 458 against 561 in 1873; notwithstanding that the candidates for the Minor and Modified examinations, the passing of which would have entitled them to be placed upon the Register, increased from 936 in 1873 to 1243 in 1874.

As has been before pointed out, the decrease in the number of pharmaceutical chemists, although much to be regretted, is due to the fact that that Register is being diminished by the removal of both the examined and unexamined classes, whilst it is recruited only by persons who have passed the Major examination. For the first time, however, the number of examined Pharmaceutical Chemists is this year in excess of that of the unexamined. The numbers are—examined, 1207, or 9·1 per cent. of the whole body of chemists and druggists; unexamined, 1138. Of the 10,939 persons who are not pharmaceutical chemists but are now on the Register of Chemists and Druggists, 1694, or 15·48 per cent., are there by virtue of having passed the Minor examination, against 1400, or 12·91 per cent., last year.

The following represents these figures in a tabular form, and gives the proportion of each class to the total number on the Register :—

	1874.				1875.			
	Number.		Per cent.		Number.		Per cent.	
Pharmaceutical Chemists :—								
Non-examined	1195	2374	9·04	17·96	1138	2347	8·56	17·66
Examined . .	1179		8·92		1209		9·10	
Chemists and Druggists (only) who have passed the Minor . . .		1400		10·59		1694		
Remainder, including those who have passed the Modified . . .		9442		71·45		9245		
Total		13,216		100·00		13,286		100·00

If we turn to the proportion which the number of persons connected with the Pharmaceutical Society bears to the whole number of Registered Chemists and Druggists, it is satisfactory to notice first that the decrease in the Pharmaceutical Chemists Members of the Society has not been commensurate with the decrease on the Register, the number being now 2101 against 2119, or only 18 less. Of the 2347 Pharmaceutical Chemists on the Register, 2101, or 89·77 per cent., are Members of the Pharmaceutical Society, against 89·25 per cent. last year. Of the remaining 10,939 chemists and druggists on the Register, 814 are connected with the Pharmaceutical Society as Chemist and Druggist Members, 459 as Associates in Business, and 830 as Associates not in Business, making together a total of 2103, or 19·22 per cent. against 1974, or 18·20 per cent. last year. These figures show that of the whole number (13,286) of persons on the Register of Chemists and Druggists, 4204, or 31·65 per cent., are connected with the Pharmaceutical Society, being an increase of 111, or 0·66 per cent. The Registered Apprentices subscribing to the Society have increased from 727 to 795.

	1874.		1875.	
	No.	Per ct.	No.	Per ct.
Pharmaceutical Chemists Members of the Society .	2119	89·25	2101	89·77
Other Registered Chemists and Druggists connected with the Society . . .	1974	18·20	2103	19·22
Total number of Registered Chemists and Druggists connected with the Society	4093	30·97	4204	31·65
Registered Apprentices subscribing to the Society .	727	...	795	...

One very gratifying feature of the statistics compiled by the SECRETARY, is the marked testimony contained therein to the wisdom of the step which was taken by the Council in February last year with respect to the Benevolent Fund. The effect of the decision to allow subscribers of five shillings to vote in virtue thereof at the election of annuitants has been to nearly double the number of subscribers of that amount. This increase, moreover, has not resulted in any decrease in the number of subscribers of larger sums; on the contrary, here there has also been a marked increase. In 1873, the gross amount received in annual subscriptions to the Benevolent Fund was £743 11*s.* 3*d.*, from 1228 subscribers, and the figures were practically the same in the previous year. In 1874, however, 1598 annual subscribers contributed £915 3*s.* 6*d.*, showing an increase of £171 11*s.* 9*d.*, and 370 subscribers.

Although this result is satisfactory so far as it goes, we cannot refrain from pointing out that even now the number of persons subscribing to the Benevolent Fund is in striking contrast to the number of persons upon the Register of Chemists and Druggists, viz., 1,470 to 13,286, or only 11·06 per cent. And if it be noted that 1,114 of the subscribers are found amongst 4,343 persons connected with the Pharmaceutical Society, leaving amongst the remaining 8,990 registered chemists and druggists, only 356 subscribers, 3·96 per cent., or less than 1 in 25, the disparity is still more remarkable. To seek no further for causes, it is probable that this apparent indifference is due partly to misconception or ignorance in respect to the true nature of the Fund, and partly to the absence of the opportunity and reminders for transmitting subscriptions which occasional communication with the SECRETARY upon other business presents to the members of the Society. However this may be, it is evident that the Fund might be materially benefited if in each district the Local Secretary, or some other influential gentleman, would undertake the duty of bringing the claims of the Benevolent Fund periodically before the chemists and druggists who are not connected with the Society. The fact that of the £423 distributed in temporary relief during 1874, nearly one-half went to persons who were *not in any way connected with the Society*, would furnish them with one strong argument as to its catholicity, whilst the gratuitous administration of the Fund, with expenses confined to a few pounds yearly for stationery and printing, would yield them another as to the economy of its application.

THE ALLEGED PRESENCE OF COPPER IN PICKLES.

ABOUT three months since (see before, p. 515), the commencement of proceedings against three persons residing in Staffordshire, for the sale of pickles adulterated with copper, was reported in this Journal. In each case the presence of copper was disputed and the hearing was adjourned to allow of an analysis being made by an analyst appointed by the court. We have just received information that in two at least of the three cases the summonses have been withdrawn. Presuming that this information is true we are of opinion that such a termination to a prosecution is unsatisfactory to the public in whose name it was initiated and unfair to the tradesmen whose reputation has been impugned: If, after three months' consideration, the conclusion has been arrived at that the evidence does not support the charge of adulteration it is only fair to the accused that the imputation should be withdrawn in court as publicly as the accusation was made. If, on the other hand, the offence charged can be proved, the case after being once opened ought not to be withdrawn from a magistrate's decision. This is not the only occasion on which the sole satisfaction a tradesman has had for weeks of anxiety and sometimes considerable expense has been the information that a summons has been quietly withdrawn.

EXEMPTION FROM JURY SERVICE.

IT would appear that there is little probability that the long-deferred hope of chemists and druggists to enjoy exemption from serving on juries will be gratified during the present Parliamentary session. On Tuesday last, in reply to a question, Mr. LOPES, who had charge of the Juries Bill during last session, said that it was not his intention to reintroduce it this session, as the causes still exist which prevented it from passing last year.

SPURIOUS SENNA.

IT is certainly not very flattering to English pharmacists to receive convincing proof of somebody's faith in their "gullibility and ignorance." But we learn from the last issue of Messrs. SOUTHALL, Bros. and BARCLAY'S 'Price Current,' which contains some "Hints on the Selection of Drugs," that notwithstanding Professor BENTLEY'S evident doubt of the probability of such an event, "some hundreds of tons of spurious senna are in the market at the present time, which appear to be without doubt the leaves of *Cassia brevipes*, D.C." Under these circumstances, it will be as well to remind our readers that this spurious senna has been described and figured by Mr. HOLMES, in the number of this Journal for the 6th of February. Messrs. SOUTHALL offer to send a few leaves to any one wishing to possess a specimen.

EARLIER CLOSING.

THE chemists and druggists of Oldham have advertised their intention in future to close their establishments on Tuesdays, Wednesdays, and Thursdays at 8 p.m.; on Mondays and Fridays at 8·30 p.m.; and on Saturdays at 10·30 p.m.

The name of JOHN PEARSON BELL, Esq., M.D., has been added to the Commission of the Peace for Hull. Dr. BELL was formerly, for a short time, in business as a chemist and druggist in Hull, as was also another gentlemen recently placed on the Commission, Mr. Alderman SEATON.

MR. EDWARD MOORE, pharmaceutical chemist, and formerly a student in the Society's School of Pharmacy, has been appointed Public Analyst for East Sussex. Mr. MOORE has also for some eighteen months past held the post of Public Analyst for Brighton.

IN the last number of the *Journal of Botany*, Dr. HANCE describes a new species of *Ribes*, *R. (Grossularia) macrocalyx*, from the neighbourhood of Pekin, the fruit of which is largely eaten by the Chinese.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The fourth meeting of the present session was held in the Society's rooms, Edinburgh, 119*a*, George Street, on Friday evening, March 5th, at half past eight o'clock. Mr. William Gilmour, President, in the chair.

Chrysarobine, or Goa Powder.

BY D. S. KEMP, BOMBAY.

Mr. H. C. Baildon communicated a paper which he had received from Mr. D. S. Kemp, of Bombay, on Chrysarobine (formerly Goa Powder), a drug imported into Bombay from South America :—

Under the name of 'Goa Powder,' a drug, of which chrysarobine is the present representative, used to be imported into Bombay by Goanese traders as a remedy for Indian ringworm. It long attracted the notice of leading medical men, but was believed to be a nostrum rather than a natural production.

In 1863 I transmitted a specimen of it to Mr. Hanbury, F.R.S., along with an account of it, and the latter was published in the *Pharmaceutical Journal* of February, 1864.

As met with then, the powder was generally of a very dark chocolate or maroon colour, a state resulting from lengthened exposure to air and moisture, and in which half the activity of the original drug had been destroyed. Under these circumstances and after some trouble I succeeded in tracing its source and obtaining fresh importations, and my firm then adopted the name 'chrysarobine' for the substance as imported by us.

Chrysarobine is much more active medicinally than the old 'Goa Powder.' For an account of its therapeutic properties I refer to a paper by Dr. Fayrer, C.S.I., in the *Medical Times and Gazette* of October 24th, 1874, and for its chemical history I have much pleasure in submitting the following paper by Professor Attfield, to whom I am greatly indebted for the attention he has bestowed on the investigation. Indeed, the results he has obtained are so interesting that I cannot refrain from making them known.

Professor Attfield's paper will be found at p. 721.

Specimen of the wood and chrysarobine itself, though expected, had not arrived at the time of meeting.

A hearty vote of thanks was awarded to Mr. Kemp for sending the paper, and Mr. Baildon for bringing the subject before the Society.

Mr. William Gilmour then read the following on Gurjun Oil :—

Gurjun Balsam.

BY WILLIAM GILMOUR.

Gurjun balsam, or as it is sometimes called, wood oil, though exciting little more than a passing notice, has been known for some considerable time, it having been noticed, so far as I am aware, for the first time more than twenty years ago in the pages of the *Pharmaceutical Journal*, as a supposed new kind of balsam of copaiba.

It was correctly traced some time later to its sources by Mr. Hanbury, who also mentioned some of its peculiarities and distinguishing characteristics, comparing it with balsam of copaiba, to which it is closely allied, and which it strikingly resembles.

It is obtained by incision from the *Dipterocarpus lævis*, and other trees of allied genera—indigenous in the hot damp Indian forests—and can be obtained in such quantities that the natives employ it for many of the purposes to which we in this country put some of the more common oils.

I have been induced to call your attention to this substance from the most remarkable results obtained by its use, first in the treatment of leprosy in India and since then in our own country in cases of skin disease. Through the kindness of Mr. Wm. Dougall, brother to the discoverer of its important therapeutical effects in cases of leprosy, I was lately afforded a perusal of his official report to the Indian Government on the subject—a report at once so exceedingly interesting in itself and valuable in its results that I felt assured a very brief summary of it would prove acceptable to you.

Passing over, then, Dr. Dougall's account of the condition in which he everywhere found that most miserable and wretched of all the many miserable and wretched in India, the leprous, together with his earlier treatment and experiments for their alleviation, we come to the point at which, by a happy thought (for it seems to have been nothing more), he was induced to try the effects of a course of this balsam. Noticing a decided mitigation of all the more marked and worse characteristics of the disease under its influence, he was encouraged to begin a more extensive and systematic use of it in the Haddo Leprous Hospital, Andaman Islands.

Here, as a palliative remedy, the gurjun balsam very soon asserted it power, the most extraordinary results ensuing in every case brought under its influence. Of twenty-four cases which Dr. Dougall had under treatment in this hospital during the six months previous to the publishing of his report,—many of these cases of the very worst kind,—every one of them had decidedly benefitted by its use; *every ulcer, without exception, having healed up and not broken out again*; the most marked benefit, however, having been derived by those suffering from the anæsthetic form of the disease. Each one of the twenty-four cases is minutely narrated and dwelt upon in the report, and however bad or hopeless they might appear at the commencement of the treatment with the wood oil, they yet soon yielded to its power. One, for example (just taking a case at random from the report), had been seven years a leper, had anæsthesia of right fore arm and both feet; the whole of the hands had been eaten away, as also portions of two toes of the right foot, and the stumps were open sores when the oil was given to him for the first time. In a few months after, sensation had been recovered in all the parts formerly affected, and all the sores had quite healed up.

Another had anæsthesia of the whole surface of the body, including both hands and feet—the face and ears only being excepted. The ulcers soon healed up, and sensation was shortly after restored to the whole body; this man being apparently in perfect health, and able to run, walk, or work with any man of his age. The parts affected heal evenly, the new skin being just a shade lighter in colour than the normal tint.

Its mode of use is somewhat novel. Dr. Dougall, after trying various plans, ultimately fixed upon a mixture of equal parts of lime water and the balsam, as being in every respect the most suitable; and this emulsion he not only gives internally, but uses also freely as a liniment.

The liniment was rubbed over the whole body night and morning, whilst the emulsion was given internally to the extent of four drachms three times in the day, in which doses he found it operated as a mild tonic, exciting at the same time a distinct diuretic and evacuant effect.

The interest which these results have excited may be inferred from the fact that Government, as lately reported in the *Pharmaceutical Journal*, has called particular attention to the report, with the view of giving it the widest publicity possible, inviting at the same time the co-operation of all local governments and administrations towards the extension of its use, with the request also that careful reports on the results maybe submitted at the end of a year.

Whether this remedy may ever become popular in this country for skin diseases, or whether it may be as successful here for such as it has been in India for the more inveterate leprous form, are questions which time and experiment alone can determine. But, meantime, it is exciting no little interest in medical circles, and Professor Erasmus Wilson lately reported the most encouraging results from its use in cases of painful eczema, in lupus, and in cancer; and further reported the case of a lady, who had not obtained sleep without the use of narcotics for weeks, until the liniment was applied, when she was relieved of all pain and obtained natural sleep.

After a few remarks by some of the members present, a vote of thanks was proposed by Mr. Young, seconded by Mr. Baildon, and cordially awarded to Mr. Gilmour for his communication. Mr. Blanshard stated that some time ago a specimen of what was called Rangoon wood oil, said to be used in making or adulterating balsam copaiba had been sent to their firm, which in appearance was not unlike the sample of Gurjun oil submitted, and which he would have much pleasure in showing at the next meeting.

Dr. S. Macadam then read the following supplementary paper on the composition of country milk :—

On the Composition of Country Milk.

BY DR. STEVENSON MACADAM, F.R.S.E., LECTURER ON CHEMISTRY, ETC., ETC.

The present communication may be regarded as supplementary to the paper read by me before the Society on the 26th of March, last year. At that time I had analysed a large number of samples of milk taken from cows in dairies in and near Edinburgh ; in other words from dairies specially arranged for the supply of milk to town, and where the animals were more or less fed with artificial food. The general results arrived at from the analysis of 66 samples of milk, taken from 46 cows, were that the average quality of genuine town milk was as follows :—

Average Town Milk.

Specific gravity, 1032·1.

Total solids by weight	. . .	12·27	per cent.
Solids not fat	„	9·69	„
Fat in solids	„	2·58	„
Ash in solids	„	0·71	„

During the month of June I made arrangements for the sampling of country milk yielded by cows fed on the best natural pasture. The farm selected was situated on the northern bank of the Tweed, and alike from the natural capabilities of the soil and the season of the year, the grass was in the best condition, and was luxuriant and nutritious. The cows were pastured in the same fields, and milked at the same time of day. In all respects they were subjected to the same diet and treatment. Samples were taken from the whole morning runnings of each of seven cows, and the analyses were made to determine specific gravity, total solids, solids not fat, fat or butter, and ash. The experimental results, calculated in each case to percentage proportions, are given in the following table :—

Analyses of Samples of Country Milk.

Cow. No.	Specific gravity of milk.	Total solids per cent. by weight.	Solids not fat per cent. by weight.	Fat in solids p.c. by weight.	Ash in solids p.c. by weight.
1	1032·3	13·17	9·87	3·30	0·73
2	1031·8	11·85	9·63	2·22	0·65
3	1033·5	12·96	10·09	2·87	0·69
4	1033·4	12·47	9·88	2·59	0·80
5	1034·7	12·25	10·41	1·84	0·69
6	1030·8	12·86	9·99	2·87	0·73
7	1029·2	13·88	9·42	4·46	0·68
Average of 7 samples	1032·2	12·77	9·89	2·88	0·71
Lowest . .	1029·2	11·85	9·42	1·84	0·65
Highest . .	1034·7	13·88	10·41	4·46	0·80
Difference .	5·5	2·03	0·99	2·62	0·15

It will thus be observed that the samples of milk yielded by the different cows varied much in composition, especially in reference to the percentage of fat or butter, which was more than twice as great in one sample as compared with another. Taking the proportion of fat assumed last year by some chemists as the standard quantity, viz., 3·2 per cent., only two of the seven samples of country milk analysed by me came up to the arbitrary standard, and consequently only the two samples would have been reported as genuine, whilst the remaining five samples would have been reported as, more or less, mixed with skimmed milk. The total solids were likewise deficient in three of the seven samples. The average quality of the seven samples of genuine country milk was as follows :—

Average Country Milk.

Specific gravity, 1032·2.

Total solids by weight	. . .	12·77	per cent.
Solids not fat	„	9·89	„
Fat in solids	„	2·88	„
Ash in solids	„	0·71	„

These proportions are up to the assumed standard in everything but the fat, and the deficiency in the latter (2·88 per cent. instead of 3·2 per cent.) would have been sufficient to have placed the whole runnings of this dairy in the position of being reported as containing only 90 per cent. of genuine milk, and mixed or adulterated with 10 per cent. of skimmed milk ; whilst if the lowest amount of fat obtained from any one of these milks be taken, viz., 1·84 per cent., this sample of undoubted genuine milk from a country dairy would have been reported to be made up of 57·5 per cent. of genuine milk, and as much as 42·5 per cent. of skimmed milk.

These results, taken from a country farm dairy at the best season of the year for natural feeding, clearly prove that the assumed arbitrary standard of quality of milk is alike too high for country as well as for town milk, and probably, had the milk been taken from the cows for analysis in September or October, when natural pasture is not so nutritious, the quality of the milk would not have been so good as it was found in June.

A hearty vote of thanks was awarded to Dr. Macadam for his valuable communication.

Mr. Baildon then submitted a very interesting paper on the history of a few important drugs known to the Ancients, and still in use in modern pharmacy, consisting principally of extracts from Professor Flückiger and Mr. Hanbury's 'Pharmacographia.'

Mr. Ainslie proposed a vote of thanks to Mr. Baildon, which was carried with acclamation.

The following contributions to the Museum and Library were laid on the table and thanks voted to the donors :—

Pinus Tæda, Torch Pine, or Pitch Pine of United States, a chief source of American turpentine, from Professor Christison ; 'Proceedings of the American Pharmaceutical Association for 1874'; 'Proceedings of the Royal Society,' from Mr. Mackay ; 'Canadian Pharmaceutical Journal,' from Toronto ; 'The Pharmacist,' from Chicago ; 'Journal of the Chemical Society,' from Mr. Mackay.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting was held at the Royal Institution, on Thursday evening, February 25th. The President, Mr. A. F. Mason, F.C.S., in the chair.

The following donations were received :—'Proceedings of the American Pharmaceutical Conference,' 'Proceedings of the Liverpool Literary and Philosophical Society,' 'The Pharmaceutical Journal,' 'The American Pharmaceutical Journal,' 'The American Chemist.' A vote of thanks to the donors was unanimously passed.

Mr. Redford described a new form of water-bath which he had found useful, and, at the request of the meeting, promised to bring on a future occasion. Mr. Mason exhibited a sample of jaborandi, and also one of Persian opium. The opium contained 8 per cent. of morphia, and was employed to make the alkaloid, its smell and appearance being different from ordinary opium. He also alluded to a case in which a solution of 50 grains of muriate of morphia had gelatinized. It was supposed to have been adulterated, but on examination it appeared that the gelatinization was due to the separation of excessively minute crystals, the liquid becoming clear again on heating.

The Secretary read a letter from Mr. Farries, expressing his regret that he was unable to attend and read a paper as he promised, in consequence of ill health.

The President then called upon Mr. J. T. Armstrong, F.C.S. (who had kindly offered to take Mr. Farries's place), to read a paper on "A College of Research for Liverpool."

The author is of opinion that the attention of the present generation is too exclusively devoted to present results and things that give an immediate return, forgetful that it would not hold the position it does had its predecessors thought in the same way, and been as selfish. Referring to the interest in the subject of original research that has recently been manifested in the Universities, Mr. Armstrong said the Universities would never be able to deal with this question in a proper manner, although they could do much to help it forward by properly training and selecting men who would devote themselves to the work. He considered that Liverpool had hitherto done little but reap the benefit without doing any of the work. Liverpool should lead the way in the matter and establish a College of Research, and before long discoveries valuable to the human race would be the result. The plan suggested by Mr. Armstrong is to have a building furnished with a well-stocked laboratory and reference library, to be superintended by a professor of chemistry who has shown that he fully understands the importance of original research, and a part of whose "time would be spent in training the masses to have a liking for science by giving courses of lectures conducted in the same manner as at the Royal Institution, London." He is also to seek out investigators and to train assistants to aid those engaged in research. Men who have made discoveries in a direction requiring further investigation are to be invited to work in the laboratory, receiving a sufficient remuneration to keep them while so engaged, and eventually, according to results. All work done is to be published periodically, and communicated to the supporters of the College and the learned societies. Mr. Armstrong, in conclusion, said that he believed it was only necessary to make the claims of such an enterprise known in Liverpool, and men would be found ready to devote time and money in carrying it out to a successful issue.

A short discussion followed in which Messrs. Davies, Shaw, and the President took part, and the proceedings terminated with a vote of thanks to Mr. Armstrong.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

The sixth meeting of session 1874-75, was held in the West Hall, Anderson's University, on Wednesday, March 3rd, at nine p.m. The President, Mr. John C. Hunter, A.P.S., occupied the chair. The minutes of last meeting having been read and approved of, the Chairman introduced James McCann, Esq., Ph.D., who delivered a very interesting lecture on geology, with special reference to the structure of Scotland, and especially that of Kincardineshire, Aberdeenshire, Ayrshire, and Dumfriesshire. In speaking of the metals which occur throughout Scotland, Mr. McCann said that "Gold is always found in the metallic form, or as a pure native metal. The metals which occur to any workable extent in Scotland, or which have been worked in former times, are—mercury, cobalt, zinc, manganese, antimony, lead, copper, iron, silver, and gold. Several of these are found in such small quantities as to be of no economic value. In Scotland the quartz rock is reported to contain two ounces of gold to every ton of mineral, therefore there is no reason to doubt that should chemistry, which has made such prodigious advances within the last century, be successful in discovering some easier and cheaper method of separating the metal from the stone, no limits can be set to the riches of the mountain land of Scotland. At present the expense of extraction by crushing and other means is so great as to be unremunerative; but as all mechanical difficulties are giving way to the progress of human invention, the presumption is that the mineral kingdom, so extensively explored by geology, will also become more obedient to the analytical processes and resolving power of science. Chemistry has already done wonders in separating as well as in combining, in subduing the most flinty, refractory mass to ductility and softness, and hence we may yet find in the fable of Prometheus taking fire from heaven to animate his man of clay, an emblem of the transmuting powers of chemistry in dissolving the rocks of the earth and vivifying their opaque dust with the radiant lustre of the precious metal."

After some remarks from a few members, the Chairman proposed a hearty vote of thanks to Mr. McCann for his instructive lecture, which was warmly responded to.

The President exhibited a large number of beautiful specimens of igneous and aqueous rocks and fossils, from the lime, coal, and clay-bed formations.

THE ASSOCIATION OF CHEMISTS AND DRUGGISTS FOR WOLVERHAMPTON AND DISTRICT.

An ordinary monthly meeting of the members and associates of this Association was held on Thursday evening, in the Committee Room, Agricultural Hall, the President (Mr. W. Fleeming) in the chair. There was a good attendance of members, including many assistants and students, who appeared to take great interest in the proceedings of the evening, which included an address by Mr. Wentworth Lascelles Scott, F.C.S., on the Adulteration of Food and Drugs Bill, as affecting chemists and druggists.

The President, in commencing the business of the evening, congratulated all present on the progress which the Association had made since its formation a few weeks ago, and the good and apparently sound position that it had already attained. He must say that at the outset he did not feel quite so sanguine, as some others did, as to the success of the Association, and he was therefore all the more gratified at the success which had attended its operations, for he found that a great deal of interest was taken in the proceedings of the Association, not only by the members themselves, but by many of the general public outside. He trusted that this interest would continue to be sustained, for he was quite sure that the Association and the classes which had been started in connection therewith would be of the utmost assistance to their young friends—the assistants and apprentices—in prosecuting their studies and obtaining that knowledge which was so necessary to them before they could take the position to which many of them aspired, as recognized chemists and druggists.

After the minutes of the last meeting had been read and confirmed, Mr. F. J. Barrett, F.C.S. (the junior hon. sec.), read over the following list of donations in money, books, and instruments which had been received since the last meeting towards the formation of the proposed library and museum:—Mr. Fredk. Weaver, (Tetenhall), £5; The Right Hon. C. P. Villiers, M.P., £1 1*s.*; Mr. T. M. Weguelin, M.P., £1 1*s.*; Mr. Peter Squire, 'Companion to the Pharmacopœia,' and 'London Hospital

Pharmacopœia;' Mr. John Balcomb, Horsley's Milk Testing Apparatus; Mr. John Griffin, F.C.S., 'Chemical Recreations,' 1 vol., 'Chemical Handicraft,' 1 vol., 'Testing of Wines and Spirits,' 1 vol., etc.

On the motion of Mr. W. Y. Brevitt (the senior Hon. Sec.), the thanks of the meeting were accorded to the donors.

The following gentlemen were then duly elected as "Honorary and Corresponding Members" of the Association:—Mr. Fredk. Weaver (Tetenhall), Mr. W. L. Scott, F.C.S. (County Analyst), and Mr. J. E. Morris, F.C.S.

Mr. Brevitt, in proposing the name of Mr. Scott, said it was due to him to state that, although this association had started so recently, yet the desirability of such an association being formed was first suggested by Mr. Scott some years ago for the purpose of uniting themselves together against the vexatious proceedings and annoyances to which in the then state of the law, chemists and druggists were liable. Circulars were sent round to the various chemists and druggists in the town soliciting their co-operation, but it was hardly thought at that time that they were in a position to commence such an association, and the movement was allowed to fall through. The object with which the Association had now been started was purely an educational one, to supply a want that was much felt, by the formation of classes, and other means, by which the assistants and pupils would have opportunities afforded them of prosecuting their studies in the science of chemistry. Mr. Brevitt further stated that until the council of the Association had decided upon a suitable room or rooms for the purpose, he had placed a room at his premises in Darlington Street at their disposal, where classes for the students were held on each Tuesday and Thursday evening; and on Friday evenings the books which had been given and purchased for the library of the Association, the materia medica specimens, and specimens of plants, etc., would be laid on the tables for their inspection and study. He would suggest to the council that prizes should be given at the end of each session to the most successful student in each class.

Three ordinary members were then elected.

The Chairman remarked that the members of the Association were very much indebted to their joint secretaries for the zealous interest they displayed in the work of the Association, and the arrangements they made to promote its success. He was very glad that amongst other things they had arranged for the delivery of a course of lectures, one of which they were to have that night from Mr. Scott, on the Food Adulteration Act. He did not know what views Mr. Scott was going to express, but he might say for himself that under the old law chemists and druggists were continually exposed to all kinds of harassing and vexatious proceedings, although he was glad to say that in Wolverhampton they had been singularly free from such proceedings. So far as he had read the Bill introduced by Mr. Sclater-Booth, he thought the difficulties and anomalies complained of in the old law were fully met. Of course there were to be found a few black sheep here and there in every profession, and it was only right that the public should be protected from them. Now the bill of Mr. Sclater-Booth was intended to afford this protection, and at the same time afford equal protection to the trade against those harassing and vexatious proceedings, to which, under the old law, they were liable at any moment.

Mr. Scott then proceeded to deliver his address. He said he wished in what he desired to say to them to make a few observations, first, as to the inconsistencies in the old or present law with respect to the adulteration of food and drink, etc.; and next to point out what he deemed to be inconsistencies in the Bill of Mr. Sclater-Booth. The present law on the subject was unfortunately not confined to one Act of Parliament, but extended over three or four, and owing to the different constructions put upon these Acts by different lawyers and different magistrates, chemists and druggists in different parts of the kingdom had, at times, been very hardly dealt with, and had been most inconsistently convicted. Mr. Scott then proceeded to refer to what he considered the two great faults of the Bill now before Parliament: firstly, that in convicting any tradesmen of certain offences there specified, the magistrates were permitted no discretionary power in apportioning the amount of the fine in accordance with the circumstances under which the offence was committed. As for instance, the 7th section of the Bill enacted that "no person shall sell any article mixed with things more than was ordinarily required for the purpose under a penalty of 10*l*." The same section provided that "any person who sold any article of food which by the usage of trade was sold in the mixed state unless the ingredients were mentioned in the proportions required by such usage should be subjected to a penalty of 20*l*." Then the 9th section said, "any person who knowingly, and with the intent that the same might be sold, altered any article of food in part or whole so as to make it unwholesome would be liable to a penalty of 10*l*." In each case the magistrate had no option, if the offence were proved, but to inflict the full penalty; that he thought a great hardship. Then, in the next place, a special provision was inserted in the Bill to the effect that all tea imported into this country should be examined analytically at the port of entry, and if found injuriously adulterated should be confiscated and destroyed; and if adulterated, but not injuriously, the same might be allowed to be sold as a mixture. Now, he considered that this provision ought to be extended to all articles of food, drink, or drugs, upon which duty was received by the Government.

A lengthy discussion followed upon these points, and ultimately the following resolutions were passed:—

(1) "That in the opinion of this Association it is expedient that the fines imposed for offences under this Act shall not be uniform, as proposed, but shall be left to the discretion of the magistrates as at present, the maximum penalty being named in the Act, but that a lower penalty may be imposed."

(2) "That in the opinion of this Association the 'special provision for tea' (section 30) is just and right, but that the same provision should be extended to all articles of food, drink, and drugs, upon which a duty is charged and collected upon importation into this country."

The secretaries were instructed to forward copies of the resolutions to Mr. Sclater-Booth, M.P., Mr. A. S. Hill, M.P., Mr. Monckton, M.P., and the members for the borough.

A vote of thanks to Mr. Scott for his address, and to Mr. Fleeming for presiding, brought the proceedings to a close.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A special meeting of the above Society was held on March 5th. Mr. C. Hester in the chair. The Secretary, Mr. Druce, after reading the minutes, said the Association had received the Calendar and Journal from the Pharmaceutical Society. Mr. Wallis presented a specimen of jaborandi, and specimens of sagapenum and antimon. vitrum were also shown.

Mr. Wallis then read a paper on the Phenomena of Life. He commenced by stating that the natural bodies by which they were surrounded were arranged under two great classes, the inorganic and organic, the living and the lifeless; the question, therefore, immediately arose, 'What is Life?' What is that of which the effects appealed so constantly and forcibly to their senses as to render the distinction thus made one of their earliest and almost unconscious observations? In the study of organic bodies they must be struck with the vital union of their constituent particles which was totally unlike every other combination of matter, differing most essentially from either chemical or mechanical combination. In crystals or other inorganic bodies they observed determinate and settled forms, while in organic bodies a perpetual change was going on by the agency of vital power; particles lately incorporated being thrown off while other foreign and inorganic substances were assimilated to be thrown off in their turn, life maintaining its triumph over the loss of dead matter, preserving for a time the identity of the animal or plant till vitality ceased and its operations gave way to the laws of chemical affinity. Death was, in fact, the conquest of the vital forces by the physical. Another fact deserving attention was that an animated being was the product of an antecedent, called its parent, which it essentially resembled, as like produced like; the lily did not aspire to the magnitude of the oak, or the lamb to the stature of the giraffe. On being minutely examined the internal organization of every living body exhibited a union of solids and liquids; the solid parts consisting of minute particles so arranged as to form fibres and tissues of various densities and structure, and everywhere pervaded by a circulating fluid from which the particles composing them are elaborated. When an attempt was made to investigate the intimate texture of the solids beyond a certain point they were foiled, no eye could scan, no instrument could follow the mystery of organic structure and its circulating fluid. Mr. Wallis then described the characters of the albuminous group, viz., albumen, fibrin and casein, and explained in a graphic manner the process of assimilation of food by animals and vegetables. He then stated that the primary and leading feature of vitality was the process of nutrition, and that process could only be exemplified by organic beings. In vain, however, did they ask, What was Life? If they applied to chemistry, they only learned from its researches that the elements of organic bodies were carbon, oxygen, hydrogen and nitrogen, and alkaline and earthy salts. Chemistry, potent over the vast empire of inert matter, was unable to ascertain what was life. Within its own kingdom it could analyse and combine, make solids fluids, and fluids solids; resolve bodies into their elementary gases, and recombine them. All this and more was in its power, but it could not recompose a single fluid or solid of any organic body. Here its penetration was baffled and its art at fault. If, then, chemistry could not ascertain the true nature of the constituents of organic bodies, neither could it discover the means by which they maintained their specific differences, not only as regarded the form but the quality of their substances—quality which widely differed even when the same nutriment was in each case received. The same soil, the same water, the same air may nourish the vine and the aconite, the rose and the hemlock; their very roots and leaves might intertwine, but their identity and specific properties would continue unaltered. Having alluded to the irritability of organic objects, and to the choking and hardening of the tissues as rendering death a necessary sequel of life, the author pointed out that with the cessation of the vital principle every phenomenon which distinguished between organic and inorganic matter ceased; the outer form might indeed remain for a shorter or more protracted period, but it remained no longer under the influence of the laws of life. Its component parts were the subjects of another empire; they formed new combinations and became lost and mingled with the elements around. To such a transition inorganic matter offered no analogy. Mr. Wallis concluded by saying that what life was even in its humblest form must remain inscrutable. The sphere of man was bounded, his researches were limited, and the hidden mysteries around and within him were too great for him to fathom. In the highest and noblest effort of man they might detect the weakness of his fallen nature, but in the works of God they had a revelation of his character; a mirror in which they might behold his infinite perfections.

After the discussion, which was rather lengthy, a hearty vote of thanks was passed to Mr. Wallis for his paper, and to the donors for the specimens and contributions.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 4th March, 1875. Professor Odling, F.R.S., in the chair. The usual business of the society having been transacted, a paper "On the Dissociation of Nitric Acid," by Messrs. P. Braham, and J. W. Gatehouse, was read by the former, and an experiment performed showing the action. Dr. Thudicum then addressed the meeting "On the Chemical Constitution of the Brain," exhibiting a large number of the products obtained from that organ. There were also papers on "Calcic Hypochlorite from Bleaching Powder," by Mr. C. T. Kingzett, and "On a Simple Method of Estimating Iron," by Mr. W. Noel Hartley. The meeting was finally adjourned until Thursday, 18th March, when Dr. Hofmann will deliver the Faraday lecture at the Royal Institution "On Liebig's Contributions to Experimental Chemistry."

NATIONAL ASSOCIATION FOR THE PROMOTION OF SOCIAL SCIENCE.

The Sale of Food and Drugs Bill.

At a meeting of the National Association for the Promotion of Social Science, held last evening in Adam Street, Adelphi, a paper was read by Mr. G. W. Wigner, Secretary of the Society of Public Analysts, on the subject of the recently introduced Bill for the Repeal of the Adulteration of Food Acts. The chair was occupied by Dr. Charles Cameron, M.P.

A discussion followed, in which Mr. Holborn, Mr. Sewell White, Dr. Muter, Mr. Helm, Dr. Bartlett, Dr. Dupré, and others took part. The questions brought forward related mainly to the difficulties which had been found to arise before magistrates in deciding between conflicting analytical testimony. One or two speakers treated the Bill from a trade point of view, dwelling on the hardship to small tradesmen, which they believed had sometimes arisen during the working of the Act at present in operation.

The subject of the nomination of a supreme court of appeal for disputed cases of analysis was also freely discussed; one gentleman arguing that such a body or institution should, to insure impartiality, be appointed without consultation of persons holding appointments under the Act; and others that the Society of Public Analysts itself should have a prominent voice in the matter.

Decided opinions were expressed against the appointment of medical officers of health as public analysts, on the ground that the successful pursuit of food examination required more time than such officers were enabled to devote to its practice, consistently with a proper performance of their other important duties.

The correctness of a so-called "classification of evidence," compiled and issued in the interests of the tea trade, having been impugned by Dr. Bartlett, Mr. Holborn, who announced himself as a joint author of the work in question, spoke to its absolute accuracy, and challenged proof of its incorrectness, which proof Mr. Wigner supplied by quoting several instances of repression or perversion of questions and answers bearing on tea.

Votes of thanks to the chairman and to Mr. Wigne brought the meeting to a close.

Parliamentary and Law Proceedings.

The Protection of the Names of Proprietary Medicines.

A case of considerable interest to patent medicine proprietors was argued before Vice-Chancellor Hall, on Thursday the 4th inst. The plaintiff was Mr. John Smith, chemist and druggist, of Lincoln, who is the proprietor of a mixture for the cure of coughs, colds, etc., known as "Pectorine." The defendant was Mr. Mason, also a chemist and druggist, of Rotherham. The plaintiff's bill of complaint alleged that he had invented and introduced to the public a cough mixture to which he gave the name of "Pectorine," a name which had never before been applied to any medicinal preparation. On January 7th, 1873, he registered at Stationers' Hall a label for the preparation, which was described as "Smith's Pectorine," and under this name was advertised in Lincolnshire and adjacent counties. By means of such announcements, and owing to its valuable properties, the cough mixture acquired a considerable reputation and a large and regular sale throughout England. In October, 1874, the label was altered by plaintiff to "Pectorine" only. In November, 1874, the plaintiff discovered that defendant was manufacturing and selling a cough mixture by the name of "Pectorine," and he thereupon instructed his solicitor to write to defendant warning him against doing so. The defendant replied that he had never heard of any other "Pectorine" than his own; but it was shown that he was for some time previously aware that plaintiff was the proprietor of a cough mixture known as "Pectorine." As he persisted in selling his preparation as "Pectorine," plaintiff filed the present bill in Chancery, praying that he might be restrained. The hearing occupied the whole of Thursday, and was argued by the learned counsel on both sides in the most exhaustive manner, the issue being regarded as one affecting the whole question of trade-marks.

The Vice-Chancellor, in an elaborate judgment, said the question to be determined was a reasonably simple one. The plaintiff's contention was that at the close of the year 1872, having invented and introduced to the public a cough mixture, he gave it the name of "Pectorine." This was undoubtedly a new name, as it had never been applied to any medicine before. He appropriated that as a trade-mark, by associating with it his own name; but the name "Pectorine" was invented for the purpose of giving a special character to the article. Having invented it, he registered the preparation on the 7th January, 1873 as "Smith's Pectorine." On the 24th October, 1874, however, the registration was altered to "Pectorine" only and this was plaintiff's title. On the 16th September, 1874, the defendant registered a medicine as "Pectorine," which preparation, as well as the name, it seemed, was his own invention, although it appeared that on the 15th September he was aware that the plaintiff claimed the name of "Pectorine." The question now to be determined, was whether defendant was entitled to use the name. One portion of the defence was that the word "Pectorine" was not capable of being appropriated as a trade-mark at all. It appeared to him (the Vice-Chancellor) as to the name that it was not a question of law, but of the ordinary understanding of mankind, whether or not the use of the word "Pectorine" for the first time applied to a particular article was a fanciful name. He considered it was a fanciful name, as nine-tenths of the purchasers of the article would probably not know the meaning of it. As to the defendant knowing that the name belonged to plaintiff, that was upon many authorities quite unimportant. It seemed to him that it was quite a misfortune he hit upon that particular name, yet notwithstanding this, the name, according to the more modern authorities, was a property belonging to the plaintiff. The Court having arrived at that conclusion, had only to ask itself this question—If this article is ordered by that name, will or will not the plaintiff be damnified by that being done? The question could only be answered in one way, namely, that the plaintiff would be damnified if orders were given for the article by that name, and those orders were liable to be executed, as they would be, by supplying the article, if defendant was selling his preparation under exactly the same name. Then it had been said that the name was originally "Smith," joined on to the name of "Pectorine," and that nothing short of using the whole description would be calculated to deceive; but this was not a correct view. The public understood it to be "Smith's Pectorine," but it did not follow that in every case where "Pectorine" was ordered by anybody who required to use it that it would be obtained by the retail agent from the original proprietor and vendor, Mr. Smith, at Lincoln. He (the Vice-Chancellor) had said that knowledge of the plaintiff's title was unimportant, and it seemed very unimportant for any other purpose now, because he still obtained the right to use the name. Therefore every act he had done since showed he was doing it with an actual intent and purpose to deceive, and as such must be liable upon that footing. After referring to several cases bearing upon the issue, the Vice-Chancellor said the article, "Smith's Pectorine," was one which, from its very nature, gradually forced its way into the market from one place to another, and from having at one time a certain limited amount of sale in a particular locality, gradually spread itself all over England. A person having a name as his property, had a right to protection in respect of it. Patent medicine vendors, as a rule, began with small beginnings, but in those beginnings they originally acquired the protection of a trade-mark. The plaintiff was perfectly entitled to the protection of the sale of his article, even at Rotherham, where, notwithstanding the defendant's medicine had had the start, he seemed to be getting a business as well as at other places. Therefore, he (the Vice-Chancellor) could not come to any other conclusion than that the plaintiff had made out his case for the protection which he asked, and he would accordingly grant an injunction forthwith.—*Lincoln Journal.*

Poisoning by Arsenic.

An inquest on the bodies of Henry, Mary, and William Chandler, who were accidentally poisoned by arsenic, was opened by Mr. G. H. Hull, at Elstead, on Saturday last. The Coroner, in opening the inquiry, said it was of the greatest importance not only to the people immediately concerned, but to the community at large, that the strictest investigation should be made into the circumstances of the present case. It seemed to him a very sad thing that a man should be allowed to obtain so easily and have in his possession so large an amount of arsenic. Had the law on the sale of poisons, which provided that arsenic should contain an admixture of Prussian blue, been properly carried out, he did not see how it could have been mistaken for flour, and it would be a subject for the most careful consideration of the jury as to whether that law had been violated or not. The inquest was adjourned till Wednesday, when evidence was taken from which it appeared that Chandler had been in the habit of purchasing arsenic in quantities of 10lb. at a time for sheep dipping. On Wednesday morning he mixed two or three spoonfuls of the compound with flour on a plate, and placed it on a shelf in the pantry, for the purpose of killing vermin. As it was not coloured, Chandler's daughter, in preparing the dinner, mixed the composition in a suet pudding. At dinner time she felt too unwell to partake of anything, and her mother recommended her to go upstairs and lie down. Shortly afterwards her father called her down and asked her if she had used the composition which he had placed in the pantry in making the pudding. She replied in the affirmative, upon which he exclaimed, "Good God! We are all poisoned." Messengers were quickly despatched to Godalming and Farnham for medical aid. Dr. Yate, of the former place, arrived at the house about 5 o'clock, when he found Mrs. Chandler dead and her husband and children in a dangerous state. He had the sufferers put to bed and applied the usual remedies, but William, Chandler's eldest son, died at 7 the same evening; and his father succumbed at half-past 1 the next morning. Mr. Griffith, chemist, of Farnham, said that when the deceased purchased the arsenic he said that it would be used for sheep dipping, and as the Act provided that upon such representation it could be sold in its pure state to the extent of 10 lb., he did not put any colouring in it. The Coroner said that the melancholy occurrence was evidently the result of an accident, and due to the carelessness of the man Chandler himself. He was strongly of opinion that there should be some alteration in the Act regulating the sale of arsenic, and that such large quantities should not be sold without being coloured. He believed that some colouring could be used without rendering the arsenic useless for sheep dipping and other purposes for which it was necessary, which would prevent it being mistaken for flour, as was the case in the present instance. The jury returned a verdict of "Accidental death," with a recommendation that means should be adopted for the colouring of all arsenic in future.

Reviews.

YEAR-BOOK OF PHARMACY, comprising Abstracts of Papers relating to Pharmacy, Materia Medica, and Chemistry, contributed to British and Foreign Journals, from July 1, 1873, to June 30, 1874. With the Transactions of the British Pharmaceutical Conference at the Eleventh Annual Meeting, held at London, August, 1874. London: J. and A. Churchill, 11, New Burlington Street. 1875.

The long expected and wearily waited for 'Year-Book of Pharmacy,' is by this time in the hands of every member of the British Pharmaceutical Conference. We have no desire to be exacting or even severely just with the editor, on whose shoulders the burden of complaint heaped together by a long delay must be placed,—his infirmity claims the rather our sympathy and kindly forbearance—but we would take this opportunity of pointing out to those whom it most concerns, that this second experience of even editors not being exempt from the ills of flesh, suggests the desirability of dividing the responsibility for a timely appearance of the 'Year-Book.' The very essence of the usefulness of such a volume as the one before us depends on its prompt publication at the close of the term embraced by its pages. In the present instance its appearance is contemporaneous with that of the eighth month of another year.

It is a handsome volume of 663 pages. The arrangement of the matter is the same as that already familiar to the members of the Conference. As to the matter itself, the short time we have been able to devote to an examination of it, induces us to offer our congratulations to the editor on the judgment which has guided his choice.

The volume seems to us to represent very fairly a year's progress in the three subjects denoted by the titles of the parts into which the 'Year-Book' proper is divided, viz., *Materia Medica*, *Pharmaceutical Chemistry* and *Pharmacy*. It is true there is a fourth part, *Notes and Formulæ*, but this we think may be considered subsidiary to *Pharmacy*. The book contains no omissions of importance, if we may so speak, and the abstracts, in those cases where the nature of a paper permits of abstraction, betoken on the part of the abstractor a keen perception of the merits of the original, and of the relation of the facts or suggestions to our every-day pursuits. It is with a feeling akin to pain, however, that we turn over page after page and see name follow name in almost unbroken succession, which is either continental or American. Why is this? Are our own prophets not honoured? or have we so few? We fear, the latter.

The editor rightly gives the first place in the list of achievements during the pharmaceutical year, to the published results of Hesse's exhaustive study of the cinchona alkaloids. The cinchonas have always absorbed a large share of the attention of pharmacists, and that they have received as much in 1873-4 as in any previous year, is evidenced by the contributions of Hesse, De Vrij, Bernatzik, Jobst, Pocklington, and Weidel. Pocklington's careful researches on the microscopical structure of drugs will some day be turned to better account than they have been yet. J. R. Jackson continues his acceptable notes on such of the vegetable materia medica whose history requires elucidating, and E. M. Holmes has laid us under obligation by pointing out sophistications to which belladonna root, cascarilla bark, and arnica root are subject. The readers of this Journal will be familiar with the labours of Hanbury and Sydney Plowman on N-gai camphor, and with the supplementary work of Flückiger on camphors generally. One of the most important and interesting discoveries in pharmaceutical chemistry is the artificial formation of vanillin by Tiemann and Haarmann. This discovery was announced nearly twelve months ago, and works for carrying on the manufacture of vanillin from coniferin have been established for some time in Germany. When may we expect to hear of this artificial vanillin in commerce? And thus we might go on until we had almost reproduced the editor's introductory chapter of sixteen pages, which we have no intention of doing. Those who have the 'Year-Book' may read it and the introduction for themselves, and those who have it not should procure it for the purpose of doing so. The most obvious way of obtaining a personal interest in the 'Year-Book' is by joining the Conference, as some four hundred gentlemen have done since the appearance of the volume for 1873. We believe the Conference now numbers nearly 2,400 subscribing members. The Transactions portion of the 'Year-Book' is edited by the indefatigable London Secretary of the Conference; to say this is to say that it is done as well as can be. One of the most interesting portions of the report of the Executive Committee is that which relates to the Bell and Hills Research and Library Fund. From this it appears that two grants of £10 each and one of £5 have been made to assist in the prosecution of original research. Each of the three gentlemen who receive these grants has contributed at least one paper to the London meeting, which also had the good fortune to receive communications from two foreign members, Dr. de Vrij (who was present at the meeting) and Professor Flückiger, as well as from many gentlemen at home whose names are familiar to all readers of this Journal.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AT THE TWENTY-SECOND ANNUAL MEETING, HELD IN LOUISVILLE, KY., SEPTEMBER, 1874. Also the Constitution and Roll of Members. Philadelphia: Sherman and Co. 1875.

Though this is a more imposing volume than the 'Year-Book,' it cannot be said to contain a much greater amount of matter in its 658 pages. The paper is very thick, and the bulk of the type very large, so that the average page-contents of the two works are about equal It may be interesting to give a short description of the contents of the volume, and the way in which they are arranged, especially as the arrangement hitherto followed is departed from in the present instance. Let it first be understood that the Association comprises fifteen committees in addition to the executive, which are either standing, special, or permanent. It is the duty of these committees to prepare reports to be laid before the Association at its annual meeting; and the reception of these reports, together with one on the Progress of Pharmacy, and their discussion, is the main business of the meeting. In previous years, the minutes of the Association meetings have formed the first part of the volume, followed by the reports above mentioned and essays by individual members, printed in full. This arrangement delayed the appearance of the book till someting like six months after the meeting, the secretary being obliged to get the minutes in type before he could proceed with the printing of the reports and essays. Assuming that these reports, etc., are *ready* at the time of the meeting, the secretary hopes that by placing them at the commencement of the volume, he may print off almost immediately, and be able to distribute the 'Proceedings' after a delay of only two to three months. It will be seen that this new arrangement is similar to that which is followed in our own 'Year-book,' for the report on the Progress of Pharmacy, and the reports of committees on adulteration, exhibition of specimens, legislation, Pharmacopœia, unofficinal formulæ, etc., of the 'Proceedings,' comprise all the subjects treated of in the 'Year-Book' proper, and a few more. The editor of the 'Year-Book' is, however, not assumed to have the MS. ready for the annual meeting of the conference.

The report on the progress of pharmacy occupies 277 pages, and is divided into the sections: 1. *General Subjects;* 2. *Pharmacy;* 3. *Materia Medica,* I. *Vegetable,* II. *Animal;* 4. *Inorganic Chemistry;* 5. *Organic Chemistry;* 6. *Necrology;* 7. *Bibliography.* It seems to us that the first section is capable of ready absorption by the remaining ones, except perhaps a few remarks in it on the Status of Pharmacy, wherein the opinions of various writers are collated and compared. The section on pharmacy includes notices of apparatus illustrated by wood engravings, eminently useful to the practical pharmacist; notices of processes and formulæ extracted from scientific journals generally. The Materia Medica are noticed under their respective natural orders. Neither here nor elsewhere in the volume do we find the slightest reference to Hesse's work on the cinchona alkaloids—a capital omission. The section on bibliography is merely a list of works on chemistry, pharmacy, and materia medica which have appeared during the year.

The special and volunteer essays (twenty-six in number), by various members of the Association, form an important feature of the volume. In an "Essay on Granular Effervescent Preparations," Mr. R. V. Mattison severely handles the English manufacturers of citrate of magnesia, and felicitates his American brethren on the conscientiousness of the home makers. A "Report on the Active Principles of the officinal Veratrums," by C. L. Mitchell, contains an exhaustive botanical, chemical, and physiological study of *V. viride*, *V. album*, and *V. sabadilla.*

We entertain a very high opinion of the work performed by the American Pharmaceutical Association as displayed in their 'Proceedings,' but (and the comparison is irresistibly suggested by the simultaneous appearance of the two volumes) we prefer the simpler arrangement adopted in the 'Year-Book,' and are inclined to think that the general style of the abstracts which appear in the latter is superior to that of the corresponding part of the former; the abstracts themselves are fuller and more complete, and likely to prove more useful.

NOTE-BOOK OF MATERIA MEDICA, PHARMACOLOGY, AND THERAPEUTICS. By R. E. SCORESBY JACKSON, M.D., F.R.S.E., etc. Third Edition, Revised, Enlarged, and Brought Down to the Latest Date, by Dr. ANGUS MACDONALD, M.A., F.R.S.E., etc. Edinburgh, Maclachlan and Stewart. 1875.

The appreciation of this well-known work by the medical and pharmaceutical public is sufficiently evinced by the appearance in so short a time of a third edition. Since the appearance of the last one the Supplement to the British Pharmacopœia has been issued, and it appears to have been chiefly with a view to including the new official articles and useful notes thereupon, that the present edition has been revised. In this sense, it certainly is brought down to the present date, and the notes upon the Additions to the Pharmacopœia fully bear out the character of the work, being thoroughly practical, and clearly and concisely written. The work does not pretend to be an exhaustive treatise, but was originally compiled "to relieve the student from much of the mechanical labour of taking notes, while suggesting a more complete investigation of the subject." This office it admirably fulfils, and we envy the student who could take such notes as are herein given, in as few words.

We notice, however, that the current literature upon materia medica seems to have been neglected. Thus, no notice is taken of the now well ascertained botanical sources of Turkey rhubarb, pareira brava, santonica, or sumbul; nor is the information upon the active principles of the aconites, aloes, ergot, and senna, etc., brought up to the present date. This is the more to be regretted since the work—from its convenient size, the clear and concise manner in which information is conveyed, the voluminous index, in which doses and official preparations are so conveniently indicated, and the excellent arrangement of the letter-press throughout the work—is the very model of a student's note-book. It may reasonably be hoped that in the next edition the above omissions will be remedied, for, although in its present state the work may give all the information likely to be required of a medical student, it will by no means meet the requirements of candidates for the Major examination of the Pharmaceutical Society.

The student who for the first time turns his attention to the subject of materia medica may get a very good practical knowledge of his subject from this work; but the more advanced student will certainly prefer to turn to the classical treatises of Pereira and Hanbury.

BOOKS, PAMPHLETS, ETC., RECEIVED.

CHEMICAL EXAMINATION OF ALCOHOLIC LIQUORS: A Manual of the Constituents of the Distilled Spirits and Fermented Liquors of Commerce, and their Qualitative and Quantitative Determination. By ALBERT B. PRESCOTT, M.D., etc. New York: D. Van Nostrand. 1875. From the Publisher.

OUTLINES OF PROXIMATE ORGANIC ANALYSIS, for the Identification, Separation, and Quantitative Determination of the more commonly occurring Organic Compounds. By ALBERT B. PRESCOTT. New York: D. Van Nostrand. 1875. From the Publisher.

LECTURES ON SKIN DISEASES, delivered at St. Vincent's Hospital. By E. D. MAPOTHER, M.D. Second edition. Dublin: Fannin and Co. 1875. From the Author.

Ueber die quantitative Bestimmung des Arsens, respektive der Arsensäure. Von G. C. Wittstein.

Ueber die Prüfung des Kaffees. Von G. C. Wittstein.

Ueber Untersuchung des Bieres auf fremde Zusätze. Von G. C. Wittstein.

Ueber die gährungshemmende Wirkung der Salicylsäure. Von C. Neubauer. From Professor Kolbe.

Weitere Mittheilungen über Wirkungen der Salicylsäure. Von H. Kolbe. From the Author.

Praktische Beobachtungen über die Wirkung der Salicylsäure. Von Dr. W. Wagner. From Professor Kolbe.

Nouvelles Recherches sur les Liquides pathologiques de la Cavité pleurale. Par le Dr. C. Méhu. From the Author.

Eine bis jetzt vernachlässigte Jodquelle. Jod und Brom in den Süsswasserpflanzen. Von H. Zenger. From the Author.

Notes and Queries.

[429]. PERCOLATORS.—I should be glad if some of your numerous correspondents would favour me with their opinions as to the best form of a percolator; whether cylindrical or conical, together with maker's name.—NIL DESPERANDUM.

[430]. LOGWOOD TEST FOR ALUM.—Can anyone oblige by informing me the strength of the "weak tincture of logwood," and "strong solution of ammon. carb." used in Horsley's test for alum in bread, mentioned by Mr. Siebold.

[431]. SILVERING PILLS.—Can any reader give me information as to the best method of rapidly silvering pills in large quantities—say, for instance, the method adopted in silvering *cachou aromatizé?*—M. P. S.

Obituary.

The Pharmaceutical Society has lost another of its oldest supporters in Mr. Samuel Manthorp, Pharmaceutical Chemist, of High Street, Colchester, who died on the 1st of February, at the age of 66. Mr. Manthorp was a Founder of the Pharmaceutical Society, and served it as one of its Local Secretaries during many years.

We also regret to have to record the death on the 28th February, 1875, from pneumonia, of Mr. Paul William Gibbs Gordelier, Pharmaceutical Chemist, of Sittingbourne, Kent, in his 75th year. Mr. Gordelier became connected with the Pharmaceutical Society in January, 1842, and although he did not take any prominent part in the management of its affairs, embraced every opportunity of showing his sympathy with its objects.

Notice has also been received of the death of the following:—

On the 17th January, 1875, Mr. John Blackbourn, Chemist and Druggist, of Snargate Street, Dover. Aged 65.

On the 23rd February, 1875. Mr. John Unthank, Chemist and Druggist, of Wakefield. Aged 40.

On the 2nd March, 1875, Mr. Eli Steele, Chemist and Drrggist, of Upper Tean, Staffordshire. Aged 34.

We notice also the announcement of the death, on the 26th February, at the age of 71, of Mr. Nathaniel Jacobson, who for many years carried on the business of a chemists' valuer, in Walbrook.

The following journals have been received:—The 'British Medical Journal,' March 6; the 'Medical Times and Gazette,' March 6; the 'Lancet,' March 6; the 'London Medical Record,' March 6; 'Medical Press and Circular,' March 6; 'Nature,' March 6; 'Chemical News,' March 6; 'Gardeners' Chronicle,' March 6; the 'Grocer,' March 6; 'Journal of the Society of Arts,' March 6; 'Grocery News,' March 6; 'Produce Markets Review,' March 6; 'Practical Magazine,' for March; 'Educational Times,' for March; 'British Journal of Dental Science,' for March; 'Journal of Applied Science,' for March; 'Canadian Pharmaceutical Journal,' for February; 'Tennessee Pharmacal Journal,' for February 20; 'Moniteur Scientifique,' for March; 'Pharmaceutische Zeitung,' for March 6; 'Sanitary Record,' March 6; 'Journal de Pharmacie et de Chimie,' for March; 'Répertoire de Pharmacie,' for March; 'The Garden,' for March 6; 'American Journal of Pharmacy,' for March; 'The Pharmacist,' for February; Pharmaceutische Zeitung f. Russland,' for Feb. 21; 'Archiv der Pharmacie,' for March.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PHARMACY IN IRELAND.

Sir,—I must take exception to your article of the 27th February, inasmuch as you appear to be labouring under a delusion with regard to the different classes connected with pharmacy in Ireland. You speak of chemists and druggists and Irish pharmacists—classes of gentlemen to my knowledge non-existent. Apothecaries we have in this country, and we have druggists, the former being the only recognized body qualified for the dispensing of medicines. They have to undergo a searching examination in "arts" before being articled; after which, in anatomy, physiology, practice of medicine, chemistry, botany, and materia medica; in fact, there is little difference between the requirements of an Irish apothecary and an Irish physician. The druggist's shop, as at present constituted, is a kind of general store, where goods of every description can be purchased, drugs included, but whether the druggist's knowledge thereof would even meet the requirements of the Minor examination I very much question, and I must confess my surprise at the pharmaceutical organ even suggesting that Irish pharmacists should form the nucleus of a Pharmaceutical Society for Ireland. There is certainly no analogy between the pharmacist of England and an Irish druggist in point of qualification, and I see no reason why the latter body of gentlemen should expect to derive more benefit from a Pharmacy Act than the humblest shopkeeper. I feel confident that Sfr Michael Hicks Beach will frame a bill acceptable to the majority of apothecaries, and I am assured by many that it will be acceptable if based upon the same principle as the Pharmaceutical Society of Great Britain. A humble suggestion of mine I trust will not come amiss. Would it not be as well for the country at large if the Apothecaries' Hall, as a medical body, ceased to exist, and turned its attention to pharmacy only? I must apologise, Mr. Editor, for not sending this letter last week. I certainly should have done so had I seen the Journal in time.

CHARLES H. HARTT.

107, *Grafton Street, Dublin.*
March 9, 1875.

Sir,—The subject of pharmacy in Ireland seems likely again to occupy the attention of Parliament, and, as the subject has now been dicussed for some years, it does appear to me that something ought to be done. The chemists and druggists of Ireland are crying out for a separate society on the plan of the English Society; this may at first sight look feasible enough, but there are difficulties in the way. In the first place, where are the funds to come from? As the English Society was always self-supporting, it is not likely that Government will give any assistance in that line. The only plan appears to me to be an extension of the English Pharmacy Act, with such modifications as may be necessary. In the first place, I would suggest that all licentiate apothecaries keeping open shop should be placed on the Register as pharmaceutical chemists. Secondly that all chemists and druggists should be eligible to become members on passing a modified examination, and that all assistants may become associates on passing a similar examination. The council of the Society should be enlarged to admit members residing in Ireland to take part in the proceedings of the Society as the Scotch members now do. A branch to be established in Dublin to conduct examinations, etc. The said branch to be supplied with funds from the parent Society.

COMMON SENSE.

Associates and the Library.

Sir,—I feel sure many Associates are thankful to Mr. Schacht for bringing under the notice of the Committee the desirability of extending the right to them of obtaining books directly from the library.

The last Journal tells us that they cannot extend this right. I respectfully suggest that they grant it, a free catalogue, and carriage one way to those subscribing to the Benevolent Fund; probably this would induce some to increase by subscriptions the usefulness of this fund, and certainly many will agree with me that this is most desirable.

According to the decision of the Committee I now have to apply to the nearest pharmaceutical chemist, who is sixteen miles off, to get his recommendation, although I am here in this city, containing a population of 8000.

Edwd. de T. Collins.

Lichfield,
March 9, 1875.

The Objections to a "Square" Man.

Sir,—Allow me in answer to the question of "Veritas" to state what I consider to be the objections entertained by many employers to the so-called "Square" man.

Leaving it to the keen judgment of "Veritas" to decide how far the shop or laboratory by any means can be transformed into a paradise, it is not, as an "Examined Assistant" tells us, that employers disapprove their assistants possessing more knowledge than themselves, but that they should presume to it when they do not possess it. And this is what the "Square" man too frequently does. Having passed his examination and obtained his diploma, he seems to think that he has become an authority on all matters connected with the trade, and when he enters the service of a man unadorned with such honourable distinction he is apt to flaunt his flag in a manner that, to a susceptible nature, is offensive. Filled to the brim with theories which he has had little opportunity of putting in practice, he attempts to do so to the loss and annoyance of his principal, who thus comes to see that scientific attainments are not an unmixed blessing, and that one who is less highly ornamented is perhaps the more useful. I knew of one young man who felt aggrieved because he was not allowed to remove the ordinary labels on bottles containing chemicals and substitute symbols, and from the high platform of his theoretical lore looked down with contemptuous sneer on his ignorant but practical employer. This, I admit, was an extreme form of the madness which afflicts many of those who have just emerged from the examination room.

Of course this sort of thing rights itself bye and bye, and when by brushing with the world the individual finds that after all he is much the same as other men are, and that the possession of a diploma is not a proof of any very rare order of genius, he is all the better for his "Square" studies. Then, again, many men seem to think that having passed their examination they therefore know their business, and they apply for and enter into situations for which they have not yet developed sufficient ability, and their incompetence is frequently erroneously connected with their scientific attainments. The result is, that censure is passed on the whole class to which they belong.

Another objection is, that the "Square" man is so often above his business. With the finest crop of wheat there grow up tares, and the education obtained at Bloomsbury Square is often tinctured with the whimsical ideas of status, etc., which some speakers and writers are so fond of indulging in, preferring the "*videri*" to the "*esse.*" So that the man who previously could do his day's work happily in an apron, now finds it to be a degradation, and instead of an aid to economy a badge of servitude.

Therefore, I think that it is the presumption and high-flown ideas which in so many instances accompany the "scientific knowledge" that prevents the latter from being appreciated.

As "Veritas" says, scientific knowledge must increase the value of an assistant's services, and where it is accompanied with practical ability and business tact cannot fail to obtain that respect it deserves.

J. G. C.

The Finance of Pharmacy.

Sir,—The above subject cannot fail to be interesting (and always so) to the majority of your readers, and as you do not announce that the present discussion is closed, I venture, with all due submission to the value of your space, to offer thereon a few remarks. I cannot but think that those who have written in opposition to the theory or statement of "Veritas" have altogether overlooked the conditions he has laid down for the attainment of the very startling result he has unfolded to our view. Referring to the young man who, having a small sum to commence with, is, in due course, to become the possessor of £10,000, and to retire on £500 or £1,000 per annum, he says :—

1. He must bear "a banner with a strange device;" strange, I suppose, in the sense that it is not familiar to us.
2. He must be a man of business. This is a *sine quâ non.*
3. He must exercise the most rigid economy.
4. He must possess untiring industry and indomitable perseverance.

Good. But are these *all* the conditions which are necessary for the achievement of the desired end? I think not, and, therefore, I venture to add the following :—

5. He (the young man in question) must possess a sound physical constitution, and live in the enjoyment of good health. A man cannot work *con amore,* however competent he may be, if he is weak or ill.
6. He must be in a position to command custom. It is evident he could not take money if there were no money to be taken.
7. He must be free from the burden of an extravagant or irrepressible wife. Few men could survive this infliction long, though it may be no excess of gallantry to say so.
8. He must have no "poor relations" to maintain. If his income went to his relatives where would be his compound interest? And finally and lastly :—
9. When he has secured his nett yearly balance he must invest it with safety and profit.

Now, given all these conditions, and cause and effect will be immediately apparent. Herein the position of "Veritas" will be completely unassailable. But, then, as I imagine, it is not so much a question of *possibilities* (else where should we stop?), as of *probabilities.* Taking men *as they are,* and the trade *as is is,* and what are the financial prospects of the pharmaceutical calling? The answer to this will be best found in *facts,* and in this instance, facts clearly show us that whilst the great majority are striving day after day to secure a living and pay their way, it falls to the lot of the comparatively few to carry the Excelsior Banner, and to attain that position which all so eagerly desire, but which, in its realization, falls so short of the earthly paradise we, in our too confident estimates and anticipations, imagine it to be. If, then, the young chemist, with a small sum to commence with, aims to become the possessor of £10,000 and upwards, he must conform to the conditions which the attainment of that result so undeniably imposes. Are, then, these conditions more exacting in pharmacy than in any other calling, whether profession or trade? If so, the question of personal fitness and ability acquires considerable importance as influencing or determining the result in each particular case. That great things may be accomplished, even in the drug trade, is impossible to deny; but herein, perhaps, it is to be remembered as specially applicable the trite aphorism, He "who would be free *himself* must strike the blow." And to those who have not achieved this success, who, in fact, are not so gifted, or so specially circumstanced, whilst they observe here and there in the far heights the waving of the envied and glittering Banner, they need only glance along the plain to find abundant and mayhap consoling illustration of the equally forcible truism, "The race is not to the swift, nor the battle to the strong, neither yet bread to the wise, nor yet riches to men of understanding, nor yet favour to men of skill; but time and chance happeneth to them all."

W. W.

February 23, 1875.

Milk of Sulphur.

Sir,—While cordially agreeing with your criticism on the remarks made by the magistrate, in the "Morning Tonic" case, I must take exception to your view of the "Milk of Sulphur" question.

On reading the report in your columns, it was patent to me that the medical analyst of Leeds had never been a druggist, or he would have been better able to stand the trenchant cross-examination of Mr. Simpson and explode his sophistry. He would have been able to tell him that for some years the term "Lac Sulphuris" has been generally ignored by wholesale druggists;—that in their lists is printed "Sulph. Præcipitatum," followed by "Sulph. Præcip. Pur."—a tacit admission that the former is impure; or they print "Sulph. Præcip. Pur." followed by "Sulph. Præcip. Sec.," while some plainly state "Sulph. Præcip. containing Sulphate of Lime." He could have told them, that, in the list of Messrs. Howards and Sons, of Stratford, is printed "Sulph. Præcipitatum Ver. (delicate colour and very pure)," and that if Messrs. Howards and Sons were applied to to supply a "lac sulphuris" of half the value, they would refer the applicant to houses of less high character than themselves. I observe that in some wholesale druggists' lists only "Sulph. Præc. Pur." is quoted, Barron, Squire and Co.'s, for instance. I never heard of a medical man prescribing sulphate of lime as a medicine, either alone or combined with sulphur, or anything else; and if perchance a medical man were to prescribe "lac sulphuris," he would certainly not mean a preparation containing an equal moiety of calcis sulph.; nor would any druggist having regard for the purity of the chemicals he dispensed prepare the prescription with such an article.

The state of the case is this. If the children of my Lord Knows-Who, of Grosvenor Square, require some "milk of sulphur," it will probably be got from the adjacent Duke Street, and sulph. præcip. pur. will be assuredly supplied for their aristocratic stomachs. But, if the children of my lord's gamekeeper, resident at Stokum-cum-Pogis, need some, and the chemist and druggist of that enlightened village be the purveyor, their plebeian insides will almost as certainly be dosed with stuff containing not less than 50 per cent. of sulphate of lime. Their father will doubtless not pay nearly so high a price for their dose as his lordship will be charged for that for his children in his Christmas account, but that would be but a sorry consolation to him or them if they understood the state of the case.

I hold that the "lac sulphuris" of commerce is as much an adulteration as if anyone were to purchase sulph. præcip. pur., and afterwards mix it with sulphate of lime. It is all moonshine saying that the public object to purchasing the genuine article. I have not for some years sold any other, and I am quite sure that it is smooth and impalpable, and as little disagreeable as any impure can be. When I kept both, nine persons out of ten—I had almost said ninety-nine out of a hundred—if asked, would elect to be supplied with the "best;" I was always ready to explain that one was pure and the other very impure. What druggist other than a simpleton, when supplying some for his own family, would give the impure article?

Again, it is sheer disingenuousness to pretend that "milk of sulphur" means one thing, and "precipitated sulphur" another. If it were so Messrs. Howards would not require to manufacture hardly one-thousandth part the quantity they do, for its use would be limited to prescriptions, in which it seldom appears. I never was asked by a customer (other than a surgeon) for "precipitated sulphur." Will anyone contend that in supplying it for "milk of sulphur" I have been guilty of substituting one article for another?

The selling of such an article as the one in question has long been a disgrace to the drug trade—quite as bad as a grocer knowingly selling a mixture of one half ground rice or pea-meal as pepper—and it is to be hoped that the publication of the recent proceedings at Leeds, and thorough ventilation of the subject, will have the effect of putting an end to it.

I thoroughly sympathize with the scammony victim, but I am amazed that anyone if asked to supply scammony across the counter should return other answer than an emphatic "got none"—accompanied by an unmistakable look to match.

I purposely refrained from sending you this letter until after the decision in Mr. Harrison's case had been given. I think he has much reason to congratulate himself in having only been mulcted in a nominal fine and no costs.

On some future occasion I may address you respecting other articles pretty generally sold by druggists in a sophisticated state; and I could say something on the proposed Bill published in your last issue, but the length my letter has already reached restrains me.

Robt. Chipperfield.

Southampton, Feb. 22, 1875.

Carbolic Acid.

Sir,—In the last number of your Journal a letter is published by Mr. Bickerdike, in which he says:—

"I state that the boiling point of pure phenol is 184° C., whilst Mr. Lowe states it to be 182°; and further adds, that these two degrees of boiling point indicate a material impurity in the acid boiling at 184° C. In another place Mr. Lowe refers to Messrs. Dale and Schorlemmer as trustworthy authorities, and I should be equally willing to accept their statements on a scientific point. In the *Journal of the Chemical Society* for 1873, p. 441, these gentlemen, in speaking of their experiments on aurin, say, 'We therefore prepared the colouring matter from pure phenol boiling quite constantly at 184° C., and melting at 42°, a large quantity of which was kindly placed at our disposal by Messrs. Chas. Lowe and Co.'"

This discrepancy between Mr. Lowe's statement and ours is easily explained, being simply due to a difference in the thermometers. That which we used had previously been repeatedly exposed to a high temperature. Now it is well known that under these conditions the bulb always shrinks a little, and consequently the thermometer indicates the temperature a little too high. Although being aware of this we did not correct our number, because it was not our intention to make an exact determination of the boiling point of phenol, the fact that it boiled quite constantly from the first to the last drop was sufficient to show that it was a pure compound. Since that time I have again determined the boiling point of the very same sample of phenol from which our aurin was prepared. The thermometer which I used was expressly constructed for the determination of high boiling points. It has a very short scale, beginning at 90° C., the two fundamental points being the boiling point of water and that of pure naphthalene, which Dr. H. Geissler, who makes these instruments, has found to boil constantly at 217°. These thermometers are exceedingly convenient, because the whole column of mercury can be immersed in the vapour, and thus no corrections are required, which always are only more or less approximate. I obtained the following results, the height of the barometer being 725 m m.:—

Water	100°
Phenol	181.5°
Napthalene	217°

C. Schorlemmer.

The Owens College,
Manchester, March 1, 1875.

Synonyms.

Sir,—It was with much pleasure I read in your last issue Mr. Haselden's communication on the above subject. I quite agree with him in thinking that this useful addition might be more extensive in the present Pharmacopœia with advantage.

It is a matter in which I myself have been interested since my first introduction to pharmacy, and I at one time copied and arranged alphabetically from Redwood's 'Gray's Supplement' the whole of its contents of synonyms, and found the list one of the most useful pocket companions I ever possessed.

The above mentioned work is the best I ever had access to for giving obsolete terms connected with chemicals and drugs, but even in it the idea is not extended sufficiently.

What I have often wished for has been a good "Book of Synonyms for the use of Chemists and Druggists," and if one was compiled by some competent man I am sure it would have a ready sale, be a great help to students, and I believe also it would be a preventive of mistakes occasionally. What apprentice, having entered the business within the last three or four years, if asked by a customer, would be able to give half a dozen of the following without first scratching his head and then going to the principal for advice?—

Turner's Cerate,	Lenitive Electuary,
Mindererus Spirit,	Rufus Pills,
Hoffman's Anodyne,	Griffiths' Mixture,
Jesuits' Bark,	Flowers of Zinc,
Yellow Basilicon,	Liver of Sulphur,
Colophony,	etc., etc.

Or, if he had a prescription or recipe put before him with either of the following ordered, I think he would require a little assistance:—

Tinct. Thebaicæ,	Ext. Saturni,
,, Amaræ,	Elixir Proprietatis,
,, Opii Camphorata,	Sal Polychrestum,
Infus. Diosmæ,	,, Enixum,
Ext. Cynosbati,	etc., etc.

Trusting this matter will be followed up by others, I am, etc.,

J. T. C.

Manchester, March 3, 1875.

Sir,—The letter of Mr. Haselden on synonyms is deserving of much consideration, especially by Professor Redwood, should he contemplate another edition of 'Gray's Supplement.'

Our apprentices and assistants of the present day may glean much information from the older editions; some of the old formulæ would explain the derivation of many names which, as Mr. Haselden remarks, are far from being obsolete.

How many of our young students would be able readily to dispense the following prescription, which was often written thirty to forty years ago, and not unfrequently is presented to me now:—

℞ Sal Cathartic. Amara . . . . ℥iss.
P. Coccinella . . . . gr. x.
Sal Nitri . . . . ʒj
M.
Extr. Saturni . . . . ℥ss.

The oft-recurring question, What is cinnabar of antimony, would be solved, also the significance in the name of so many "Vitriols."

Geo. Cocking.

Ludlow, March 4, 1875.

Copies of Prescriptions.

Sir,—I should be glad of the opinion of experienced pharmacists as to the propriety of making some charge for copies of prescriptions. It is a common thing for a patient to lose his prescription and then apply to the dispenser for a copy of the same, expecting it gratis.

The point has already been brought before us in the Journal, but I do not remember that any pharmacist of known reputation contributed his opinion, or that anyone informed us that he had adopted the system. If it is adopted by some, I should be glad to learn what charge is made.

"Fideliter Peragimus Artem."

February 25, 1875.

"Donor Unknown."

Sir,—In the list of donations to the library in last week's Journal is one, "'Nouvelles Recherches sur les Liquides Pathologiques de la Cavité Pleurale' (donor unknown)." Will you allow me to state that the author and donor of that pamphlet is Dr. C. Méhu, Pharmacien de l'Hôpital Necker, Paris. He was the delegate of France, and the able exponent of the views of French pharmacists, at the St. Petersburg Congress. That these international courtesies should be duly acknowledged is the object of this letter.

Thomas Greenish.

20, *New Street, Dorset Square,*
March 10, 1875.

F. Williams.—(1) We will endeavour to obtain the information. (2) The formula for trimethylamine is correct. (3) It would depend upon how much ergot there was in the wheat.

E. Schiemann.—We are obliged for your communication, and should be glad to receive for publication any definite information on the subject it refers to. The statements made in the report you enclose do not seem to furnish that.

"*Semper Eadem.*"—We think the opinions you express must be founded upon a misapprehension.

Errata.—In the Analysed Statement of Subscriptions to and Grants from the Benevolent Fund, on p. 711, the number of persons on the Register should be corrected to 13,286, and the number of persons who do not subscribe to 11,816. On p. 706, col. i., line 16, *for*—
Corks, Arthur Brownhill ....Worthing,
read Cortis, Arthur Brownhill ....Worthing.

M. N.—Lindley's 'School Botany' is published by Messrs. Bradbury and Evans, Bouverie Street, Fleet Street, and Roscoe's 'Elementary Chemistry' by Messrs. Macmillan, Bedford Street, Covent Garden.

P. Wells.—'The Chemical Testing of Wines' is published by Messrs. Griffin and Co., Long Acre.

"*Electricity.*"—We are not acquainted with any book on the subject.

"*Prudent.*"—You would not be able to commence business in Great Britain without passing the Minor Examination and becoming a registered chemist and druggist.

"*Senex.*"—See the paper printed at p. 723 for information respecting Poh de Bahia.

"*Vicar.*"—(1) and (2). We are not aware that any injurious results would follow. (3). The answer would depend upon the nature of the gas to be produced, and might be ascertained by simple calculation. (4). Gasoline is light petroleum oil.

Caution.—Mr. J. Farmer, of Putney, informs us that he has just been questioned by a lady on the difference between his Frederickshall Water and some which she had bought from a soda water cart in the street, the one at 18*s.* and the other at 8*s.* per dozen quart bottles.

G. Cathcart.—Assuming that Dr. Kirby would be willing to supply the information, your best course would be to apply to him directly.

"*Quærens.*"—The provisions of the 17th section of the Pharmacy Act do not apply to articles to be exported from Great Britain by wholesale dealers, nor to sales by wholesale to retail dealers in the ordinary course of wholesale dealing, nor do any of the provisions of this section apply to any medicine supplied by a legally qualified apothecary to his patient, nor to any article when forming part of the ingredients of any medicine dispensed by a person registered under this Act; provided such medicine be labelled in the manner aforesaid, with the name and address of the seller, and the ingredients thereof be entered, with the name of the person to whom it is sold or delivered, in a book to be kept by the seller for that purpose.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

MISTURÆ.

BY CHARLES SYMES, PH.D.

For some years past new remedies have been introduced much more rapidly than existing ones have become obsolete, and modified forms of these latter have also become numerous, yet room still remains for considerable improvement in the already voluminous list.

There are in the Pharmacopœia certain preparations known as mixtures, to which, it seems to me, some additions might be made with advantage.

Mist. gentianæ is largely prescribed, and with *some modifications in manipulating its process* is a good and creditable preparation. I will not here take exception to its being classed amongst the mixtures, although some grounds exist for so doing. It is in itself a type of a special formula put on its trial and approved by the profession. The question now arises, therefore, What other substances should be brought under the same category?

Anyone who has examined the marc left from infusion, fluid extract, or even decoction of cinchona will be aware that a large portion of the alkaloids remain undissolved, so that the preparations do not really represent the amount of bark from which they are prepared. The United States' Pharmacopœia surmounts this difficulty by the addition of aromatic sulphuric acid to the water used for exhaustion; the acid being added only in small quantity and partially combining with the lime present in the bark, the amount remaining free in the resultant liquid might be considered unimportant. Now, I would suggest, as an elegant, efficient, and not disagreeable preparation, mistura cinchonæ prepared thus:—

Yellow Bark, in coarse powder	of each	℥ss.
Powd. Liquorice Root		
Dilute Sulphuric Acid		♏ 50.
Distilled Water		Oss.

Moisten the mixed powders with the acid liquor, transfer to a percolator, pour on the remainder of the fluid, and when it ceases to drop, continue the percolation with water till 8 ounces have been obtained; add to the percolate 2 ounces of proof spirit, and the result will be a pale sherry coloured liquid, perfectly bright, containing much more of the alkaloids than the ordinary infusion, and yet with the bitterness to some extent covered by the liquorice. It keeps well for some weeks at least.

Calumba is a bitter very frequently prescribed, but its infusion has a somewhat musty and disagreeable smell and taste, and it does not keep more than a few days. This is a case in which we might with advantage produce a mist. calumbæ free from these undesirable characters. It would be necessary to avoid adding anything possessing astringent matter, as columba is so frequently prescribed with iron. This might be accomplished as follows:—

Take of—

Calumba Root, in coarse powder	½ oz.
Water	8 ozs.

Macerate two hours.

Bruised Cardamom Seeds	20 grs.
Proof Spirit	2 ozs.

Macerate for the same period, strain, and mix the liquors.

This small quantity of cardamoms gives a pleasant aromatic taste and odour to the liquid; it keeps well.

Mist. rhei co. in which the taste of rhubarb is somewhat masked, would, I think, be prescribed by many practitioners, if a good formula were produced; the following, perhaps, admits of improvement, but it possesses the qualities mentioned as desirable:—

Rhubarb Root, in coarse powder	150 grs.
Boiling Water	9 ozs.

Macerate for two hours, strain and produce 8½ ozs.

Powdered Pimento	of each	50 grs.
,, Coriander		
Proof Spirit		1½ ozs.
Spirit of Chloroform		1 drachm.

Macerate two hours, and filter into the strained infusion.

This is a cordial aperient, elegant, and not disagreeable; it keeps well.

More examples might be added, but they are at present unnecessary. In any future edition of the Pharmacopœia, these or similar formulæ might be added with advantage; their adoption by the medical profession is highly probable, and they would in many instances replace the infusions of the same substances.

This weak spirituous form of preparation is far from desirable for a very large number of vegetable substances, but I have endeavoured to select those in which it is suitable, and to which no valid exception can be taken.

Liverpool, February 26, 1875.

ACTIVE PRINCIPLES OF FOXGLOVE.*

BY PROFESSOR SCHMIEDEBERG, OF STRASSBURG.

The author has prepared a new, well-defined, crystallizable principle, *Digitoxin*, from the leaves of *Digitalis purpurea*, and exactly investigated the constituents of commercial "digitalin," as obtained from seeds of the same plant.

As to *Digitoxin*, Schmiedeberg completely exhausted with water the leaves previously dried and powdered, and then extracted them repeatedly with dilute alcohol, 50 per cent.; the tincture thus obtained was then mixed with basic acetate of lead as long as it produced a precipitate. The latter being separated, the filtered liquid was concentrated and the deposit now formed, after some days, removed from the aqueous liquid. It was then washed with a dilute solution of carbonate of sodium, by which a yellow matter (*chrysophan?*) was partly removed. The substance was then dried and yielded to chloroform a brownish mass, which after the chloroform had been driven off, was purified by benzin. This liquid dissolved the remainder of the yellow or orange matter, and a little fat, leaving crude digitoxin, which is to be purified by recrystallization from warm alcohol, 80 per cent., adding a little charcoal. This purification still yields yellowish crystals, which ought to be washed again with carbonate of sodium, ether or benzin, and then recrystallized from warm absolute alcohol, containing a little chloroform. This process, however, will only afford colourless crystals provided it be so performed as to cause the separation of digitoxin on account of the cooling of the solution, not by the evaporation of the solvent. If the liquid is instead allowed to evaporate it will soon assume a darker coloration. In the way just pointed out, perfectly colourless scales or needle-shaped crystals of pure digitoxin are at length formed, the yield being not more considerable than about *one* part from 10,000 of dried leaves.

*Abstracted from the author's paper in 'Archiv' fü experiment. Pathol. und Pharmakol., III. (1874) 16.'

Digitoxin is insoluble in water, to which it does not even impart its intensely bitter taste as displayed in alcoholic solution. It is likewise insoluble in benzin or bisulphide of carbon, very sparingly soluble in ether, more abundantly so in chloroform, the latter liquid however acting but very slowly on digitoxin. Its best solvent is alcohol, either cold or warm. The composition of digitoxin answers to the formula, $C_{31}H_{33}O_7$.

Digitoxin warmed with concentrated hydrochloric acid assumes a yellow or greenish hue, the same which is commonly attributed to commercial "digitalin." Digitoxin is not a saccharogenous matter; in alcoholic solution it is decomposed by dilute acids,* and then affords *Toxiresin*, an uncrystallizable, yellowish substance, which may easily by separated on account of its ready solubility in ether; it appears to be produced also if digitoxin is maintained for some time in the state of fusion at about 240° C. Toxiresin proved to be a very powerful poison, acting energetically on the heart and muscles of frogs. The very specific action of foxglove is due—*not* exclusively—to digitoxin; it is so highly poisonous that Schmiedeberg thinks it not at all fit for medicinal use, which might rather be confined to other constituents of foxglove, as, for instance, to those described further on under the names of digitalin and digitalein. The latter, however, are of more difficult extraction than digitoxin.

The preparation of digitoxin is similar to that of *Nativelle's* crystallized "digitalin;" † the former as well as paradigitogenin (of Schmiedeberg) are largely found in Nativelle's digitalin.

Foxglove growing abundantly in Alsace, there is at Strassburg a firm, Messrs. Henn and Kittler, making digitalin from seeds on a somewhat large scale. They exhaust the seeds with alcohol, fifty per cent., distil off the alcohol in a vacuum apparatus, purify the liquid by means of acetate of lead, and add tannic acid. From the precipitate now formed and immediately dried "digitalin" is separated by means of oxide of zinc. It is a whitish powder, almost completely soluble in water, and acting very energetically.

This commercial digitalin chiefly furnished the materials of Schmiedeberg's researches on the principles afforded by the *seeds of foxglove*. Among them three substances are directly obtainable, being no doubt contained in the seed itself; whereas, five other substances are artificially derived from the former, viz.:—

I.—*Digitonin*, an amorphous body, soluble in water; not in cold alcohol, nor in ether, benzol, or chloroform. It yields by decomposition sugar, and gradually the following derivatives:—

I[a]. Digitoresin.
I[b]. Digitoneïn.
I[c]. Digitogenin.
I[d]. Paradigitogenin.

II.—*Digitalin*; it forms roundish, not crystalline, tufts, sparingly soluble in cold water, ether, or chloroform; abundantly in alcohol, or in alcohol containing chloroform. Digitalin is likewise dissolved by even dilute acetic acid as well as by boiling water; it may be split up in sugar, and—

II[a]. Digitaliresin, which again may be resolved into substances not yet more exactly examined.

III.—*Digitaleïn*, a yellowish substance, affording with water frothing solutions like digitonin, yet differing from it by being soluble in chloroform. The product it yields by dilute boiling acids appears to agree with digitaliresin.

I. *Digitonin.*

Commercial digitalin, as alluded to, is moistened with absolute alcohol, and then treated with a mixture of equal volumes of alcohol and chloroform, which will dissolve the most part of "digitalin." The filtered liquid, on addition of ether, yields digitonin, which is to be subsequently dissolved by warm alcohol, purified by charcoal and again precipitated by ether. Digitonin may also be prepared by mixing a concentrated aqueous solution of "digitalin" with baryta, when a precipitate is thrown down, from which carbonate of barium may be separated by means of carbonic acid. Digitonin then remains in the liquid, which is to be cautiously concentrated, diluted by alcohol, and then mixed with a little ether in order to precipitate first some impure digitonin. This being removed and more ether added, nearly pure digitonin makes its appearance; it is perfectly purified by repeating this treatment, which, however, will unavoidably cause a considerable loss of digitonin. Its aqueous solution partakes of the frothing quality of solutions of *saponin*; and, in fact, digitonin and saponin are very closely allied. Schmiedeberg assigns to digitonin the formula $C_{31}H_{52}O_{17}$, Rochleder's formula of saponin being $C_{32}H_{54}O_{18}$.

Digitonin turns red by boiling with dilute sulphuric acid, not so saponin. The former then yields a flocculent matter, consisting of *digitoresin* and *digitoneïn*; digitoresin may easily be removed by means of ether. Digitoneïn is soluble in boiling alcohol, or in alcohol containing chloroform, and is separated from these solutions by ether in form of white tufts, devoid of crystalline structure. Digitoresin, as well as digitoneïn, is further resolvable into sugar and substances which remain to be examined. The product thus afforded by digitoneïn yields, with concentrated sulphuric acid, a brown liquid, displaying in sunshine a magnificent green fluorescence. Lastly, digitoresin and digitoneïn have also been observed in an aqueous solution of digitonin, mixed with an aqueous infusion of foxglove leaves, the whole liquid being kept for some months in a temperature of 35°, when a slow fermentation took place.

A crystallized substance, *digitogenin*, is afforded if either digitoresin or digitoneïn in alcoholic solution is boiled for a day or two with dilute sulphuric or hydrochloric acid. The alcohol is removed by distillation, the yellow residue washed with water and crystallized from hot alcohol. The long, colourless, needle-shaped crystals of digitogenin are abundantly soluble in chloroform, but little in ether. They are not coloured by cold concentrated sulphuric acid, but turn yellow by warming, and then display the same green fluorescence as the above-mentioned derivative of digitoneïn.

On exposing to slow fermentation a solution of digitonin there is found a considerable deposit from which *paradigitogenin* may be extracted by chloroform; it is likewise crystallizable and very closely allied to digitogenin. Yet paradigitogenin, when

* For this reason all the liquids or precipitates to be worked upon, in order to get digitoxin, ought to be kept *neutral with the utmost care.*

† See *Flückiger and Hanbury*, 'Pharmacographia,' 423.—Another crystallized substance, from seeds, mentioned by those authors, l.c., 424, has not been examined by Schmiedeberg.

moistened with cold concentrated sulphuric acid, assumes a reddish-brown hue; that substance is also readily formed by heating commercial "digitalin" with water to about 210° or 220° C. Paradigitogenin has been proved to be present to some extent in Nativelle's digitalin; it agrees, perhaps, with the "digitalose" of Homolle and Quevenne.

II. *Digitalin.*

This appellation has been applied by Schmiedeberg to a very well-defined substance, which he removed from commercial digitalin by mixture of 1 volume of ether and 3 volumes of alcohol. The liquid is repeatedly shaken with small quantities of water, which will dissolve both *digitalin* and digitaleïn, although pure digitalin, if not accompanied by other constituents of foxglove, would not dissolve in water. From the above liquid the ether is distilled off, and water is added, and then if the liquid be concentrated by gently warming it, a flocculent whitish or yellowish mass of Schmiedeberg's digitalin is obtained. The same may also be got from the ethereal solutions, which had furnished digitonin, as above said. Crude digitalin is contaminated with a yellow matter, probably *chrysophan*. This is removed by using a weak solution of carbonate of sodium; the digitalin is then washed with chloroform, dissolved in warm dilute alcohol, from which it separates on cooling, in a few days. It is not convenient to evaporate the solution of digitalin, because it would quickly darken, even in presence of charcoal. Digitalin forms soft, colourless, small grains, agreeing in composition with the formula $C_5H_8O_2$; the solvents for this substance are alcohol, alcohol containing chloroform, and dilute acetic acid; whereas it is but sparingly dissolved by ether or chloroform, still less by water, even when boiling. This well-defined digitalin possesses in a high degree the action of foxglove on the heart; it is the prominent constituent of several kinds of commercial digitalin, especially that of Homolle and Quevenne.

Schmiedeberg's digitalin dissolves in cold concentrated sulphuric acid without assuming any coloration; it strikes yellow or yellowish-green when warmed, and beautifully red if a little bromide of potassium be added. At the same time sugar and *digitaliresin* are produced; the latter is, like its mother substance, a very powerful poison. Yet digitaliresin itself is further capable of being resolved into sugar and another derivative, which is devoid of any active virtue. Digitaliresin is, on the whole, nearly allied to digitoresin.

III. *Digitaleïn.*

In order to get this substance, the liquid, which had already yielded digitalin, is evaporated *in vacuo*, the residue dried over sulphuric acid and dissolved in absolute alcohol. On addition of a little ether, impure digitaleïn separates, the liquid at the same time becomes perfectly clear. On further addition of ether, purer digitaleïn is precipitated. The redissolution and precipitation is to be repeated until the digitaleïn turns no longer red with boiling concentrated hydrochloric acid, but only yellowish. It has, nevertheless, not yet been possible to deprive it entirely of a yellowish hue. In other respects digitaleïn agrees with digitalin, but the former is abundantly soluble in water, and this solution is frothing like that of digitonin. Digitaleïn is, on the other hand, also readily dissolved by absolute alcohol, while digitonin is not so.

ARTIFICIAL SALT BATHS (SOOI BÄDER).

BY DR. G. SIEGMUND.*

The object of this paper, by Dr. G. Siegmund, published in the *Berliner Klinische Wochenschrift*, January 11 and 18, 1875, is not to explain what operation the various ingredients of salt springs have on the organism, but to show how the use of salt baths may be introduced into every house. Salt springs, which are obtained from various sources (from natural wells, from borings, from rocks, by letting in water to dissolve the salt they contain) not only differ from each other very much in their degree of concentration, but they often vary in the amount of their mineral ingredients in the same source. Natural springs, and those got by boring may, according to the nature of the rock which is superimposed, be greatly influenced by the daily rainfall. Such natural dilutions are easily made up for by adding a suitable amount of salt; and it would not be necessary to allude to this, if such deficiencies were always attended to in bathing establishments. Whoever has often been present at the filling of baths in such places, must know how little attention is paid to the degree of concentration. But the principle should be laid down, that the degree of concentration ordered by the medical man should be as much attended to as the degree of temperature. The quantity of salts present in the waters of the most visited baths, varies from about 1·5 to 31 per cent. (Rheinfelden) or to the strength almost of a saturated solution; and if we consider only the amount of chloride of sodium, those having less than 1 per cent. are scarcely worth counting, while the stronger ones reach 20 and even over 30 per cent.

But we must guard against considering the strength of the natural water as identical with the strength of the bath, and here attention must be called to a fault from which few monographs are free, not even Dr. Niebergall's careful tables in Valentiner's 'Balneology,' 1873. Handbooks, and special accounts of baths, give analyses of salt springs; but as there are but few salt springs whose waters are used in their natural state, most salt waters are, in fact, constantly either strengthened or weakened, according to their degree of concentration. It is not enough to tell us how much is added to a bath unless we are told what the whole quantity of water in it is. The quantity of water added to reduce a concentrated solution, and the quantity of a weak salt water to which a certain amount of the concentrated solution is added, must both be known. But from neglect of this, we generally are ignorant of the real strength of a bath, and in many places can only ascertain it by the use of a hydrometer. We imagine a strongly concentrated fluid when we think of the Ischl spring, containing 24·5 per cent. of salts, and of a bucketful of it containing thirty to thirty-three pounds, and know that one or two bucketsful are added to the bath. But if we reflect that a full bath requires about fifteen bucketsful of water to fill it, we find that the addition of one bucketful only brings the bath water up to the strength of a salt spring of the second degree, and of two buckets to that of one of the third degree; and in Arnstadt, where the natural spring contains from 22 to 25 per cent. of salt, although, according to Niebergall, baths are occasionally prepared of the strength of 8 per cent., yet the usual strength is only for children from 1 to 2 per cent., and for grown-up people 3 per cent.

The actual practice at different baths varies much, and depends much on the abundance or otherwise of the supply of salt. If in Ischl the baths seldom exceed 3 per cent., and in Kösen the baths of nearly 5 per cent. are counted strong and exciting, no one thinks anything of the nearly 5 per cent. water of Colberg. In Salzungen the strength is usually from 3 to 6 per cent., and this is often further fortified by the addition of mother liquor, as it is

* Abridged translation of a paper read before the Berlin Medical Society. Reprinted from the *London Medical Record*.

called. The baths in Rheinfelden are of a strength of 3 to 8 per cent., and in Frankenhausen of 7 to 8 per cent. and more; yet the patients do not complain of excitement, sleeplessness, or of irritation of the skin, or of any other unpleasant effects. We are wont to think only of the chloride of sodium in salt springs; and indeed the other constituents amount to a very small quantity, as is apparent from the following table.

	In 100 parts of water. Total constituents.	Not chloride of sodium.
Rheinfelden	31·8	0·7
Ischl	24·5	0·9
Salzungen	26·5	0·8
Arnstadt	23·7	1·3
Reichenhall	23·3	0·8
Bex	17·0	1·3
Juliushall	6·5	0·4
Elmen	5·3	0·4
Colberg	5·1	0·7
Kösen	4·9	0·5
Sulza	10·7	0·8
Kreuznach (Oranien)	1·7	0·3
Münster am Stein	0·8	0·1
Rehme	4·0	0·8
Nauheim	3·5	0·6
Kissingen (Soolspindel)	1·4	0·3

This table shows sufficiently the immense preponderance of common salt. There are, however, some exceptions to this rule: thus, in the Hubertusbad, the total of mineral ingredients is 2·69 per cent.; of this only 1·49 is chloride of sodium, while 1·16 is chloride of calcium, and in a well in Suderode the chloride of calcium, 1·5 per cent., exceeds the chloride of sodium, 1·1 per cent. In Zaizon, one of the iodine and bromine springs, in 0·27 of mineral ingredients 0·06 is the amount of chloride of sodium, 0·02 of iodide of sodium. Similar exceptions might be adduced, but the general rule of the entire preponderance of chloride of sodium over other constituents remains unaffected. With reference to the occurrence of other salts, there is no uniformity. Besides sulphate of lime, which is rarely absent (and which is of no great therapeutic importance), sulphate of soda and of magnesia occur, but by no means constantly, and only in small quantity.

Passing by iodine and bromine, which do not bear directly on our object, the remaining salts are combinations of chlorine and alkalies. Of these chloride of magnesium is usually present; chloride of lime and chloride of potass are so occasionally.

I must next speak, Dr. Siegmund says, of the practice prevailing almost everywhere of strengthening the baths with the mother liquors.

Here, too, there is no rule as regards the chemical mixture. Iodine and bromine, referred to with much pride in some mother liquors, are entirely wanting in others, and when they are present, what amount of real efficiency do they possess? In the lye of Münster, according to one analysis, we have 0·59 per cent. of bromide of sodium and 0·05 of iodide of sodium; according to another one, we have 0·6 of the bromide without any iodide, while another gives the Theodorshall spring 0·77 of bromide of sodium and 0·0007 of iodide of sodium. We may then have in those two lyes, 0·6 to 0·7 of the bromides and iodides.

Suppose we add, what is counted a large quantity, 10,000 grammes of the lyes to a bath containing 300 litres, we have about sixty grammes of bromine and iodine compounds, or perhaps 0·02 per cent. It may be possible that even with this degree of dilution there may be, in the presence of the other salts of the solution, some slight cutaneous absorption; but we must remember that the above strength is greater than that of the baths usually supplied.

Where bromine and iodine are absent, it is generally the presence of a large amount of chloride of calcium that is characteristic—for instance, in Nauheim 29·97 per cent., in Münster about 25 per cent., in Theodorshall 33·2 per cent.; but in some places chloride of magnesium is in excess in the lye, for instance, 48·6 of chloride of magnesium against 23·9 of calcium in Wittekind, and 24·4 of the former against 17·06 of the latter in Arnstadt. In Salzungen there is 17·2 per cent. of chloride of magnesium and none of calcium, and in Ischl and Rheinfeld the lye is practically only a very rich solution of common salt, with perhaps a tenth of other chlorine compounds which are soluble in the lye.

The great dissimilarity of the composition of the salt springs naturally repeats itself in the lyes. It is out of the question to talk of them as homogeneous fluids; and even if their constituents were well ascertained, and their variations were closely copied in their imitations made at Leopoldshall, yet it is beyond doubt that physicians order lyes quite promiscuously, those of Colberg, Schonebeck, Salzung, Wittekind, as they may be nearest to hand, and that they only use them with more discrimination, perhaps, in the case of those valued for containing iodine or bromine.

We may draw one general conclusion from all this, that we do not act under the guidance of any principle. We do not know what is the special action of the chloride of sodium, or that of the other salts. Our only criterion is the amount of salts; we know that a certain degree of concentration is necessary to produce a certain stimulation of the skin.

As examples of the absolute amount of salts in individual baths, we may further mention that the water of Elmen contains sixty pounds of salts in a bath of thirty cubic feet; that of Salzungen, in the bath (the amount of the water of which is not given), forty to forty-eight pounds; and that of Frankenhausen forty-eight pounds in only 300 litres of water.

We shall next inquire what course has been usually pursued in the preparation of artificial salt baths as compared with natural ones. We make use of sea salt, seldom of chloride of sodium, or of mother lye or its salt, to strengthen the salt baths. But in what quantities do we use them? The quantity of sea salt or of chloride of sodium for a bath is usually set down in handbooks at two to six pounds. The 'Prussian Medical Calendar' of 1874 was the first to say from ten to fifteen pounds. Now the former maximum of six pounds, which even now is counted a considerable quantity, gives in a bath of 300 litres a solution of 1 per cent. An idea may be got of how little conception people had of the real strength of such baths, from the fact that patients in hospitals here when ordered salt baths, usually were ordered not more than six baths, each of which contained 2 lbs. of salt. But the uselessness of the ordinary practice is still more apparent in the case of the mother lyes. It was usual to order 1lb. to 2 lbs. for a child's bath. Usually the lye was selected with reference to the quantity of iodine which it contained; but had one any right to expect important results from so small a quantity? The Kreuznach lye, the most popular of all, contains in 500 grammes about 3 of iodine and bromine compounds. The smallest baths used contained 50 litres or 100 lbs., = 50,000 grammes; the 3 grammes added to this gives a proportion of 0·006 of iodine and bromine compounds. Grown-up people no doubt were ordered 1 or even 2 litres; but in a bath containing 200 to 300 litres the dilution was still greater. And if we must now admit that the ordering such small quantities in private practice was in fact a sham ordering, what is the justification for using mother lyes at all? It seems really to have been the result of following an ancient, somewhat mystical belief in the action of salts, without reference to the quantity in which they were present. In imitating natural salt baths, we are thus constantly ridiculously behind our originals. The grounds of this are two; first, if we are to tell the truth, the carelessness of the physicians, who had forgotten to calculate the proportion of salts necessary; and, secondly, the increasing dearness of the materials of the bath. We are thus brought to face the fact that our country is rich in a material which is easily procured, yet is proscribed from common use by artificial circumstances, and especially by taxation.

In the hopes of getting the tax taken off salt that was to be applied to bathing purposes, I applied to the minister of commerce, and asked whether the rough salt which, as supplied to chemical works, pays only a small duty, might not be subject to an equally low rate of tax when supplied for baths; but there were financial difficulties in the way, and the minister obligingly called my attention to the so-called Stassfurt bath salt.

This is a rich potash salt, which is found in a natural state in Stassfurt; its average constitution is as follows:—

	Per cent.
Chloride of Potassium	16·8
Chloride of Magnesium	26·5
Chloride of Sodium	13·6
Sulphate of Magnesia	11·6
Water, etc.	31·6
Total	100·0

It will be observed that there is not much chloride of sodium here. Other chlorine compounds predominate, especially chloride of magnesium, and the composition resembles that of a mother lye rather than of a salt spring; nor does it strongly resemble the saline contents of the water. The water of the Atlantic Ocean contains nearly three and a-half per cent. of salts, which consist of—

	Per cent.
Chloride of Sodium	76·05
Chloride of Magnesium	9·0
Chloride of Potassium	4·0
Bromide of Sodium	1·15
Sulphate of Lime	4·60
Sulphate of Magnesia	5·20
Total	100·0

Notwithstanding its difference of composition from salt springs or sea water, the Stassfurt salt is coming every day into more extended use; and I have myself frequently used it up to the strength of 4 per cent., and with exactly the same effect as salt baths of the same strength.

Its great advantage is its cheapness; 1lb. costs only about two pfennigs (one-fifth of a penny); it therefore can readily be employed in poor-houses and hospitals. But we must be more accurate for the future in ascertaining the exact strength of the baths supplied. For all ordinary purposes it is enough to imitate the strength of the weaker salt springs or of the ocean, and give a bath containing from 1 to 4 per cent. of salt. For the earlier ages from 1 to 2½ per cent. is strong enough. For adults, unless under special circumstances, it should not be weaker than 3 per cent. Calculating the amount of water, a child's bath requires from 1 to 2 lbs. of the salt; an adult's, 12½ to 16½ lbs. The rich have usually larger baths, and may require 48 lbs.

But another kind of salt also occurs at Stassfurt, containing a larger quantity of chloride of sodium; its chemical composition is as follows, according at least to the latest analysis of it:—

	Per cent.
Chloride of Sodium	43·0
Chloride of Potassium	9·4
Chloride of Magnesium	12·8
Sulphate of Magnesia	15·6
Sulphate of Lime	1·5
Water	17·7
Total	100·0

Viewed chemically, this compound comes nearer sea salt and various mother lyes, and would therefore seem better adapted for our purpose; but, practically, a portion of the salt is not only very insoluble, but it swells before it dissolves. Possibly these disadvantages may be overcome, and it is to be hoped that they may be so, as this salt is even cheaper than the last-named one.

In any case, there is no longer any difficulty in supplying salt baths to the poorest patients; and we must have a complete reform of baths of this kind. Their strength can no longer remain a matter of guess work. Their percentage of solids must always be ascertained with a hydrometer. It will also save time in preparing baths, if concentrated solutions of the salts be kept ready, which may be poured at once into the baths, and will prevent the delay of waiting for the solution of the salt, if put in in its solid state. There would be no difficulty in having artificial baths on a large scale, in introducing carbonic acid into the solutions of the salt, and in having inhalation-rooms; and the managers would have their establishments more under control than the proprietors of natural waters have their ones.

No doubt natural salt baths will always retain the advantages they possess—in locality, in climate, and in amusements; and will continue to be resorted to in summer. But rivalry will lead to their exact composition being more minutely studied; and, indeed, the whole subject of the operations of chlorine compounds on the system requires to be more fully investigated. Possibly other analogous salts might have the same effect.

[Of late years, the exaggeration which has prevailed about the strength of sool baths, and the fabulous amount of iodine they were supposed to contain, has been pretty well exposed. Dr. Siegmund's paper will help to enforce more precision. In Germany, where sea bathing is entirely beyond the reach of the mass of the people, sool baths have always been favourites, and they are growing in popularity. In England salt baths have been much neglected. Sea bathing is rarely pursued systematically; and it is only of late that the idea of adding to the strength of sea-water baths has been thought of. Of weak sool baths, England has Woodhall Spa, tolerably prosperous; Ashby-de-la-Zouche, used a little; and Victoria Spa, we believe, closed. The only strong sool baths in England are those of Droitwich, to which place and to its new bathing establishment the *London Medical Record* has several times called attention during the last two years. —*Tr.*]

CRYSTALLIZED ACETATE OF AMMONIA.*

BY M. BERTHELOT.

The author describes the preparation of this salt which he believes had not previously been obtained pure in an isolated state; the crystalline substance that is sold in commerce under this name being ordinarily an acid salt analogous to the binacetate of potash formerly met with, and containing acetimide when it has been prepared with heat.

The author states that the true acetate of ammonia may be obtained in the solid form by evaporating the solution in the presence of an excess of ammonia, and finishing the operation at a low temperature. In operating he dissolves glacial acetic acid in caustic ammonia in a cooled retort, taking care to add sufficient water to prevent crystallization during the saturation, which would give an imperfect product. The mixture is then evaporated in a water-bath in a current of dry ammoniacal gas until the liquid solidifies upon cooling. It is then introduced into a large capsule which is placed under a large bell glass with caustic lime, and a considerable quantity of gaseous ammonia is injected under the glass. After an interval of several days, the bell glass is removed, the crystalline mass is coarsely broken up so as to facilitate the penetration of the ammonia vapour, and the capsule is replaced over the

* *Journal de Pharmacie et de Chimie* [4], xxi., 183.

lime with more gaseous ammonia. The operation is slow and requires several months to complete it, but the author states that he has thus prepared by it some hundreds of grams of perfectly pure acetate of ammonia. It is an extremely soluble salt, crystallizing in large needles analogous to nitrate of potash and resembling formiate of ammonia. The salt has no acid reaction. Its analysis yielded 21·9 NH_3, the formula $C_2H_4O_2NH_3$ requiring 22·0. Its solution in water disengaged a small quantity of heat. It is approached by the acetates of potash and of soda, which are also obtained anhydrous by drying them at the ordinary temperature and which disengage heat in dissolving.

SUGAR, CHEMICALLY AND OPTICALLY CONSIDERED.*

BY HENRY POCKLINGTON, F.R.M.S.

I propose in this paper to confine my remarks on the chemistry of sugar pretty closely to the department of applied chemistry, since it strikes me that a chemical audience will most probably know a good deal more of sugar from the pure chemist's aspect than I do myself. I shall also restrict myself almost exclusively to that variety of sugar we call in popular language cane sugar, and, otherwise, sucrose. I shall assume, as I say, that you know already that this sucrose is a chemical compound of CHO in the equivalents respectively of 12, 22, 11; that it is allied to, and speedily may be transformed into, fruit sugar, or fructose $C_6H_{12}O_6$, and into glucose $C_6H_{12}O_6$ H_2O; fruit sugar being (and this is of biological interest) intermediate between cane sugar, or sucrose, and starch sugar, or glucose. I shall assume also that you know that cane sugar crystallizes readily in four-sided prisms with rhomboidal bases, but are often apparently cubical, and that sometimes, very frequently indeed, they become six-sided prisms. You know also that sugar is intensely sweet, that it is soluble in cold water, extremely soluble in hot water, that it is much less soluble in dilute alcohol, and that it is practically insoluble in absolute alcohol (·52 per cent.) Pure cane sugar has neither colour nor smell. Its crystals are remarkably bold and sharp in outline, however small they may be, and they are beautifully white and translucent. Grape sugar, as you know, differs from cane sugar to a considerable extent. It is, in the first place, only about half as sweet; when it crystallizes at all, it is in fibrous masses or tufts radiating from a centre. The crystals are exceedingly minute and indistinct. It is less soluble in cold water than cane sugar. Fruit sugar does not crystallize at all.

I have taken the liberty of recalling these facts to your mind, because we shall need them as we proceed, as we shall also the additional important fact that, viewed from one aspect, sugar is an exceedingly stable compound, that is from the side of what I may call its individuality, inasmuch as it does not readily enter into combination with other substances, its compounds are not numerous, nor, with the exception of its lime salt, are they of importance. On the other hand, cane sugar is exceedingly prone to change in the presence of heat and moisture. Quite unchangeable in a dry air, and very indisposed to change when pure in pure water at a low temperature, it rapidly passes into fruit sugar and glucose in the presence of warmth and water, and under the influence of dry heat passes through a series of changes of considerable interest economically and theoretically, as we shall see later on.

Having thus, as I think, cleared my ground, I will discuss as briefly as I can the applied chemistry of sugar. By this I mean, chiefly, the manufacture of sugar.

Sugar, as we all know—for were we not taught it as children—is obtained from the juice of the sugar cane, and also from the beet. It is obtained from other plants too, from the *Sorghum*, from palms, etc., and exists in nearly all sweet roots, as those of the parsnip and carrot; and in sweet nuts and fruits, as those of the walnut and hazel. But, practically, we obtain cane sugar only from the sugar cane and beet. The sugar cane, as we all know, is a member of the great grass family, from which we derive so many essentials or luxuries in our dietaries. It is a native of, and best thrives in, tropical and sub-tropical climates—anywhere, in fact, where it is not exposed to frost. It is cultivated largely in the West Indian Islands, in the Mauritius, and in India. In Australia and in Queensland its growth is becoming an important industry. I have specimens on the table drawn from various other less known sources, including a very fine specimen produced in Egypt, and an interesting sample from the Fiji Islands.

The cane grows to from 12 or 15, or occasionally to 20 feet high. The stem has a diameter of about an inch and a half, is dense, brittle, with a hard shining rind, green in colour whilst growing, but changing to yellow when mature. It is jointed like all other grass stems, the joints being from 3 to 6 inches apart. Its leaves are alternate, and given off from the nodes, are from 3 to 4 feet long, flat, straight, and pointed, and from 1 to 2 inches broad, sea green in colour, embracing the stem at the base, and very minutely serrated along their edges. When the canes are about a year old they put forth at their apex a shoot from 7 to 8 feet long, with a diameter of about half an inch. This shoot has no joints, and is terminated by an ample panicle of very numerous flowers, white or very pale lilac. In cultivation, the canes are not allowed to flower, but are propagated by cuttings of a foot or so in length, which are planted in rows four to six feet asunder, the cuttings being four to five feet apart, due provision having to be made for air and light. To provide access by carts, etc., the rows are divided into blocks of a few hundred square feet, separated by appropriate roadways. When the canes are ripe, that is just as they change to yellow, they are cut down and at once conveyed to the mills.

We now have to deal with the cane from the sugar-producing point of view. According to M. Dupois' analyses, made at Guadeloupe, the constitution of the cane is as follows: *—

Water	72·0
Sugar	17·8
Cellulose	9·8
Salts	0·4

A more recent analysis by M. Casaseca of the old creole cane, at Cuba, gives:—

Water	77·8
Sugar, etc.	16·2
Wood and fibre	6·0

M. Icery, still later, in his researches on the juice of the sugar cane, gives as the average composition of Mauritius cane *juice*:—

Water	81·
Sugar	18·36
Mineral	0·29
Organic	0·35

This last named author has made a further very interesting series of analyses of the chief species of cane under cultivation, but I am afraid I must not give you the details or our time will be gone before we well know where we are. It may suffice to say that he finds that the species known as Virgin Bellouguet contains in the body of the cane 13 per cent. of sugar, all of it being crystallizable, and in the head of the cane, and please bear this in mind, only 7 per cent. of which 5 per cent. was crystallizable or cane sugar, the notable quantity of 2 per cent., nearly a half of the whole, being fruit sugar. A variety of cane known as Virgin Diard, contained in the body of the cane the large percentage of 18·2 sugar, of which 17·9

* Lecture delivered before the Leeds Chemists' Association.

* *Practical Magazine*, 1874.

was cane sugar, and 0·3 was fruit sugar. Bellouguet cane reached 20 per cent. of sugar, whilst on the other hand a mixed harvest of recent sprouts gave only 6·8 per cent. of sugar, of which 4·2 were cane, and 2·6 fruit sugar. It is interesting to notice before we pass on the gradual development of the sugar in the cane as shown by the increments in amount found in analyses of the same species at different ages. Payen for example found in Otaheitan cane at one-third of its development as follows:—

Water	79·70
Sugar	9·06
Cellulose	7·03
Albumen	1·17
Starch, etc.	1·09
Fats, etc. / Oils and Silicate	1·95

When mature he found the water had decreased to 71·04, and the sugar increased to 18 per cent. The cellulose also had, of course, increased, to 9·56, but the minerals, fats, and starches, had all decreased.

We may note here that there appears from the best researches to be a period in the history of the cane when the cane sugar is at its minimum, and that at this period the inverted sugar present as its minimum being, according to Icery, only ·004 of the cane juice or ·02 of the cane sugar present. At this period of the cane's history it is said that minute crystals of sugar are to be seen by a lens, distributed through the whole of the more fruitful saccbariferous tissues, viz., those between the first knots of the root and the green leaves below the panicle. It has also been found that the proportion of fruit sugar present increases pretty regularly as we ascend the stem, and reaches its maximum in the growing point of the stem where it is shielded from all action of light. This is a point of which I am sure you will see the significance. It is also worthy of note that canes too rapidly developed contain a notable quantity of fruit sugar, in one case mentioned by M. Icery as much as in the proportion of 2·4 per cent. as against 3·6 per cent. of cane sugar. These canes, as you will probably guess, are the sickly children of the family, and have rapidly run up in the shade without adequate sun and air. The fruit sugar thus found in the cane appears to have special and peculiar physical properties, but they have not as yet been fully worked out.

The juice is expressed from the canes by means of cylindrical presses or rollers. These may be of stone, as in the large old mills, or of iron, as in the newer mills. These rollers are driven by either water, wind, steam, or by beasts. Steam power is the preferable, and by its aid a larger percentage of sugar is obtainable from the canes. The most improved presses are formed of three rollers of cast-iron placed horizontally in a very strong fitting and so arranged that they may be approximated to each other by any desired distance, so that the pressure upon the canes may be varied at pleasure. One of these rollers is driven by the prime mover and itself communicates motion to the others. The canes are brought to the rollers by an endless cloth and passed through the first two cylinders, where they are flattened and half pressed. They then fall down a metal incline, and are passed through the next roller at a higher pressure. It is essential that the speed throughout should be low. Heating the rollers by steam has been found to expedite the process, and to render the expression of the juice more complete. But we must bear in mind that it is desirable not to exhaust the cane too completely, otherwise its value for fuel will be lost. The diffusion process is not applicable in most of our colonies for the same reason.

From the mills the juice flows into a large reservoir where it is allowed to "rest" a short time, for the purpose of clearing itself from suspended matter, woody *débris*, etc., and is then passed to the boilers.

Five of these boilers form what is called a "set." The whole of these are placed upon one fire which is fed by the trash from the mills,—that is, the canes from which the sugar has been expressed,—in order that fuel, a very important item, may be economized as much as possible. In the first of these boilers the juice is mixed with 2 to 3 per cent. of lime which causes a thick scum to arise, and forms with the albumen a copious floating precipitate, and also neutralizes any acids present. The scum is skimmed off and the juice is passed into the second boiler where the evaporation commences, thence into the third boiler or flambeau, into the fourth, and finally into the fifth, or battery boiler. This process results in a serious loss of sugar as will be seen from Payen's analysis, which shows that 55 to 65 in every 160 parts of sugar only are obtainable whilst 25 to 20 parts are absorbed or inverted, and as much as 80 to 75 parts left in the trash, so that not more than 44 per cent. of sugar is recovered from that found in the cane. I am indebted to the *Practical Magazine* for certain of these data.

A considerable portion of this loss is due to the high temperature at which the cane juice is evaporated, causing the transformation of a considerable portion of the cane sugar into glucose. To obviate this evil, two methods have been adopted; the one, the most useful where an adequate supply of water can be obtained, is that known as the vacuum pan method. These vacuum pans are closed vessels, often of great size, from which the air is partially exhausted by powerful air pumps. The working of this will be at once seen if you bear in mind that water which boils at 212° F. in the open air will boil at about 1° lower temperature for every half inch (·589) the barometer is depressed, and since in a good vacuum pan, fitted with proper condensers for condensing the vapour given off by the boiling fluid, we can depress the mercury column to a single inch, we can boil water at a very low temperature indeed, at about 120°, or even less. At this temperature the sugar is slightly changed, but the change is by no means comparable with that due to the higher temperature.

The other method to which I have referred is that which involves the use of what is known as the concretor, which has been described as follows:—

"The cane is crushed and the juice clarified or defecated in the usual way. After the defecation the juice passes on to the 'tray' of the concretor. Here it is concentrated up to about 30° to 33° Baumé at which density it passes into the 'revolving cylinder,' also forming a portion of the apparatus. The interior of this cylinder is full of spiral blades of iron. As the cylinder revolves these spiral blades take up the concentrated juice or syrup, and expose a very large surface of it to the action of a current of hot air drawn through the cylinder by a fan, which forms part of the machine. The evaporation in this cylinder is conducted entirely by means of hot air, the consequence being that though the evaporation proceeds rapidly, the temperature of the juice or syrup is kept low; indeed, on entering the cylinder, the temperature of the syrup at once falls to about the temperature at which it would be boiled in a vacuum pan."

Sugar made by the use of the concretor can hardly claim to be called sugar at all. It is really dried cane juice and contains all the nitrogenous and other soluble matters of that juice, and is obviously unfit for dietetic purposes. Its sole use is for refining, and even refiners have a dislike to it on account of the mineral salts it contains, which act very injuriously upon the syrup, rapidly transforming it into glucose, and also upon the charcoal used in refining.

You will have gathered from what I have said of the various processes by which sugar is obtained from the cane that there is a wide variety in the qualities imported into England, if, indeed, you did not know this already from observation of the grocers' windows. But I am inclined to think that general notions of this diversity are much more restricted to matter of colour than the facts warrant. It so happens that, except to the specially skilled, the appearance of a sample of sugar affords a very poor guide to its sweetening powers, and still less to the quantity of sucrose it contains. It is, in fact, quite possible, as I shall show almost immediately, that a white sugar contains less sucrose per cent. than a much darker sugar, and that the darker sugar is not only the richer of the two in sweetness, but also by far the most wholesome and the cheaper.

I have here this evening a number of specimens of sugar kindly placed at my service by the Messrs. Finzel, of Bristol, who are, as you are aware, the largest refiners of sugar of the kingdom; and by the kindness of my friend, Dr. F. W. Griffin, I am in possession of the results of many hundreds of analyses made by him during the past few years. I have also myself made very careful analyses of some of those on the table, and of various samples purchased in this town and elsewhere. With your permission, I will read a few of the most striking results of our labours. The specimens are here so that you can judge of their appearance.

Havana, 87 per cent.; St. Vincent, 89 per cent.; Barbadoes, 90 per cent; Havana, 94 per cent; Syrupy Java, 86 per cent; Egyptian, 99½; Fiji Islands, 83; St. Vincent, 82; Cuba, 86; Clayed Manilla, 85; Maccio, 87; White Bengal, 97; Kemble's Cuba, 95; Porto Rico, 89½; Havana, 97½; Nazareth, 86; Syrupy Mauritius, 90; Havana, 93; Java, 96; Pernambuco, 87½; Paraiba, 83½; Mauritius, 97; Clayed Pernambuco, 91; Havana, 95; Porto Rico, 89; Pernambuco, 88; Bahia, 92; Havana, 94; Paraiba 91; Guatemala, 91. Summarizing a number of Dr. Griffin's analyses, I found that an average of 19 samples of Bahia sugar shows 88 per cent.; 15 samples of Demerara give 89 per cent., and four samples Barbadoes give 88 per cent.* If you compare these results, and they are quite reliable (those that I have worked over are abundantly confirmed), with the same analyst's analysis of the crystals on the table, you will find there is a wide difference between the two, ranging from 12 to 7 per cent., which difference arises out of the various impurities with which, even the best (these averages include no very bad samples), raw sugars are contaminated. You will find these crystals, which are, I might say, the ordinary manufacture, some of them made before my own eyes during a flying visit to the refinery of the Messrs. Finzel, are practically chemically pure. They contain by chemical analysis 99·90 per cent of cane sugar, and form the best standard of purity we can have for the purposes of the method of analysis we pursue, and to which I shall refer at some length presently. How the differences between the coarsest and darkest of the raw sugars on the table and these crystals have been removed, I propose now to tell you; and I do not know that I can do much better than describe the process as I saw it myself during one of several visits I have had the pleasure of paying to the Counterslip refinery.

The process of refining may be classed under three heads. It consists, firstly, in the removal of mechanical impurities. These are exceedingly varied and consist, as I shall show elsewhere, on a future occasion, of varying amounts of portions of the tissue of the cane, sand, earthy matters, the abominable itch insect, whose likeness I have the pleasure of showing you, and various other sorts of matter, too numerous to mention. It consists, secondly, in the removal of the colouring matters due to overheating and to the retention of some of the normal colouring matters of the cane or beet. And lastly, to the removal of the grape and fruit sugar with which all raw sugars, except perhaps raw beet, are more or less contaminated. The first of these classes of impurities may, as you will at once see, be removed by mere filtration. The second may be removed by washing, as in the process of claying sugar and in the final process of crystal or lump sugar making, or much more completely, by the use of the wonderful decolorizing powers of animal charcoal or bone black. We can practise both these processes experimentally. We have only to take some of this yellow beet sugar and wash it with strong alcohol to remove, as you see, most of its colour, and we have only to take some of this black St. Vincent, dissolve it in water and agitate it with bone black for a short time with subsequent filtration to procure a perfectly white syrup. We shall better secure this end if we pass the sugar solution through a long column of the black, but this the limits of our time will not allow us to do. The exclusion of the last of our classes of impurities, the grape and fruit sugars, can only be secured by means of that wonderful law by which Nature when she makes a crystal always does her best to make it a pure and a perfect crystal. Instances of the working of this law have been tolerably frequent during the past month, and you must all have observed them. Looking into any of our street gutters or little pools of dirty water by the wayside you cannot fail to have seen little spiculæ of the purest ice, or a solid covering of clear ice hardly less pure or less brilliantly white than the snow from heaven. It is by means of this law, by working with and encouraging nature in her endeavours after the purest and best, that these crystals have been obtained. The process I will briefly explain.

The sugar is first dissolved in warm water by the aid of steam ingeniously applied and the resulting syrup is strained through canvas and then passed through animal charcoal in large upright filters, many feet in height, called in the Bristol works—"Joeys." The importance of these filters and of bone black may be at once seen by the visitor to the refinery if only when he sees that two-thirds of its immense area are devoted to it in some way or other. The syrup leaves these filters perfectly white and is then transferred to the vacuum pans, where it is boiled for a greater or lesser time at a temperature proportioned to the kind of sugar in process. Now, there is one important fact connected with this manufacture of crystal sugar that struck me very much when I first saw it. It is this, that the crystals are formed, not in quiescence but during the most tumultuous ebullitions in the vacuum pans. Looking into these pans through a glass window provided for the purpose, you see a yellow tempestuous sea; and it is in this that the most perfectly formed and the purest crystals are formed. Faraday has, I believe, shown that under certain conditions perfect purity of ice crystals can only be obtained when the congealing water is kept stirred by a feather. The result as regards the purity of these crystals is shown very satisfactorily by Hassall's, Griffin's, and Cameron's analyses of them, which coincide very closely in giving as the amount of sugar 99·92, the remaining portions being about ·069 of hygroscopic moisture, and ·02 of ash. My own observations on their specific molecular rotation quite confirm this view of them, and I think there is no room for doubting they are pure sugars. But to return to our sugar syrup. It is taken from the pans to a kind of drum with perforated sides, into which it is thrown. The drums are then caused to revolve at the rate of about 1000 revolutions per minute, and, in a few minutes, by virtue of that law of centrifugal force which enables a housemaid to drain her mop by twirling it, the crystals are freed from their mother liquor, and a slight washing by a stream of water, or clear syrup, whilst the pan is in motion, removes any adherent syrup, and the crystals are dry enough to be wrapped in paper and placed in your pocket, if you are so fortunate as to gain permission.

Time scarcely allows of the description of the process of lump sugar making, which, however, so closely accords with that described above that little need be added beyond this—that the centrifugal pans are replaced by conical moulds, into which the syrup, when properly concentrated, is placed, and the moisture allowed to drain away through a hole in the apex of the mould, which points downwards. When the syrup has run off, the sugar is washed, as in the former cases, and the loaves removed from the moulds, turned in a lathe and dried in a stove.

* Cheap white moist sugars do not compare favourably with these results, as will be shown in another place.

After some further remarks on the purity of commercial sugars, the lecturer described at considerable length the optical characteristics of sugar and the various methods pursued in making polarimetric analyses, including a description of the apparatus employed; but this portion of the lecture is withheld from publication for the present by request of the lecturer; it will be incorporated to a certain extent in a series of articles now in course of preparation on the technical uses of polarised light.

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.*

BY J. BURDON SANDERSON, M.D., V.P.R.S.,

Jodrell Professor of Physiology in University College, etc.

LECTURE II.

CHANNELS BY WHICH BACTERIA MAY ENTER THE ANIMAL ORGANISM.

In the bodies of men and of the higher animals, there are innumerable doorways by which particles as small as septic bacteria must constantly enter, yet no putrefactive changes occur. Bacteria, as we have seen, are, if I may so express myself, potentially present in all articles of food; for every kind of ordinary liquid has the faculty, when added, even in the smallest proportion, to a "cultivation liquid" (*i. e.*, a liquid fitted to serve as soil), of determining at once the development of bacteria. The fact that, even when we employ the highest powers of the microscope, we can see absolutely nothing in these liquids, only teaches us that our modes of observation are insufficient; for we have the proof, not merely that they act zymotically, but that we can deprive them at will of this power, either by heat or by agents such as carbolic acid, which are destructive to bacterial life. Thus, in ordinary drinking water, in cold meat, in fresh vegetables, in cheese above all, and in all ordinary specimens of milk, we are constantly taking in efficient sources of saprogenous life.

When such aliments come into operation with the absorbing apparatus of the intestine, whatever of course is chemically soluble enters the blood-current by the veins, while the insoluble parts enter the lymphatic system by the villi. The mechanism of absorption by the villi is such that even inorganic solids, in a state of fine division, are very readily taken in, and thus find their way from the intestinal cavity into the lacteals, through the thoracic duct, into the blood-stream. Anatomically, this was formerly very difficult to understand; for, so long as it was supposed that the epithelial covering of the villi was set on a structureless hyaline basement-membrane, it was difficult to see how particles could pass through such a membrane. Now we know that this membrane is not structureless, but that here, as in other examples of supposed structurelessness, the substance is penetrated by channels lined with protoplasm, which in the one direction are ready for the taking in nutritive particles, especially oleaginous ones, and in the other communicate with the commencing lacteal.

But, before these anatomical conditions were known and understood, it was proved experimentally that solid bodies in a state of fine division readily entered the lacteals. It is a great many years since Oesterlen showed that, if charcoal in extremely fine powder were mixed with the food of animals, the particles could afterwards be found in the circulating blood. *A fortiori*, therefore, if bodies relatively so enormous as charcoal-particles can be taken into the blood-stream by the villi, bacteria must certainly get into the vascular system whenever they are present in the intestinal liquids. Yet, notwithstanding the ubiquitousness of bacterial germs, it is manifest that the chance of their entrance into the organism by the intestine must depend in a considerable degree on the quality of the food, and particularly on its liability to septic change, and on the readiness with which its constituents are absorbed. Of these two conditions, the latter is likely to be the more influential.

Those alimentary substances which are soluble, as has been already said, enter the circulation by diffusion—a process which would exclude even particles so small as bacteria. But the fatty constituents can only obtain admission by interstitial channels, such as those which form the beginnings of the lacteal absorbents in the intestinal villi. Hence we are led to anticipate that a liquid like milk, of which the oleaginous particles are of extreme minuteness and in enormous numbers, all of which enter the absorbent vessels without undergoing any chemical change, would have a better chance of serving as a vehicle for saprogenic germs than any other sort of food. Whether this is so, is still a matter of speculation. It is supported by what was ascertained in the inquiry relating to the remarkable epidemic of typhoid fever in London last year. With reference to that epidemic, it was, I think, clearly shown that the spread of typhoid was due to a widely spread contamination of a certain supply of milk; but it was not shown what was the nature of that contamination.

Notwithstanding the trouble that was expended in the research, it cannot be admitted that a case was made out in evidence of its specific origin—*i. e.*, its origin from previously existing cases of typhoid fever. This question must, I think, be allowed to remain open. For my purpose it is sufficient that it was contaminated, and that the contamination had a very wide distribution. For if this be admitted, a practical lesson may be learnt from it—*i. e.*, that if it happened once, it may and will happen again; and that greater precautions against contamination than are at present used are necessary. In England we use our milk raw. In Germany, and in all countries in which acid fermentation products are consumed by the population, the milk is all boiled at the dairy before anything else is done to it; for, if it were not so, it would not be possible to produce sour milk, without constantly running the risk of septic fermentation. It would pass through the stage of lactic acid fermentation into that of putrefaction. I have myself ascertained experimentally that it is not possible, as regards London milk, to keep it until it is acid without its becoming at the same time putrid. Sour milk, as used in Germany, is a refreshing and wholesome beverage, but a little leaven of septic bacteria is sufficient to deprive it of both these qualities, as any one knows who has attempted to prepare it from London milk.

The other doorway for the introduction of bacteria is the mucous membrane of the lungs. Experiment has proved that, in animals exposed to a smoky atmosphere, the black particles are absorbed by the mucous membrane, and can be traced step by step along the course of the absorbent channels. It was indeed in this way that the first step was made towards the acquisition of that knowledge of the lymphatic system of the lungs which has lately been brought to comparative completeness by the anatomical researches of my colleague at the Brown Institution, Dr. Klein; for it was by Knauff's experiments* on the effects of a smoky atmosphere on dogs that the manner in which smoke particles find their way through the pulmonary epithelium, and thence into the network of superficial lymphatics, that the course and distribution of these channels first began to be understood. In the pulmonary mucous membrane, we have, then, a second unguarded portal by which morbific particles can enter the animal organism.

GERMLESSNESS OF HEALTHY LIVING TISSUE.

These considerations lead us to another question, which lies nearer to the object we have in view in these lectures

* Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal*.

* See my paper on Artificial Tuberculosis, in the *Report of the Medical Officer of the Privy Council for* 1868.

—the elucidation of the relation of bacteria to disease. From experiments made in 1871, I came to the conclusion, that the blood and tissues of healthy animals were barren; that is, that, when subjected to conditions of temperature favourable to the development of microphytes, no such organisms were developed in them, provided that they were protected from external contamination. The general truthfulness of that conclusion has been confirmed by better and more exact experiments than mine, so that "barrenness" may now be accepted, as regards muscle and blood, as a criterion of health. But, from recent experiments which have been made at Heidelberg, under the direction of Professor Kühne,* and which I have lately repeated a good many times, following his method exactly, it appears that the negative property of germlessness is not one which belongs to all organs, and that, in particular, those parts of the animal body which are in closest proximity to absorbing mucous membranes are most liable to be found pregnant with microphytic life when tested by suitable methods. Kühne's mode of experiment is as follows. An animal having been killed by opening a large artery, the organ of which the germlessness is to be tested is rapidly exposed, and a small bit cut out with a sharp scalpel, to which a previously boiled silk cord is attached. The preparation is then, without a moment's loss of time, dipped in paraffin at 120 deg. to 130 deg. cent. (about 250 deg. to 260 deg. Fahr.), and immediately afterwards withdrawn, allowed to cool, and again dipped. This process having been repeated several times, it is finally plunged into paraffin at a lower temperature (52 deg. cent. = 125·6 Fahr.), and allowed to remain until the whole mass (which is contained in a paper box like that used by histologists for "embedding") is cool. The thread having been burnt away, the whole is covered by an additional layer of paraffin, and the cake is placed in the "warm chamber" at a temperature of 30 deg. cent. (86 deg. Fahr.) In this process, the surface-layer of the embedded bit of tissue is of course cooked, *i.e.*, its albumen is coagulated, but the interior remains unaltered. If the tissue be germless, it remains free from organism, and is found to be so when the preparation is examined microscopically after remaining four or five days in the chamber. I place before you several such cakes of paraffin, some containing muscle, others liver, kidney, or spleen. I cannot assert that any of them are free from organisms, but it is quite possible that that of muscle may be. As regards the others, I will answer for it that all are full of bacteria—bacteria, be it understood, of which the germs unquestionably did not enter after death—germs which existed and retained their latent vitality in the living tissue. Muscle and blood, if healthy, are germless; liver and spleen never are.†

The experiment I have been describing is by no means the only one by which it can be shown that blood and muscle are germless. As regards blood, the earliest is that of Professor von Recklinghausen, to which, it may be remembered, Professor Tyndall referred in his famous lecture on Dust and Disease. This consists simply in allowing blood to flow from an artery into a platinum capsule which had been heated to redness and allowed to cool. It is then placed in a moist chamber, *i.e.*, a chamber of which the atmosphere is saturated, and kept at the temperature of the body, or rather below it (35° cent. = 95° Fahr.) The blood so kept remains without putrefaction for months, if protected from contamination. The coagulum first formed disintegrates; the colouring matter of the corpuscles leaves them, becomes dissolved in the liquor sanguinis, and crystallizes, if crystallizable; but, after this, no further change occurs. This method has been improved and modified by Klebs; for in the form originally devised it often fails.

Instead of using a capsule, he employs a glass tube of the same nature as the one exhibited at last lecture. When it is desired to collect a specimen of blood, the drawn out end of the tube is introduced into a vein and secured in its place by a ligature. This done, the point (which is of course within the vein) is seized by the thumb and finger and broken off. The tube being half vacuous, the blood fills a great part of it. The tube is then withdrawn, and immediately closed hermetically. The specimens of blood thus collected may be kept for any time without undergoing putrefactive change. If the blood of animals whose colouring matter is readily crystallizable be used, and the temperature be suitable, the liquid in the tube contains crystals of hæmoglobin. Most of it, however, undergoes a peculiar change, which results in the production of an amorphous coloured mass, differing from hæmatin in its insolubility in alkalies.

The other method—that of cultivation—was employed by Dr. Ferrier and myself in our original experiments in 1871. It was by it that the fact of the absence of the septic ferment in the blood was first established. Having found that all exposed liquids possessed what I then called the zymotic property—that is, the power of starting the development of *Bacteria Termo* in Pasteur's liquid—we extended our inquiries, not only to other animal liquids, but also to healthy tissue, and concluded that all the liquids and tissues of the body are germless.*

(*To be continued.*)

* Tielgel, Ueber Coccobacteria septica im gesunden Wirbelthierkörper. (Virchow's *Archiv*, vol. lx, p. 453.)

† It is desirable to note that in the experiments I have myself made with reference to the germlessness of muscular tissue, that of the dog was used. In substituting muscle of the rabbit, I have failed. I believe this stands in relation with the observed proneness of the latter animal to traumatic infection as compared with the immunity of the former.

* Under conditions not as yet sufficiently known, organic forms, probably allied to bacteria, are met with in the blood of healthy persons. About three years ago, a discovery was made simultaneously by Dr. Ferrier and by Dr. Lostorfer, of Vienna, that in certain individuals bodies exist in the blood which in form resemble sarcina. They are to be found in blood which has been received into calcined tubes with all the necessary precautions. If such tubes are kept at the temperature of the body for a week or two, they are found to multiply rapidly. This observation has been confirmed by Cohn (*Beiträge, loc. cit.*, p. 223). A still more remarkable observation was made by Dr. Osler in my laboratory two years ago. He found that in the blood of certain apparently healthy persons, peculiar aggregations of pale particles of extreme minuteness, but definite form, existed in considerable numbers. These were studied under the microscope, on a stage of which the temperature was maintained at 38° (about 100° Fahr.), and exhibited a series of changes, all of which are carefully figured in his paper (*Proceedings of the Royal Society*, No. 153). In short, each aggregation resolved itself in the course of half an hour or an hour into individuals, each of which possessed the power of active locomotion.

CHLOROFORM AND ACONITE LINIMENT.†

Take of Chloroform	2	fluid ounces.
Tincture of Aconite Root	2	„
Soap Liniment . . .	12	„

Mix them.

This preparation has been in use many years in Baltimore under the names of "chloroform liniment," "compound chloroform liniment," and "chloroform and aconite liniment." It differs from the formula of the U. S. Pharmacopœia of 1870, which is as follows:—

Take of Purified Chloroform .	3	troy ounces.
Olive Oil	4	„

Mix them.

† From the Report of the Committee on Unofficinal Formulas to the American Pharmaceutical Association.

The Pharmaceutical Journal.

SATURDAY, MARCH 20, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF FOOD AND DRUGS BILL.

THE "Adulteration of Food and Drugs Bill," or, as it is now less ominously designated, "The Sale of Food and Drugs Bill," ordered by the House of Commons in Committee to be reprinted with amendments, has now been issued and is set down to be recommitted on Friday the 19th inst. The original Bill was printed at p. 675; but it has undergone considerable modifications.

These modifications have been the result of the nearly unanimous opinion of the public press that unless considerable amendments were made in Committee the Bill would, in the words of Dr. PLAYFAIR, relieve traders from what they considered hardships at the expense of the public. Referring to the provision that there should be evidence of guilty knowledge, as implied by the occurrence of the word "knowingly" in several places, the *Times* remarked that the public cannot allow the retail dealer to "evade his responsibility on any plea of innocence or ignorance." The *Lancet* said "One would think the Bill had been drawn up by a conclave of adulterating manufacturers, who while professing the desire to afford the public some protection against adulteration, yet contrived that the measure should cover nearly every form and species of adulteration." The *Medical Times and Gazette* was of opinion that it had "too evidently been drawn in the interests of trade." The *Medical Press and Circular* stigmatized the Bill as "The Fraudulent Traders' Protection Bill." It was also severely condemned by the *Saturday Review*, and the feeling of a large portion of the public was no doubt represented by the following words of the *Pall Mall Gazette*:—

"It is to be hoped that Conservative reaction will not take the form of undoing the little that has been done for the protection of the public against adulterated food. Such a policy will, no doubt be greeted with frantic applause by a large number of dishonest and disreputable traders, but it will create a very disagreeable impression in thousands of households where even under the working of the present imperfect machinery of the Adulteration Act, pure milk is now thankfully drunk as a pleasing novelty, and will not be relinquished without a feeling of intense disgust and dissatisfaction."

Numerous notices of amendments to be moved upon going into Committee on the Bill were put upon the notice paper, and it soon became evident that it would be a loss of time to discuss the Bill in its original form. It was, therefore, ordered to be reprinted in order to give the Government an opportunity of adopting such of the suggested amendments as it might think advisable. It will be useful here to indicate the more important alterations of the Amended Bill which have been adopted by the Government, as well as those proposed omissions and insertions of which notices of motion have been given.

As has been before mentioned, the title of the Bill has been altered to "The Sale of Food and Drugs Bill." The sphere of its proposed operation, also, which was previously limited by clause 2, has, by the omission of that clause, and the insertion of the necessary provisions in other clauses, been extended to Scotland and Ireland, sheriff substitutes or magistrates in the former country and divisional justices in the latter being now included in the interpretation of the term "justices." Moreover, an addition has been made to the statutes which are to be repealed, in the 33 & 34 Vict. c. 26, s. 3, or the section of the Sale of Poisons (Ireland) Act, extending the Adulteration Act, 1852, to medicines sold in Ireland. The other statutes proposed to be repealed are the Adulteration Acts of 1860 and 1872, and the section of the Pharmacy Act, 1868, extending their provisions to the sale of medicines.

In clause 3 (now 2) the former extremely faulty definition of "food" as "every article *eaten or drunk* by man other than drugs," is altered to "every article *used for food or drink* other than drugs," and this is decidedly an improvement. Mr. STANHOPE proposes to add the words "or water." In clause 4 (now 3) the word "knowingly" is still retained in the Amended Bill in respect to the mixing of injurious ingredients with articles of food and also in respect to the sale of such mixed articles; but Dr. PLAYFAIR has given notice of his intention to move the omission of the word in the first case, and Dr. CAMERON intends to move its omission in the latter case also. The same remarks apply to clause 5 (now 4), where the word "knowingly" is retained in respect to the mixture of drugs with injurious ingredients and to the sale of the same, and notice of motion for its omission in both places has been given.

Clause 6 (now 5), has been much altered. In the first line the words, "No person shall *knowingly* sell any article of food or any drug which is not of the nature, substance, and quality of the article demanded," are altered to "No person shall sell *to the prejudice of the purchaser* any article of food which is not," etc. The word "harmless" is inserted, to qualify the exception as to matter mixed for rendering articles of food portable or for preserving them. The very elastic exception of admixtures, "according to the usages of trade," which was so sharply criticized on the second reading has been expunged, and the same fate has attended the exception in respect to spirits reduced from their ordinary strength. An improvement of considerable importance has been made in the exception in favour of articles unavoidably mixed with extraneous matter, by the addition of the words, "in the process of collection and preparation;" an alteration which, we believe, is due to the representations of the deputation from the Council of the Pharmaceutical Society that recently waited upon Mr. CLARE READ. A provision, however, is retained, that no article shall be deemed to be within any of the exceptions if the admixture exceeds what is required for the purpose referred to.

The first portion of Clause 7 (now 6) is entirely new, and it provides that no person shall sell any compound article of food which is not composed of ingredients in accordance with the demand of the purchaser, under a penalty of twenty pounds. This clause, if retained, would have a very wide scope, and might possibly affect the sale of some popular remedies which are made up according to different formulæ in different localities. But it, doubtless, could be made to meet the grievance of the recent deputation of hop-growers to the Local Government Board, as to the alleged sale of beer containing other bitter substances than hops. The latter part of the clause, which, as it originally stood, might have been construed to interfere with the sale of proprietary (not patent) medicines, or the sale of non-official compounds, has been modified by words allowing the sale of drugs compounded "in accordance with the demand of the purchaser," and "in accordance with the provisions of the Pharmacy Act." The references to the regulations prescribed by the British Pharmacopœia, and to a "basis to be laid down by the Pharmaceutical Society or the Privy Council" are retained, but no mention is now made of the Local Government Board. Further, no explanation is given as to the nature of this "basis," or when it is to be "laid down," or whether the Pharmaceutical Society and the Privy Council are to act jointly or independently in the matter. These two clauses are so important, and have undergone so much alteration that it will be as well to give them in full as they now stand:—

"5. No person shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance, and quality of the article demanded by such purchaser, under a penalty of twenty pounds, except as herein excepted and provided; that is to say, except—

"Where any harmless matter or ingredient is mixed therewith for the purpose of rendering it portable or palatable, or of preserving it, or of improving its appearance;

"Where it is the subject of a patent in force, and is supplied in the state required by the specification of the patent;

"Where a drug is compounded as hereinafter described;

"Where the article is unavoidably mixed with some extraneous matter in the process of collection or preparation.

"Provided that no article shall be deemed to be within any of the exceptions above set forth, if the matter or ingredient mixed exceed what is required for the purpose referred to."

There is yet another alteration of this clause proposed by Mr. SANDFORD, who has given notice of his intention to move the addition of words providing that when a person has been fined for the sale of an article of food or drug to the prejudice of the purchaser, without knowing it to be of a different nature or quality from that demanded, he may recover his costs with damages from the dealer from whom he may have received the article.

"6. No person shall sell any compound article of food which is not composed of ingredients in accordance with the demand of the purchaser, under a penalty of twenty pounds.

"No person shall sell any compounded drugs except the same shall be compounded in accordance with the demand of the purchaser, or with the prescription in writing of a registered medical practitioner, or with the regulations prescribed by the British Pharmacopœia issued by the General Medical Council, or with a basis to be laid down by the Pharmaceutical Society or the Privy Council, or in accordance with the provisions of the Pharmacy Act, 1868, under a penalty of twenty pounds."

Clause 8 (now 7) referring to the labelling of mixed substances, although re-written, remains substantially the same. But Mr. ALEXANDER BROWN has given notice that he will move the addition of words making it no offence if the mixed article be supplied from a receptacle clearly marked so as to indicate that the article contained in it is mixed and placed where the purchaser may read what is marked thereon.

In clause 9 (now 8) referring to the abstraction of any part of an article before sale and selling without notice, the word "knowingly" is omitted in both places, whilst the penalty is increased from "ten" to "twenty" pounds.

Clause 10 (now 9) stands unaltered in the amended Bill, with the exception of the additions necessary for the extension of the Act to Scotland and Ireland, by which the approval of analysts is in the former country vested in "one of Her Majesty's Principal Secretaries in Scotland," and in the latter in "the Local Government Board of Ireland." A very important amendment to this clause, however, will be moved by Dr. PLAYFAIR, and one that will, in the majority of cases, prohibit the appointment of a pharmaceutical chemist to the office of public analyst. It consists in the insertion, after the provision for the appointment as analysts of "persons possessing competent knowledge, skill, and experience," of the words, "provided that such analysts be not engaged in the trade of buying or selling any article of food or drugs." This amendment is so directly contrary to the tendency which has been manifested on the part of local authorities to utilize the special qualifications of the pharmaceutical chemists for the office, and, if adopted, would have such an effect in still further increasing the acknowledged paucity of persons properly qualified for the post, that it is to be hoped a vigorous opposition will be offered to its incorporation in the Act. And this is the more necessary as the obvious assumption upon which the proposed amendment is based has no good foundation, since if proper arrangements are made, as we have on previous occasions pointed out, it is not at all necessary or advisable in any case that the analyst should know the sources of the articles he is called upon to analyse.

The provision in clause 12 of the original Bill (now clause 11) which, in the event of a purchaser requiring an analysis in a district where an analyst has not been appointed, made it compulsory upon the analyst of a neighbouring district to perform the analysis for a sum "not more than ten shillings and sixpence," is now made dependent upon the payment of "such sum as may be agreed upon." The limitation of ten shillings and sixpence is however retained as the payment for analyses of purchases made within the district for which the analyst is appointed. Further, the provisions of the clause are extended to comprise "drugs" as well as "articles of food."

The next six clauses of the original Bill remain unaltered, with the exception of such change as is implied by the insertion of the word "forthwith" in clause 14 (now 13) in the provision for dealing with the sample when purchased. Mr. MUNTZ is to move the addition of words providing that one portion of the sample shall be submitted to the analyst "within seven days, or if perishable articles, forthwith;" and Dr. LYON PLAYFAIR will move the omission of the words leaving the analysis to the inspector's discretion. Another amendment is to be moved by Mr. PELL, by adding to clause 19 (now 18) words providing that the authority appointing the analyst shall annually transmit to the Local Government Board a return of the number of articles analysed, and shall be entitled to receive out of moneys provided by Parliament for the purpose the sum of five shillings for each analysis towards the expense of carrying out the Act. Mr. MUNTZ will move the insertion of a proviso in clause 20 (now 19) that proceedings shall be taken within twenty-one days of service and that a summons shall not be returnable in less than seven days from date of service.

Clause 20 (now 19) has certain alterations, rendered necessary by the extension of the Bill to Scotland and Ireland; the next clause remains unaltered.

Clause 22 (now 21) is a clause that certainly still requires reconsideration. As it originally stood it limited the power of justices, in the event of a disputed analysis, to referring it to "the analyst of *an adjoining* district." These words are altered to the "analyst of *another* district," and they would therefore limit the reference to persons holding the post of public analyst. Irrespective of the evident fact that it may sometimes be advisable to have the independent opinion of an analyst not holding a public appointment, it is palpable that by such a provision the best advice in a crucial case might be thus rendered unavailable, and, moreover, a decided injury would be inflicted upon the unofficial analysts as a body. However, it is probable that this result is not intended by those who have charge of the Bill, and that a suitable modification could be obtained by proper representation. Two notices of amendment to this clause have already been given. One is by Mr. PELL, to the effect that the reference shall be to persons appointed by the Commissioners of Inland Revenue, and the other, by Sir HENRY PEEK, that it shall be to the Inland Revenue Department, Somerset House, whose certificate is to be final. Sir HENRY PEEK has also another notice of amendment to make it compulsory upon a Court hearing an appeal to award reasonable costs.

With the exception of certain necessary additions in respect to Ireland and Scotland no further alteration has been made in the subsequent portion of the Bill as reprinted, until clause 27 (now 26) is reached, where to the punishment of two years' imprisonment with hard labour for forging a certificate of warranty, are added penalties of twenty pounds each for the offences of "wilful misapplication of warranty," "false warranty," and "false label." The only other alteration of importance is the provision that, in Scotland, the expenses of executing the Act shall be borne by the "police money in counties and boroughs respectively," and in Ireland "by the grand jury cess."

There are, however, two or three important notices of amendments yet to be mentioned. Mr. SANDFORD proposes (clause 24) that where a case is dismissed on the production of a warranty, it shall be lawful for the justices to summon the dealer who has given the warranty. Sir HENRY PEEK proposes (clause 29) that tea proved to be in the same condition in which it passed the Customs shall not render the vendor liable to penalties; and Mr. MUNTZ proposes that tea once examined and allowed to pass out of the Custom House shall not be returned into bond. Finally, Mr. THOMAS HILL proposes that in a certificate relating to milk, butter, or any article liable to decomposition, the analyst shall specially report whether any change had taken place in the constitution of the article that would interfere with the analysis.

We take this opportunity of referring our readers to a letter from Mr. WIGNER, at page 759, in which he repudiates the statement he is reported in the *Chemist and Druggist* of the 15th inst. to have made at a meeting of the Social Science Association last week. We trust that in reference to what was reported to have been said by another speaker on the same occasion there may have been a similar inaccuracy, for the assertion of Dr. DUPRÉ that "with the exception of the milk trade, I know of no class who have practised adulteration to such an extent as pharmaceutical chemists," conveys an imputation entirely without any foundation save one that would be, to say the least, uncomplimentary to the speaker.

SATURATED SOLUTION OF CAMPHOR.

A LETTER from "A PHYSICIAN," which appeared in the *Times* of the 5th inst., has recalled attention to the danger attending the use of a saturated solution of camphor which is in very general use as a domestic remedy for colds and other trifling ailments, and is sold under the name of "concentrated solution of camphor," "Rubini's saturated solution of camphor," or "mother tincture of camphor," frequently without any intimation by label or otherwise of its potent properties. The subject was brought before the Clinical Society in November, 1873,* by Dr. GEORGE JOHNSON, who described some cases where serious symptoms of poisoning followed the incautious use of the remedy, and those cases have since been supplemented by several others, published in the medical journals. We think this subject has an interest for chemists and druggists in a more special sense than was alluded to in the discussion that followed the publication of Dr. JOHNSON'S paper in this Journal which turned principally upon the extra-pharmaceutical question of the rival claims of the homœopathic and allopathic systems of medicine. As there are, no doubt, many pharmacists who are now called upon to supply this preparation, it is of much greater importance to them to agree as to the manner in which it should be sold; and, after the evidence that has been given, there can be little doubt as to the advisability of using a "caution" or even a "poison" label. We are given to understand that this is done by some pharmacists.

"A PHYSICIAN" asserts that this saturated solution of camphor in spirit is in its poisonous potency quite equal to the prussic acid of the Pharmacopœia and four times as powerful as an equal quantity of laudanum, and he points out the danger of its being mistaken for the much weaker solution of the Pharmacopœia, which contains only one-seventh the quantity of camphor. He further states that the taking of 15 to 25 drops of that solution has been followed by epileptic convulsions and apoplectic stupor. The correctness of this opinion was questioned on the following day by Dr. BREE, of Colchester, who stated that he had taken 3 grains of camphor for ten consecutive nights without any other result than a beneficial one. "A PHYSICIAN" replied in another letter that to compare the action of camphor in the solid state and in spirituous solution was misleading, for when the spirituous solution is mixed with the fluids of the stomach the camphor is precipitated in a state of minute subdivision and is more rapidly absorbed, and he alluded to the much smaller relative dose of the solution given in the Pharmacopœia. In this opinion he was also confirmed by a letter from Prince LOUIS-LUCIEN BONAPARTE, who made, some years ago, a therapeutico-chemical research on camphor.

The *Medical Times and Gazette* is of opinion that the fact that a preparation of such poisonous potency can be sold without any warning of its noxious properties is a grave danger, and suggests representations by the Medical Council to the Privy Council as to the advisability of placing it on the list of "poisons." The *British Medical Journal* says, "This homœopathic solution of camphor is as actively poisonous, drop for drop, as the prussic acid of the Pharmacopœia, and we maintain that any chemist who sells it without labelling it as 'poison' should be as liable to censure and to penal consequences as if he sold prussic acid, or the much less powerful laudanum, without a poison label."

* See PHARM. JOURN., vol. iv., p. 402.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

March 17th, 1875.

Present—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Hills, Linford, Martindale, Moss, Schweitzer, Southall, Taylor, and Umney.

Dr. Greenhow was also present on behalf of the Privy Council.

MAJOR EXAMINATION.

Eight candidates were examined, of whom *one* failed. The following *seven* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Riley, Charles Reynolds ....London.
Twemlow, Francis Ernest ......London.
Radford, John Storer ....Nottingham.
Dutchman, Walter ....London.
Draper, James William ....Malmesbury.
Hillier, Henry ....Newport, Monm.
Brown, William Braithwaite ...Preston.

MINOR EXAMINATION.

Twenty-one candidates were examined, of whom *eleven* failed. The following *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barrett, Josephus Teague ......Devonport.
Case, William ....Norwich.
Franciosi, Eugène Auguste de...London.
Green, George ....Thetford.
Williams, William Thomas......Fairwater.
Cross, John Thomas.............. Dover.
Pasmore, Walter Frank ....London.
Leslie, George ....York.
Berry, Henry Burton ....Gloucester.
Vernon, William Henry ....Boston.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned *seven* certificates were received in lieu of the Society's Examination:—

Certificates of the College of Preceptors.

Buck, Charles Burton ....Sandgate.
Cock, James ....South Molton.
Gower, Joseph Read...............Tunbridge.
Taylor, Samuel M. ....Notting Hill.

Certificate of the Society of Apothecaries.

Chapman, Harry Dugard ......Brierley Hill.

Certificates of the University of Cambridge.

Carvell, John Maclean......... ..London.
Steward, Alfred ....Great Yarmouth.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The first monthly meeting of this Association for the present session was held at the rooms, Tudor Place, on Wednesday evening, March 10th, Mr. H. W. Maleham, President, in the chair. After the usual routine business, Mr. W. Ward, F.C.S., read a paper on "Our Interests as a Trade Association." The speaker said that of all the schemes put forth by that Association none had produced any real practical or permanent result. The title of "Pharmaceutical and Chemical" had been assumed by them, several courses of scientific lectures delivered, museum specimens collected, and a host of other requisites obtained. Yet it was a lamentable fact, so far as the question of education was concerned, all attempts in that direction had signally failed. The time, however, had come when they would do well to pause and consider whether they had not lost sight of the main principle of association as applied for the purpose of advancing the interests of commerce and supporting those engaged in the trade against the aggression which had befallen many of their *confrères*. After advocating free trade principles as essential elements of modern political economy, and as being the only sound basis upon which the Association should be governed, he objected to any system which would entirely abolish mental culture; for whilst he had chosen the subject of trade interests, he maintained they ought to make that association conducive to the educational advancement of those who came under its influence, and although it was proposed to strike out afresh and pursue a plan wholly different from that hitherto followed—a course he heartily supported—yet he trusted one tendency of the Association would ever be to *elevate*, rather than dwarf the standard of proficiency of those engaged in pharmacy. He instanced several recent cases of prosecutions under the Adulteration Act, mainly attributable to the misinterpretations and blunderings of magistrates; and whilst believing the new Bill would tend greatly to remedy many of the evils which had arisen out of ill-advised and absurd precautions, he expressed a hope that its tendency would not be to retrace steps which in principle were undoubtedly in the right direction. Having next drawn attention to infringements of the Pharmacy Act, he said the sub-committee had already done some good, and had now set out with the full determination of investigating every case brought under its notice. He expressed much regret that the Council in London had not supported the Association in matters of that kind as it might have done. If the Committee appointed for the purpose obtained all necessary information of cases of infringement about which there would be no doubt, he held it was the duty of the Parliamentary Committee to take action at once without their apathy having to be aroused by repeated applications often of long duration, as that Committee would bear him out had not unfrequently been the case. He next dwelt upon the subject of prices, feeling sure it was the desire of a great majority of the trade to arrive at some better understanding. He was well aware it would be somewhat difficult to fix a uniform rate of charge, owing to the circumstances of various neighbourhoods and their demands differing so greatly. It was, however, certain that dispensing prices might be made more equable, and he submitted that for small quantities of dispensed medicines the charges generally made were much below their value, that taking into consideration the time, and care, and responsibility involved, especially in many of the prescriptions of the modern physician, they ought to adopt some scheme whereby to obtain more reasonable and remunerative charges. After urging the importance "to play the man," and call all articles of commerce in which they dealt by their proper names, and not have recourse to the expedients of the quack and showman in order to realize a beggarly livelihood, he concluded by an earnest appeal for full and free discussion of the subjects which had been brought before them as the only means of arriving at the true object he had in view.

At the conclusion, a very interesting discussion occurred on the topics alluded to by Mr. Ward, which resulted in a resolution being carried, moved by Mr. Preston and seconded by Mr. Cocking:—

"That a circular be issued to the members of the trade throughout the town, with a view to the adoption of a recognized charge being made for the dispensing of prescriptions."

After a very cordial vote of thanks had been accorded to Mr. Ward for his very interesting paper, the President announced that at the next monthly meeting of the Association, Mr. Ellinor would introduce the "Milk of Sulphur" question for debate.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The fifth ordinary monthly meeting of the session took place on Wednesday evening, March 10th.

Mr. G. S. Woolley occupied the chair.

The names of twenty-nine new members and twenty-two associates were read by the Secretary, and these gentlemen were duly elected.

Mr. Louis Siebold delivered the fifth of his special course of lectures on the detection of adulteration of common articles of food and drink. There was a large attendance.

In opening his lecture, Mr. Siebold referred to the voluminous literature on tea and its adulterations, and stated that, as he had only one evening to devote to the treatment of this subject, it would be impossible for him to do justice to the researches of Péligot, Zöller, Allen, Wigner, Wanklyn, and others. He must therefore remind his audience of his intention to confine himself, as he had done in the preceding lectures, to the description of such processes and tests as could be readily applied by the average pharmacist. The botanical characters of the tea should be first noted, and for this purpose a number of the leaves should be softened in hot water and then spread out, so as to admit of an examination. The notch at the apex, the marginal serration which stops short at some distance of the petiole, the almost parallel veins which run from the midrib and turn before reaching the boarder, and the characteristic space between the two cells of the stomata would enable the analyst to recognize the true tea leaf and to distinguish it from foreign leaves which may be present in the sample.

The chemical examination should begin with an estimation of the ash by incinerating about one gramme of the tea, dried at 100° C., in a platinum crucible. A pure tea rarely leaves more than 6 per cent. of ash and a residue amounting to more than 8 per cent. would indicate an adulteration with mineral matter. If 8 or more than 8 per cent. of ash be left, the result should be confirmed by boiling a larger quantity of the tea (about 50 grammes) with water, taking out the leaves from the decoction, collecting the sediment on a filter, and weighing, after washing, drying, and igniting it. Ironfilings and magnetic oxide of iron may be detected in the tea by a magnet, or in the sediment from the decoction by chemical means. The presence of small quantities of iron in the ash of tea, however, is no proof of an adulteration, as this metal is one of its normal constituents. Prussian blue is very commonly used in the facing of green tea, and may be detected by treating the tea with water to remove the facing, treating the sediment with solution of $NaHO$, filtering, and testing the filtrate for ferrocyanide by Fe_2Cl_6 which would produce a blue precipitate. The portion of the sediment insoluble in $NaHO$ may be washed and tested for china clay, French chalk, etc. Soluble iron salts such as ferrous sulphate are sometimes mixed with tea, in order to produce a dark-coloured infusion.

They may be detected by treating the tea leaves with water acidulated by acetic acid, filtering and testing the filtrate with ferrocyanide of potassium. Carbonate of sodium and carbonate of potassium are likewise mixed with tea with the object of giving a darker colour and therefore a fictitious appearance of strength to the infusion; the former may be recognized by the persistent yellow flame produced by heating the ash on platinum-wire in the flame of a Bunsen's burner; the latter by the increased alkalinity of the soluble ash. In pure tea leaves the alkalinity of the soluble ash amounts to 1·3 to 1·9 per cent. as calculated for K_2O.

As pure tea yields from 5 to 6 per cent. of ash, of which at least 3 per cent. is soluble in water, and as spent tea leaves leave only about 3 per cent. of ash, of which about 0·5 per cent. is soluble in water, the presence in a sample of tea of less than 5 per cent. of mineral matter, and of less than 3 per cent. of soluble mineral constituents, would point to an adulteration with exhausted tea leaves. Again, if the total amount of ash be high (more than 6 per cent.) and that of soluble ash abnormally low (below 3 per cent.), this would show an adulteration both with mineral matter and exhausted tea leaves.

The determination of the extract is the next important operation. Ten grammes of the powdered tea leaves are boiled with 250 c.c. grammes of water in a glass flask for at least half an hour and the exhausted leaves boiled a second time with the same quantity of water. To make up for loss by evaporation sufficient water is now added to the united decoctions to make up the weight to 500 grammes. Fifty grammes of the clear mixture are next evaporated in a platinum dish at 100° C. and the residue dried until it ceases to loose weight. Pure teas yield from 32 to 50 per cent. of dry extract, and certainly never less than 30 per cent. A smaller percentage than the last named would therefore indicate the presence of spent tea in the sample examined. A very good tea, containing from 45 to 50 per cent. of extractive matter, might, however, be adulterated with spent tea, so that the mixture would yield fully 30 per cent. of extract, and in such a case the mere determination of the extract would throw no light on the adulteration.

The lecturer then described Mr. Allen's process for the estimation of tannin, by means of a standard solution of acetate of lead. The latter is made by dissolving 5 grammes of pure acetate of lead in water and diluting the solution so as to measure a litre. The indicator is made by dissolving 1 part of ferricyanide of potassium in 1000 parts of water and mixing the solution with an equal bulk of strong liquor ammoniæ. Two grammes of the powdered tea are repeatedly boiled with water until completely exhausted, and the strained and united decoctions made up with water to 250 c.c. Ten c.c. of the lead solution are now diluted with 90 c.c. of water, and to this mixture the decoction of tea is added from a burette until all the lead is precipitated, or until a filtered drop of the mixture turns red on the addition of one drop of the indicator, thus showing that a slight excess of tannin has been added. The number of c.c. of the decoction required contains 0·01 grammes of tannin. In green teas the quantity of tannin amounts to about 20 per cent., but it is subject to considerable variation. In black teas, however, it is much more constant, and may be pretty accurately taken as 10 per cent. The average percentage of tannin in spent tea being only 2 per cent., the above test affords a ready and reliable means of detecting and estimating this adulterant. If T represents the percentage of tannin found in the sample of tea, the percentage of spent tea present would be $\frac{(10-T)\,100}{8}$. Having given an experimental illustration of this volumetric process, the lecturer explained Mr. Estcourt's method for the separate determination of tannic and gallic acids in tea, as described in the *Chemical News*, vol. xxix. p. 109. In his opinion, however, a separate estimation of the two acids, though very interesting from a purely chemical point of view, did not possess any practical advantage.

Mr. Siebold will deliver his next lecture, the last of the series, on Food Analysis, on April 14th.

BRISTOL PHARMACEUTICAL ASSOCIATION.

At the meeting of the above Association in January, a Paper on Essential Oil of Cherry Laurel, by Dr. W. A. Tilden, was read; also one on the Presence of Lead Iodide in Syrup of Iodide of Iron, by Mr. W. A. Shenstone. These papers will be printed in an early number of this Journal.

At the last monthly meeting of the Association, Mr. Thomas Bolas, F.C.S., of Charing Cross Hospital, delivered an interesting lecture on Coal Tar and Coal Tar Colours, with experimental illustrations.

At the meeting to be held next week, Dr. Spencer, of Clifton, will deliver an Address on "Pharmacy in its Relations to Modern Medicine."

Proceedings of Scientific Societies.

PARIS SOCIÉTÉ DE PHARMACIE.

At a meeting of the above Society held on Wednesday, the 3rd of February, under the presidency of M. Planchon, a note from M. Schlagdenhauffen was read, on the estimation of a mixture of arsenious acid and oxide of antimony. It stated that by dissolving a determined weight of such a mixture in water containing Rochelle salt and an alkaline carbonate, and adding a small quantity of indigo, the relation which exists between the arsenic and the antimony may be determined by means of a titrated solution of hypochlorite of soda. The first effect of the reaction is to convert the arsenious acid into arsenic acid and the oxide of antimony into antimonic acid, and it is not until after this double change has taken place that the chlorine contained in the hypochlorite commences to attack the indigo; consequently in the decoloration of the solution there is a clear and precise measure of the reaction that has taken place. M. Schlagdenhauffen has found by experiment that, as might be expected, the consumption of hypochlorite varies according to the relative proportions of the arsenious acid and oxide of antimony. It is, therefore, sufficient to note exactly the quantity of hypochlorite solution used, and the quantitative result to which it corresponds may be ascertained by a simple calculation.

M. Méhu remarked that having had to examine an alleged definite compound of arsenite of antimony, he was enabled to separate the arsenious acid by the simple action of strong alcohol.

A letter upon silphium, from M. Stanislas Martin, having been read, M. Planchon recalled the memoir of M. Oersted* upon the same question, and stated that he did not think it could be affirmed that the *Silphium Garganica* was the silphium of the ancients. According to coins upon which the plant was delineated, there appeared to be no doubt that the plant was a *Ferula*.

M. Desnoix said that he had received from Algeria an inactive *Thapsia* resin, which he thought was attributable to the existence in that country of two very similar species of *Thapsia*.

M. Lefranc said that during a residence in Algeria he had ascertained that the resin prepared from the fresh root is much more active than that obtained from the dried root. He exhibited to the Society specimens of *Thapsia Garganica*, and another species of *Thapsia*, and he expressed an opinion that the plant would gradually disappear from Algeria, whilst attempts to reproduce it by cultivation, judging from experiments made, would give unsatisfactory results.

* See *Pharmaceutical Journal* [3], vol. iii., p. 1012.

Parliamentary and Law Proceedings.

Strange Case of Poisoning.

On Monday, March 8, an inquiry was held at Cockermouth into the circumstances attending the death of Isabella Bell, aged 53 years. It appeared from the evidence that the deceased had been found asleep on the roadside, by some persons to whom she represented that she had missed a train. One of them took her in, gave her some tea, and arranged that she should pass the night in her kitchen. Upon going to call her in the morning she was found to be dead. It had been noticed that she snored very heavily.

Mr. Joseph Straughton, druggist, said that a woman, answering the description of the deceased, came into his shop and asked for a pennyworth of laudanum. He gave her five drops with some peppermint and water, and she drank it in the shop. She said she was suffering from a pain in the stomach. The reason of witness giving her so small a dose was because her breath smelt of drink. She said that she had taken gin, and that it did her no good. The dose he gave her would not have caused her to sleep.

In answer to a question from the foreman (Mr. Dent) witness said that if the woman, after leaving his shop, had gone to other druggists' shops and taken seven or eight drops at each it would have had the same effect as if it had been taken in a single dose.

A Juror: I suppose you are only allowed to give them a certain quantity?

Witness: I do not know that there is any particular tie. It is left to our own discretion, and if we poison people we take the responsibility.

Mr. Robinson, druggist, said that a woman answering to the description that had been given him of the deceased, came into his shop at about six o'clock, and asked him to let her have a pennyworth of laudanum. She said she was in the habit of taking it regularly when the pains came on. She appeared to be troubled with spasms in her stomach. Witness told her he would give her thirty drops. She said, "That won't do; it will not have the slightest effect." He then added another thirty drops, which she took. The quantity would not harm her if she was in the habit of taking it regularly, but if she had not been in the habit of taking it it would cause a drowsiness. He had known of people taking three or four times as much every day, and from 220 to 240 drops was not an unusual dose.

A Juror: What is the quantity you are allowed to sell?

Witness: According to the Pharmacopœia it is from 15 to 40 drops, but people who are in the habit of using it daily may take an ounce. If the deceased had been in ordinary health, and had not been in the habit of taking laudanum, the dose he gave her would not have caused her death.

Dr. Dodgson gave evidence to the effect that if the deceased had been in the habit of taking laudanum the doses mentioned as having been given by the previous witnesses would not have killed her. There was, however, a great deal of difference between measured drops and drops counted from a bottle. If measured there would be almost twice the quantity; the proportion was 13½ counted to 25 measured. The snoring referred to by the female witness was a symptom of poisoning by laudanum.

Mr. Robinson, recalled, said he measured the drops.

Mr. Hugh de Bosco Askew, an assistant with Mr. Bowerbank, said the deceased came to the shop at about a quarter past five o'clock, and asked for laudanum. He gave her twenty drops of chlorodyne. She said she did not feel better, and he then gave her two ounces of mint water and half a drachm of sulphuric ether.

Dr. Dodgson, in answer to the Coroner, said that any one of the doses mentioned would not have done much harm, but the whole together, if the deceased was not accustomed to the use of laudanum, would cause her death, and the probability was, judging from the circumstances, that she died by being poisoned by laudanum.

The jury were again left to themselves, and on the door being re-opened, the foreman announced that they had come to the following verdict: "That the deceased died from taking two doses of laudanum and one of chlorodyne in too quick succession. The opinion of the jury is that there is no blame attached to any one."—*West Cumberland Times.*

Poisoning through a Mistake in Dispensing.

The following is reported in the *Edinburgh Daily Scotsman* for Friday the 12th inst., but the name of "Dr. Smith, druggist, Springburn Road, Glasgow," does not occur on the Register of Chemists and Druggists:—

A man named Alexander Jamieson, in the employment of Dr. Smith, druggist, Springburn Road, Glasgow, was yesterday examined before Sheriff Murray, and remitted, on a charge, it is stated, of culpable homicide. It appears that on Tuesday a man named Parker went into Dr. Smith's shop to get a powder for his child. The accused, it is alleged, had mistaken the bottles, and instead of giving the medicine asked for, supplied instead a quantity of strychnine. Parker administered the powder which he got for the child, and the result was that shortly afterwards symptoms of poisoning manifested themselves. Death resulted in a very brief period.—*Edinburgh Daily Scotsman.*

Suicide by Prussic Acid.

An inquest has been held at the Garrison Hospital, Portsmouth, respecting the death of Mr. W. C. Ellis. It appeared that deceased, who had been for some days previously peculiar in his manner, suddenly left the room where he was sitting, and returning a few minutes afterwards, threw a hexagonal purple glass bottle upon the ground, and immediately expired. Medical evidence showed that his death resulted from poisoning by hydrocyanic acid. A verdict of suicide during temporary insanity was returned.

Review.

Die Rohstoffe des Pflanzenreiches. Von Dr. Julius Wiesner.—The Raw Substances of the Vegetable Kingdom, etc.—8vo, 846 pages, and 104 chiefly anatomical wood-cuts. Leipzig: W. Engelmann.

This work concerns the druggist very little, for the author includes only those vegetable products employed as medicine whose preparation is a recognized branch of industry; at least, this is the rule he professes to have adopted, though we can scarcely agree that he has carried it out. Many drugs are included, however, because they are used in perfumery, dyeing, etc.; but the mention of several others seems to have depended upon chance. For instance, storax, balsam of tolu, castor oil, jalap, cardamoms, and asafœtida are mentioned, and, in some cases, fully described, whilst croton oil, rhubarb, senna, grains of paradise, sarsaparilla, etc., are not named. But, as the author does not undertake to provide a work for druggists, this can hardly be termed a defect. Opium, aloes, cinchona bark, catechu, castor oil, etc., are pretty fully described, though not so minutely as in pharmacographical works. The chapter on opium is chiefly from Flückiger's 'Pharmacognosie.' To aloes four pages are devoted, and under the head of catechu group, we have the various kinds of catechu, gambir and kino.

The chapters on fibres, gums, resins, barks, etc., are much more detailed. Taking the first, on gums, as an example, the matter is divided thus · physical properties, chemical properties, origin (secretion) of gum in plants, sources of gums, special consideration of the various kinds of gum. The different substances described are brought under twenty heads, but the arrangement is not so convenient as it appears at first sight. Fibres, fats, starch, woods, etc., have separate chapters devoted to them; but dyes and substances employed in tanning are scattered, some under barks, others under seeds, fruits, leaves, woods, or galls. This would not be of great importance if the index were more complete. In fact, it would be difficult to devise a classification not open to criticism on some point.

We can strongly recommend this work, as it is very complete and accurate, so far as it goes, and is brought up to a very recent date in its information. The references to other works that have been drawn upon are very numerous, and constitute a useful feature of the work. The chapter on the anatomical structure and identification of various fibres is exceedingly interesting, as is also that on starch. The botanical portion is limited to the names, and is generally very correct. After using the book for some time, we have seen very few blunders. Exogonium, however, is spelt Exogossium, both in the index and the body of the work. A few recent determinations do not appear, but that is accounted for by the fact that the first part of the book was printed early in 1872.

A similar work in English would be very welcome.

Notes and Queries.

[432]. PRESERVATION OF FLOWERS.—Will any reader inform me how to preserve flowers in their natural shape?—J. E. Roberts.

*** The following description of the process appeared in the *Pharmaceutical Journal*, [2], vol. vii., p. 36:—A vessel, with a moveable cover, is provided, and having removed the cover from it, a piece of metallic gauze of moderate fineness is fixed over it, and the cover replaced. A quantity of sand is then taken sufficient to fill the vessel, and passed through a sieve into an iron pot, where it is heated, with the addition of a small quantity of stearine, carefully stirred, so as to thoroughly mix the ingredients. The quantity of stearine to be added is at the rate of half a pound to one hundred pounds of sand. Care must be taken not to add too much, as it would sink to the bottom and injure the flowers. The vessel with its cover on, and the gauze beneath it, is then turned upside down, and the bottom being removed, the flowers to be operated upon are carefully placed on the gauze and the sand gently poured in, so as to cover the flowers entirely, the leaves being thus prevented from touching each other. The vessel is then put in a hot place, such for instance as the top of a baker's oven, where it is left for forty-eight hours. The flowers thus become dried, and they retain their natural colours. The vessel still remaining bottom upwards, the lid is taken off, and the sand runs away through the gauze, leaving the flowers uninjured.

Obituary.

Notice has been received of the death of the following:—

On the 14th March, 1875, Mr. John Parnell, Pharmaceutical Chemist, Peterborough. Aged 71. Mr. Parnell was a Founder of the Pharmaceutical Society, and acted as one of its Local Secretaries for many years.

On the 18th February, 1875, Mr. John Bennett, Chemist and Druggist, of Shaftesbury, Dorset. Aged 55.

On the 23rd February, 1875, Mr. William Wilson, Chemist and Druggist, of Hull. Aged 28.

On the 14th March, 1875, Mr. Henry Mills Ayre, Chemist and Druggist, of the Provident Dispensary, Leamington. Aged 27.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

"Thirty Years Ago."

Sir,—In the prolonged discussion of early closing which has almost exclusively occupied your correspondence columns since last November, it is remarkable that no one appears to have apprehended the obvious fact that *the thing is done.* Early closing has been proved to be practicable in pharmacy as well as in other trades by many examples in London and elsewhere, thus solving the ancient difficulty and only wanting time for those examples to spread and for the ball to go on rolling down hill, as it cannot fail to do in spite of occasional hindrances, until it rests at a practicable level.

We have been favoured with some interesting recollections of the usages which prevailed some thirty years ago (and which, if necessary, I could confirm); but it is strange that the writer who so graphically describes the past should be so little alive to the significance of current events as to say in a subsequent letter that "there cannot be much effected in the direction of early closing!" It seems as if the revival of old memories had reproduced old sentiments, for this was the language of *thirty years ago*, but it is inconsistent with later experience. I well remember about that time one who had been brought up under the thraldom of the old system, and who had therefore some excuse for his prejudices, objecting to join in a mild measure of early closing because he was "not going to dictate to his customers when they should send their orders." In those days it really was considered impracticable to close a chemist's shop before 11 p.m., when the weary household retired to bed. Does anyone think so now? If he does, he makes the grievance from which he suffers, for it will naturally happen that so long as the shop is open the public will conclude that they are invited to enter, and they will probably do so upon trifling occasion.

It is unfair to raise difficulties about the supply of necessary medicines after hours as though it were a part of the early closing question, for it is always assumed that provision will be made for such services at all hours of the day or night. Many pharmacists of the highest standing consider it inexpedient to question the necessity of these late summonses, and it seems particularly unwise to give that liberty to assistants. Generally speaking, people will not unnecessarily incur the inconvenience of waiting while a closed shop is reopened, and it is wiser to bear the exceptions philosophically, including the irrepressible pennyworth of hair-oil, upon which depends some poor girl's tranquility of mind and possible attendance at church on the Sunday morrow. Thus, while we forbear, the public are gradually becoming educated to the new state of things.

I should be sorry to see an extra charge levied upon late business, feeling convinced that it would be likely to produce misunderstanding between pharmacists and customers. It is more honourable to ourselves to supply such wants for a human than for a mercenary motive, and it is more dignified to accept these disagreeables cheerfully as incidental to our vocation than to give the public reason to suppose that they are entitled to disturb our rest for a payment of sixpence more or less.

It may not be out of place to quote the changes which have taken place in the hours of closing in this neighbourhood during my recollection, as one instance among many of what has been accomplished since that misty period spoken of by your correspondent as "about thirty years ago," when we, like most of our fraternity, kept open shop till 11 p.m. daily, Sundays included. The first amelioration of this state of bondage was brought about by the unprecedented agency of our customers, who held a public meeting and summoned us to mend our manners. We, thereupon, agreed to close at 8 p.m. in the summer, and 9 p.m. in the winter, but soon found that it was more convenient to adopt one uniform hour all the year round, and that the earliest. About two years ago we agreed to further limit the hours of business by closing at 7 p.m. which is as early as can reasonably be desired by those who expect to make a livelihood by retail trade; and I am not aware that the present arrangement has occasioned inconvenience either to ourselves or to the public. Increased activity in business during the shorter hours will naturally be expected from assistants, and they should not fail to evince their appreciation of the privilege by a willing response to the call.

I was much struck recently by the evidence of similar progress in the west end of London. Formerly the streets were enlivened to a late hour by the glare from the windows of the gin-palace, the tobacco shop, and the pharmacy. In these favoured quarters, if not elsewhere, the undesirable association is now happily dissolved, and Gin and Tobacco are permitted to hold court alone. It may confidently be hoped that the boon will rapidly extend to districts not yet reached, and that pharmacists will have enough self-respect to cease from imposing a hardship upon themselves and others which the necessities of the public do not demand. The influential London houses have set an excellent example, and it is to be hoped that they will always thus lead the van for the welfare and advancement of pharmacy. The smaller houses must ultimately follow though they cannot lead; for it is the province of the great firms to make the ground for us. The opportunities which early closing affords for scientific improvement and its consequent influence upon the elevation of pharmacy are too obvious to need remark, and though I would be the last to counsel anything which might have the semblance of an assistants' strike, it is evident that these considerations will influence their choice of situations; and, having regard to the alleged scarcity of the supply, this must compel the trade generally to follow the practice of the leading firms.

It is above all things desirable that assistants and masters should pull together in this as in every other respect, but I am not sure that the modern assistant has been equally devoted to the interests of his employer as the assistant of former days. Habits are changed and engagements do not now last so long as they formerly did, not long enough perhaps to develop the old feeling of identity with the fortunes of the house. This may be the reason for the suggestion for which there is certainly some foundation, that "Square" men are not popular with certain employers, and I confess to so far sharing the feeling that I would prefer a zealous assistant without science to a paragon of science without zeal. Is it too much to ask assistants to remember that scientific knowledge is intended to supplement, not to supplant, those sterling qualities without which none can satisfactorily fulfil the duties of life?

RICHD. W. GILES.

Clifton.

IRISH PHARMACY.

Sir,—I have hitherto refrained from entering into a paper controversy on this subject, but my attention having been drawn to a letter in your last week's issue, signed C. H. Hartt, in which truth is so grossly misrepresented for the sake of shop, I cannot refrain saying a few words in reply.

In the first place this gentleman appears to ignore the existence of the Irish chemists and druggists; he graciously permits them to retain what he considers the humbler grade—viz., "druggists;" but if they are entitled to this name as being vendors of drugs, much more are they to that of chemists as being both vendors, and also, to a large extent, manufacturers of chemicals, and if I mistake not their knowledge in this branch would contrast very favourably with many who hold the title of apothecary.

Mr. C. H. Hartt glories in the fact that the Irish apothecaries are the only recognized body for the dispensing of medicines, and that they have to undergo examinations and pursue studies which would qualify them for the degree of M.D., which consequently most of them follow, leaving the pure pharmacist almost extinct; consequently the necessity for immediate legislation on the subject which we now seek. The next item of valuable information in Mr. C. H. Hartt's letter is that "the druggist's shop is a kind of general store, where goods of every description can be purchased—drugs included; but whether the druggist's knowledge thereof would even meet the requirements of the Minor examination I very much question."

Now, with regard to this sweeping assertion, I wish in the first place to say that his description of what he calls "the druggist's shop" is not applicable to the Irish chemists and druggists' shops, in which "every description of goods cannot be purchased." But supposing the description to be true, it will also be true of the larger apothecaries' establishments, including the Apothecaries' Hall, but with the addendum of "prescriptions compounded;" but to apply the latter portion of the sentence to this respectable body of men I will require, with your leave, to paraphrase or perhaps alter it a little, I think the following will be about correct:—"But whether the employers, including the compounders, could pass any kind of examination is a matter of doubt, at least, if the following were put as a test question of their competency:—Decide the difference between carbonate of ammonia and cyanide of potassium."

While on this subject I may mention that as far as my memory will carry me I can say that no accident to the public has occurred in Ireland through the ignorance or incompetence of any chemist and druggist, or their assistants. Perhaps Mr. C. H. Hartt can inform you if he can say the same for the apothecaries. With regard to his humble suggestion "that the Apothecaries' Hall as a medical body should cease to exist and turn its attention to pharmacy only;" perhaps if Mr. Hartt used his influence with that worthy corporation he might be able to accomplish his wish, but I fancy the apothecaries consider themselves quite as competent as Mr. Hartt to manage their own affairs, and I think if he would take a hint it might be better for both his own interests and those of the public if he would mind his.

One more word and I have done: it is with reference to Mr. Hartt's want of visionary instinct in "not seeing why the Irish druggists should expect to derive more benefit from the Pharmacy Act than the humblest shop-keepers." I can only attribute such a remark to the grossest ignorance or wilful blindness, and I should be making little of the common sense of the readers of your valuable Journal to say another word on the subject. Apologizing for the trespass on your space, I am, etc.,

WILLIAM HAYES,

Hon. Sec. to the Chemists and Druggists' Society of Ireland.

12, *Grafton Street, Dublin,*
March 17, 1875.

THE ADULTERATION ACT.

Sir,—Permit me through your columns to correct an erroneous report, which appears in a monthly contemporary, of a remark which I made at the meeting of the Social Science Association last week.

I am reported to have said that "The Council of the Pharmaceutical Society wanted to encourage adulteration and I wanted to discourage it."

What I intended to convey was—that I could not have joined the deputation which went from the Council of the Pharmaceutical Society, because I understood they intended to object to the erasure of the word "knowingly," which would, in my opinion, tend to promote adulteration.

The difference between the two statements is important.

I distinctly object either to the retention of the word "knowingly," or to the substitution of the word "fraudulently," in its place, on the ground that either of them would render the Bill of no avail in checking adulteration.

G. W. WIGNER.

79, *Great Tower Street, London, E.C.,*
March 18, 1875.

Sir,—In your last issue appeared a report of a recent meeting of "The Association of Chemists and Druggists of Wolverhampton and District."

In an address delivered by Mr. Wentworth Lascelles Scott, the official analyst, reference was made to Mr. Sclater-Booth's Bill to regulate the sale of food and drugs; and in which one great fault was pointed out—"that in convicting any tradesman of certain offences there specified, the magistrates were permitted no discretionary power in apportioning the amount of the fine in accordance with the circumstances under which the offence was committed."

Mr. Scott then quoted three clauses under which penalties of £10, £20, and £10, respectively, could be inflicted, and remarked, "In each case the magistrate had no option, if the offence were proved, but to inflict the full penalty; that he thought a great hardship."

A lengthy discussion ensued and a resolution was passed:—

"That in the opinion of this Association, it is expedient that the fines imposed for offences under this Act shall not be uniform, as proposed, but shall be left to the discretion of the magistrates, as at present, the maximum penalty being named in the Act, but that a lower penalty may be imposed."

Had Mr. Scott, or the gentlemen taking part in the lengthy discussion, read the Bill before discussing it, they would, in clause 20, have found that:—

"Every penalty imposed by this Act shall be recovered in the manner prescribed by 11 & 12 Vic., c. 43, and 'may be mitigated according to the judgment of the justices;'" the term "justices" being previously defined as including "any police or stipendiary magistrate invested with the powers of a justice of the peace."

The inherent defects in the Bill, as it at present stands, must insure its rejection, and it is quite unnecessary to criticize and condemn clauses that any one, reading it, must know form no part of it.

THOS. PAYNE, Sec.

Anti-Adulteration Association Limited.
6, *John Street, Adelphi, W.C.*
March 15, 1875.

Sir,—Having read so many reports in this Journal in which respectable chemists have been brought before the magistrates for selling drugs not up to the microscopical standard, may I ask why grocers, who sell numbers of our drugs, including "Sulp. Præcipt.," at a lower rate, and much inferior in quality, should not be visited by the same authorities?

JUSTITIA.

[*⁎* Undoubtedly grocers who are in the habit of selling certain drugs are as amenable to prosecution if they sell them in an adulterated state as chemists and druggists are. We would suggest that it is possible for any person possessing evidence of such a practice to set the law in motion against the offender.—ED. PHARM. JOURN.]

MILK OF SULPHUR.

Sir,—Is it not at least possible that a similar mistake is being made about the milk of sulphur as the ancient philosophers made over the famous problem—why the weight of a vessel of water was not increased by the immersion of a living fish?

It may cause a smile among the knowing ones, and yet by your permission I will venture to ask the question—Have the medical properties of the sulphate of lime ever been investigated? Lime combined and uncombined (lime-water with milk), as well as sulphuric acid combined and uncombined, is frequently given medicinally: why may not the sulphate of lime be sometimes beneficial?

Attempts to decompose it have been commercial failures, but may not that wonderful laboratory, the human stomach, with its adjuncts, be enabled to separate its elements and to use the beneficial and to eject the detrimental. *A priori*, this may seem the more probable when we reflect on the enormous tasks we sometimes impose on our stomachs. Few chemists probably, except those of the "Veritas" tribe, can frequently indulge in what may be called a jolly good dinner, but when such a luxury is our privilege, is it not worth a moment's consideration, what an awful task we impose on the analytical attributes of our stomachs, to sift out nutriment from the heterogeneous mess gulped into them in a few minutes? What a power of endurance is shown by some human stomachs year after year! Surely it is not so very unreasonable to suggest the possibility that so powerful an organ may contrive to get some good even out of sulphate of lime, especially when presented to it in the condition in which it exists in the milk of sulphur.

May I also ask on what grounds stand the reputation of any medicine? Does not quinine, for instance, own its high reputation to observation, experience, and testimony? and is it not through the working of the same triad that tons of milk of sulphur are sold annually? I mean sulphur with calcium sulphate, and I contend that, at least in most country trades, if such milk of sulphur be not supplied the customer does not receive what he desires and expects to have. For instance, a farmer's wife on way to market tells a neighbour her children have a "breaking-out" or a "rash," the ready prescription is: "Give them milk of sulphur, it is the best thing in the world for them." Here we have the result of the "observation, experience, and testimony," which, as observed, gives all medicines their more or less deserved repute. The mother goes to her usual chemist, and if she does not get the old-fashioned milk of sulphur she does not have the medicine prescribed for her.

I say the popular reputation of the medicine has been formed on experience of the old article, and the chemist who sells in such cases the sulphur præcipitatum, B. P., sells an article which is not asked for, or intended.

Again, I ask, would it not be more philosophical practically to investigate the virtues of a popular remedy sold by the ton, although no philanthropic professor spends £20,000 a-year to trumpet aloud its virtues, than without any examination to condemn it *ex cathedrâ*?

Many medical men have made their own frames and the persons of their friends the basis of experiment with far more dangerous and active substances, especially with the poison alcohol. As the late Dr. Lankester said, in a discussion on a paper of the late Dr. E. Smith, "The public ought to be very much obliged to the abstemious and persevering doctor, for he not only got drunk himself before breakfast for the benefit of the public, but persuaded some of his friends to do the same."

The operation of sulphur is so gentle that its effects may be submitted to without much personal inconvenience, and surely it would be worth while practically to test the operation of such a popular remedy as sulphur with calcium sulphate in a similar way.

W. SYMONS, F.C.S.

Barnstaple, March 15, 1875.

SYNONYMS.

Sir,—I fully agree with "J. T. C." respecting a book of synonyms, and believe that one of a small and convenient size would find its way into nearly every chemist's shop and into many an assistant's and apprentice's pocket, and that its sale would amply repay the time, trouble, and expense of the compiler.

T. F. H.

London, March 13, 1875.

British Pharmaceutical Conference.—One of the Honorary General Secretaries of the British Pharmaceutical Conference informs us that the Association now numbers upwards of 2700 members, and that since the issue of an appeal some eight months ago, no less than 850 pharmacists have become candidates for membership.

H. A. H.—The Pharmacopœia test is sufficient for the detection of the presence of carbonate, and descriptions of other tests will be found in any manual of analytical chemistry.

"*Registered.*"—According to sect. 1 of the Pharmacy Act it is "unlawful for *any* person to sell or keep open shop for retailing, dispensing, or compounding poisons," unless such persons are registered under the Act, and conform to such regulations as to the keeping, dispensing, and selling of such poisons, as may from time to time be prescribed by the Pharmaceutical Society with the consent of the Privy Council.

R. J. M.—The second equation represents the reaction that takes place.

A. Warren.—We agree with you that, besides being otherwise inaccurate, the use of the words Oleum Tempus as equivalent to Oil of Thyme is an amusing instance of the manner in which "the nominative and genitive cases of Latin words are sometimes confounded."

T. F. H. is thanked for his lines on "My Sunday In."

"*Devonian.*"—Blaine's 'Outlines of Veterinary Pharmacy.'

J. Lawrie.—We find that, as you state, in the proportion of the ingredients ordered there is not nearly sufficient fluid to keep the salicin in solution. Squire gives the solubility of salicin as 1 in 28.

COMMUNICATIONS, LETTERS, etc., have been received from J. Whitfield, C. Lowe, J. A. Cope, H. Brown, J. C. McMechan, Gallois, A. Ellis, Mr. C. Heanley, J. B. S., G. H. B., Z. O., "Ranunculus," "A Notting Hill Chemist."

ESSENTIAL OIL OF CHERRY-LAUREL.*

BY WILLIAM A. TILDEN, D.SC. LOND.

It has long been known that the fragrance of cherry-laurel water is due to the presence of an essential oil the properties of which agree so closely with those of the essential oil of almonds as to sanction the general belief in a corresponding similarity of composition. Nevertheless, so far as I can ascertain, this substance has never been submitted to a systematic examination, and this view, however probable, is therefore supported by but little direct evidence. An opportunity of studying the properties and composition of the essential oil of cherry-laurel presented itself a few months ago in a kind offer by Mr. Umney of a large specimen amounting to about two and a half fluid ounces. This was the product of the distillation, in August last, of 300 pounds of the leaves and represents about ·05 per cent. or 1 part from about two thousand. The essential oil thus obtained is, of course, merely that portion of the entire yield which separates during repose from the saturated distilled water *(Aqua Lauro-Cerasi)*, the latter being the primary object of the operation.

In a letter to me on the subject, Mr. Umney adds his opinion that by fractional redistillation of the water the product might have been increased to double this amount, but not more.

The oil, as I received it, had a pale yellow colour and held in suspension a few crystals, probably consisting of benzoic acid. In odour, it resembled essential oil of almonds with, however, a decided flavour of the leaf which gave it a character quite peculiar. Its specific gravity was found to be 1·0615. Tested qualitatively, it gave abundant evidence of the presence of prussic acid, but no attempts were made at a quantitative estimation of this constituent. Mr. Umney represents† the proportion of prussic acid present in the oil at less than 2 per cent., but there can be little doubt that it would be somewhat variable.

The further examination of the oil was conducted in the following manner. About two-thirds of the sample were shaken up with an excess of a strong solution of acid sulphite of sodium, by which all the aldehydic constituents of the oil were dissolved and a very small quantity, between 1 and 2 per cent., of an oily substance containing some brown resin was left. The sulphite was crystallized out from the aqueous solution, and then distilled with excess of sodium carbonate. In this way an essential oil was obtained which after drying by chloride of calcium presented all the characteristics of pure benzoic aldehyd. It distilled without residue between 174° and 178° C., and its specific gravity at 17° C. was found to be 1·0492.

This conclusion was confirmed by a comparison of its "cohesion figure" upon distilled water with that of pure benzoic aldehyd from almonds.

The small amount of the viscid oil left by the bisulphite after repeated treatment with fresh quantities of the solution put any attempt at distillation out of the question. All that could be done, therefore, was to boil it with dichromate of potassium and sulphuric acid, and examine the products of its oxidation. No appreciable amount of volatile products, except a little CO_2, was formed, and the crystalline deposit obtained after this treatment was collected, dissolved in warm solution of carbonate of sodium, and the filtered liquid acidified with sulphuric acid. The acid which then crystallized out was carefully sublimed, and was found to melt at 121° C. There could be no doubt, therefore, that this oxidation product was benzoic acid, with which, moreover, it entirely agreed in appearance, solubility, and so forth. Regarding the nature of the oil from which this benzoic acid was obtained, it is not very easy to speak positively, since the quantity was so small as to preclude further investigation. We may, however, risk the conjecture that, since it was certainly not benzoic aldehyd, it not improbably consisted, at least in part, of the alcohol C_7H_7OH, which stands towards benzoic aldehyd in the same relation as common alcohol to common aldehyd. From the facility with which it is converted into benzoic acid I infer that this portion of the essential oil is probably not a hydrocarbon. The former hypothesis, moreover, derives some slight additional weight from the fact that benzoic alcohol and some of its compound ethers have been recognized in several other products of vegetable origin.

These experiments, therefore, indicate that the essential oil of cherry-laurel leaves consists mainly of benzoic aldehyd, accompanied with hydrocyanic acid (less than 2 per cent. according to Umney), volatile oil, possibly benzoic alcohol (perhaps 1 per cent.) and minute quantities of an odorous resin.

Inquiries I have made as to the nature of the changes by which these bodies are produced in the leaf have not added materially to the general information on the subject. It seems to be agreed on all sides that the volatile oil does not exist ready formed, but is produced by the action of water on certain, at present unknown, principles resident in the leaf, and Mr. Umney seems to lay emphasis on the opinion that this reaction is *instantaneous*.

Hanbury ('Pharmacographia,' p. 227) states that "the leaves may even be dried and powdered without the evolution of any odour of hydrocyanic acid, but the latter is at once developed by the addition of a little water." This interesting observation seems to point to the direction in which further experiments on this part of the subject might be advantageously prosecuted.

* Read before the Bristol Pharmaceutical Association, January 22, 1875.

† *Pharm. Journ. and Trans.*, Jan. 1869.

THE ACTION OF THE INDUCED CURRENT UPON THE INTRA-CELLULAR PROTOPLASMIC CIRCULATION IN PLANTS.

BY HENRY POCKLINGTON, F.R.M.S.

If Dr. Lindley's chronology be right, the past year (1874) should be red-lettered in every microscopist's diary as the centenary of Bonaventura Corti's discovery of what he called the circulation of the sap in Characeæ and in *Caulinia fragilis*,* a discovery the importance of which has not as yet, perhaps, been fully learned, but which has been of interest to probably every microscopist for the last fifty years. I say fifty years, for it is rather singular that although Corti's discovery appears to have made some little noise at the time, it was soon forgotten (in the lack of physiological botanists), and the rediscovery of the

* Schleiden, or his translator, however, has it 1772, but so far as I know stands alone.

phenomenon by Treviranus in 1807, and by Amici in 1819, came upon the scientific world with all the freshness of a new discovery. Corti appears to have quite mistaken the nature of the phenomenon; indeed, it is not until quite a recent date that it has been recognized as independent of, and distinct from, the general circulation of a plant, and that whatever it may be it is purely intra-cellular. This was shown clearly enough by Robert Brown in his observations on the hairs of Tradescantia in 1831, and by Mohl and Schleiden in their numerous observations on other plants. Other observers, Slack, Meyer, Dutrochet, Varley, Wenham, etc., have described the phenomenon in various other plants, and it has become pretty generally admitted that at least some part of all plants manifest it at some period or other of their history, and that it is in some way or other related to the process of cell life or cell nutrition. The phenomenon has been very variously described, and under different names;* and, perhaps, a brief sketch of the history of the subject, and explanation of the phenomenon, may serve as a suitable introduction to the main subject of this paper. Corti's notion was that the ascending and descending streams were separated by a septum, and that the circulation was a true sap circulation. The existence of a septum was, however, speedily disproved. Others have supposed that there are minute anastomosing vessels on the outside of the cell, and that the circulation takes place in these. This idea, propounded by Schultze, is so highly improbable and so easily disproved by simple observation that we need not wonder that it never gained much ground. Dutrochet's idea that the circulation is due to a galvanic action in which the chlorophyll granules play the part of batteries may be at once relegated to the region of forgotten absurdities. A more plausible theory, propounded years ago and lately revived, accounts for the phenomenon by supposing that the cells are lined with fine cilia, whose constant motion produces the current. Some observers have even asserted that such cilia have been seen by them. This, however, as Wenham has shown, is purely an error of interpretation, due to imperfect illumination or defective lenses, and the theory is probably not now held by any observer of eminence. Certainly the use of a high power—Powell and Lealand's $\frac{1}{25}$th—has abundantly satisfied me as to the non-existence of cilia, or anything analogous to them. Others have supposed the currents to be produced by alternate contractions and expansions of contiguous cells; whilst a somewhat recent observer, B. Schnetzler, supposes that the ultimate cause is to be found in the chemical action of oxygen, which passes through the walls of the cells, and of which a portion is probably turned into ozone under the influence of light, assisted by currents of electricity passing between the surface of the leaf and the contents of the cell. This idea also may probably be relegated elsewhere. A more plausible theory is that propounded at great length and with great ability by Dr. J. Bell Pettigrew,† in his lectures on the "Circulation in Plants and Animals." Dr. Pettigrew says there can be little doubt that cell gyration "is referable to vital, chemical, and physical changes occurring in the cell contents, but the precise nature of these changes is at present undetermined." He believes that the chief cause lies in physical causes, as absorption and evaporation, exosmose and endosmose, capillarity, chemical affinity, etc. Of these numerous physical agencies he singles out the first four as most important, and has devised some exceedingly ingenious apparatus wherewith to illustrate his theory. One of these pieces of apparatus is shown in fig. 1, copied from

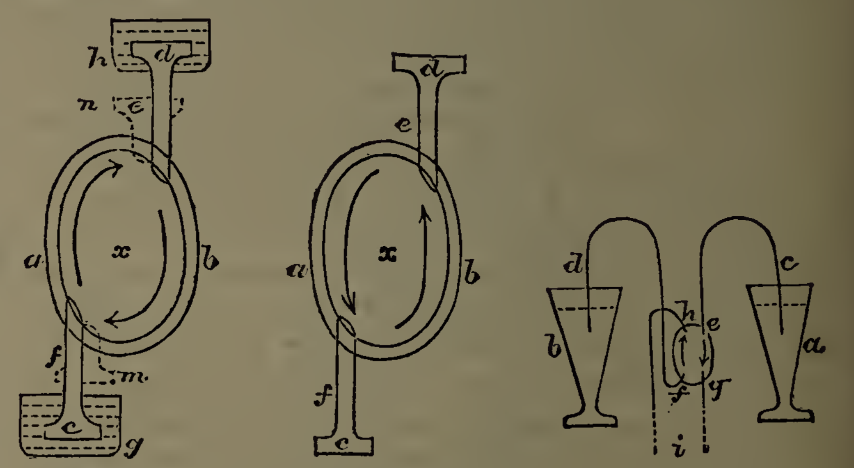


Fig. 1. Fig. 1*a*. Fig. 1*b*.

Dr. Pettigrew's lecture in the periodical cited. There is no doubt that cell gyration could be, and has been, out of the plant, produced by the causes there brought into action, but that the conditions of the experiment obtain in plants is quite another question. It is difficult, for instance, to imagine that the circulation in the terminal cell of a branchlet of Chara is due to any such factors. The general character of the phenomenon in Vallisneria and Anacharis, where the circulation may be right-handed in two or three contiguous cells, then left-handed in perhaps a single cell, amongst other cells whose gyration is right-handed, is also against the simple theory propounded by Dr. Pettigrew.

Probably all that the facts at present known warrant us in saying, is that the phenomenon is purely a vital one, whatever this may mean, and that whatever is inimical to the general life of the plant has a similar influence upon the intra-cellular circulation, and stays it with more or less alacrity. In Chara and Vallisneria the rotation appears to be stopped by the application of a temperature of about 150°F.; before this temperature is reached the circulation begins to show signs of cessation. Prussic acid, acetate of lead, opium, and corrosive sublimate (Pettigrew), iodine, dilute sulphuric and acetic acids and alkalies (Auctor), also arrest it, as does cold below about 50°F. in the case of Vallisneria, and below about 40°F. in the case of Chara. Anacharis appears to be (from some experiments in 1869) much more tolerant of heat and cold than Vallisneria or Chara; but the limits of its endurance have not so far as I know been determined. It is to be noted that different specimens differ somewhat widely in this respect. Mechanical injuries have a very marked effect upon the intra-cellular circulation. The act of cutting the leaf of Vallisneria, or plucking the leaf of Anacharis will generally stay the circulation for a short time, but much of the effect commonly ascribed to these inquiries is really due to a chill caused by transference of the section or leaf to a cold slide, and the circulation rapidly recommences when the slide is slightly warmed, and experiments prove that mechanical injuries are far less potent in arresting the circulation than is sometimes

* Cyclosis, cell rotation, are the most approved.

† *Edinburgh Medical Journal* for 1872–3; since re-published in book form. For further information on the history of the subject see Schleiden's 'Principles of Botany,' Mohl's 'Vegetable Cell,' Henfrey's 'Botany,' Lindley's 'Vegetable Kingdom,' and R. Brown's 'Manual of Botany,' 1874.

said. My own experiments do not confirm the statement in Brown's 'Manual of Physiological Botany,' that jolting or pricking will stop the current. Immersion in milk and thin gum, is said (*op. cit.*) to accelerate gyration in Vallisneria. It will continue in Anacharis, though the plant be immersed in a ten per cent. solution of sugar. (Auctor.)

We have now to consider the behaviour of the phenomenon in presence of an agent known to have a potent influence on vital phenomena generally, the induced current. On this point we meet with contradictory statements in our text-books. Henfrey (Master's ed. of 'Manual') states that electrical currents do not affect it (with this some experiments performed by me in 1868-9 agree—why, will be seen later). Brown ('Manual of Physiological Botany'), on the other hand, states that "a current of electricity stops it, but no sooner is the current shut off than it recommences." To determine between these was one object of my experiments.

The loose use of the word "electricity" by our authors leaves us the choice of the direct galvanic current from the battery, the high tension and rapidly reversed current from an inductorium, or the Leyden jar discharge of frictional electricity. Practically, we are restricted to the former two. It may be best to consider the action of the direct current first, and very briefly; but before doing this a few words are necessary respecting the method of experimentation. In addition to the ordinary battery and conducting wires some form of electrical slide is needful. The simplest is that used by continental microscopists, and consists of an ordinary

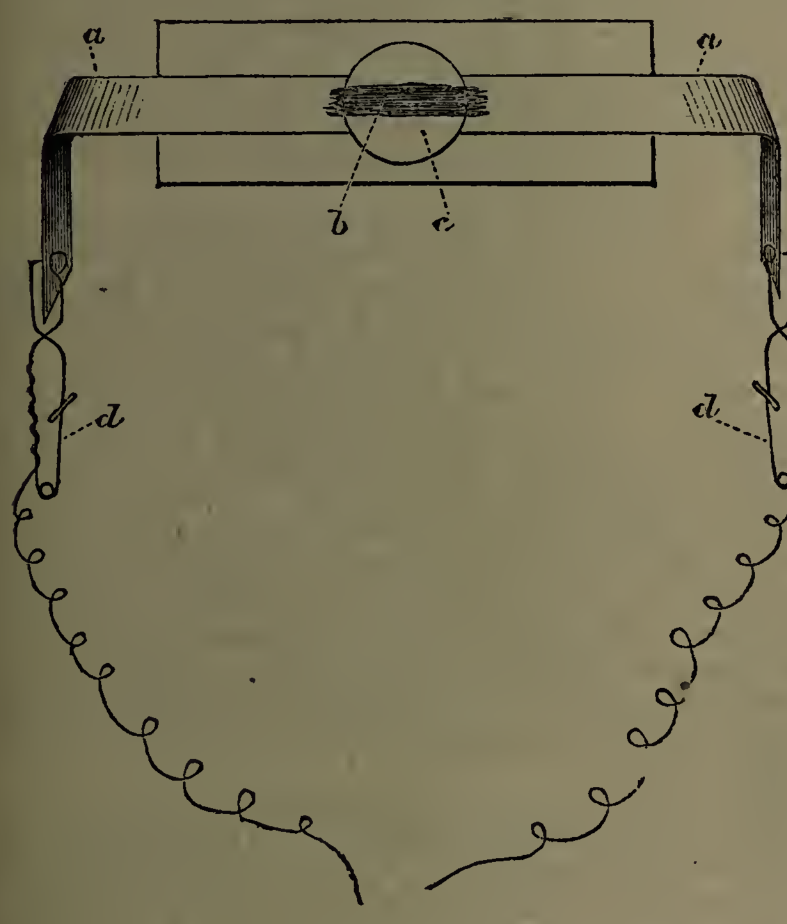


Fig. 2.

glass slip whereon are gummed two strips of metal foil, one from each end to within a short distance of the centre of the slide. The wires from the battery or coil are attached to metal springs, insulated from but attached to the stage. When the slide is in position these springs press upon the tinfoil and complete electrical contact so long as the space between the foils is bridged over by some conducting object. In the examination of Vallisneria we place the portion of leaf in the position shown in the figure, and cover it as usual with the cover. On making circuit the current passed through the whole apparatus, and the effect can be observed by the ordinary modes of illumination. My own use of electricity in microscopical observation is too limited to warrant the expense of special apparatus, and I have modified the stage as shown (fig. 2), which appears to answer all requirements.

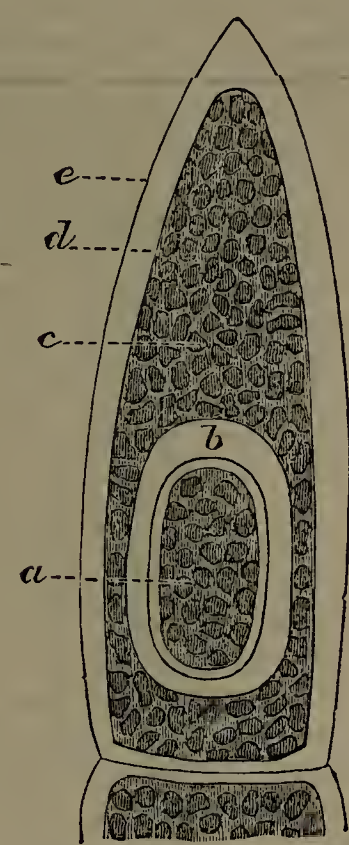


Fig. 3.—Terminal Cell of Chara.

Two thin strips of copper are fastened along the middle of the slip, about a quarter of an inch from each edge, by marine glue, as shown in the figure, and allowed to project about an inch and a half from each end. When the cement is firm these ends are bent at right angles downwards. The wires from the battery are furnished with spring clips (those sold by Baker for mounting answer well if their corks be removed), and are attached to the pendent ends of the slide when the object is in position under the microscope and the slide clamped in its place. If care be taken to have these battery wires well "spiralled" the object may be moved about on the stage, and will be free from vibration with high powers. The circuit must be made and broken, however, either by a commutator or some "break" which will not involve interference with the wires—a mercury break answers as well as any, but I generally use a "short circuit wire" (simply a bridge between the poles of the battery or coil which opens or shuts at pleasure).

Under the influence of the direct current from a single half pint Bunsen cell (exposing about twelve square inches of zinc) the current in Vallisneria is sensibly accelerated for a time, then the protoplasm becomes granulated, and the chlorophyll granules become vacuolated, and the current is gradually brought to a stop. The current from a Daniell cell of the same size does not appear to have any other than an accelerative influence. The circulation in Anacharis does not appear to be influenced by the direct current of low intensity. My experiments on Chara give undecided results, and I am not aware that any experiments have been performed on Tradescantia. My efforts to get a direct current through the interior of the nettle hair have failed (a larger battery power involves heating effects that are objectionable).

The action of the induced current upon the circulation in Anacharis, Vallisneria, and Chara may be divided into two groups, those resulting from the employment of a very low power, and those resulting from the action of a moderately strong current.

The inductorium employed was a small so-called medical coil, without shunt for the reversed current, and without condenser. The battery employed was the Bunsen* and Daniell single cells, already described. The low power was one just sufficient to cause muscular contractions in a young child without being painful to it; the high power was just sufficient to be very slightly unpleasant to a lady. The low power was employed upon Vallisneria only. The results were somewhat contradictory, but the main effect seemed to be, gradual arresting of the current in the larger cells composing the middle layer of the leaf, and temporary acceleration of the current in the more circular cells of the upper and lower layers where the whole cell contents gyrate with greater or lesser rapidity when the leaf is in active growth. The protoplasmic matter in these cells sensibly retracts itself from the cell wall when contact is made, the nucleus becomes more sharply defined, and the whole circulation becomes much more circular and gyratory. Lengthened application of the current leads to degradation of the chlorophyll, and fatal changes in the protoplasm. The action of the current upon these circular cells appears to be that of a true stimulant.

The action of the stronger current has been observed on Vallisneria, Anacharis, and Chara, and with doubtful success on Closterium. Vallisneria is very suitable for the experiment as portions of the leaf may be procured of sufficient length to make a good circuit, and its cells are large, transparent, and the current rapid as well as sharply defined. The terminal cells of Chara answer well if procured from plants grown in water containing little lime. The effects produced by the passing of the currents are exceedingly well marked.† The circulation stops almost instantly, and the margin of the circulating fluid is seen to have suddenly corrugated. If the current be immediately shut off, and it has been only just powerful enough to arrest the circulation, the gyration will recommence in a few minutes. Usually, however, with the current employed in the experiment, it does not recommence, and the protoplasm breaks up, the chlorophyll granules changing in a very singular fashion (at this season of the year; I doubt whether this obtains to so great an extent in the summer when the plants grow more rapidly), by becoming ovoid, with distinct oval slits near their centres. This is probably due to some change in the neighbourhood of the amyloid nucleus of the granules. The current, in short, kills the leaf. The action of the current on the circulation in Anacharis is in all respects similar. In the case of Chara we have similar results with a very singular effect in addition when we deal with young shoots, whose cells, though of considerable length, are still elongating. The circulation stops as in the other plants, and as quickly. If the current be strong we have no other result, but if it be only just powerful enough to arrest the circulation, and we intermit it for a minute, we observe very frequently a remarkable vacuolation of the protoplasmic contents of the cell, then an aggregation of certain of these contents into a spherical mass, like the zoospores in Vaucheria, and the formation on the exterior of this of a hyaline envelope, as in the zoospore of Vaucheria. This does not appear to gyrate or to pass through any changes whatever.

So far as can be ascertained, the action of the current upon the peripheral circulation in Closterium is similar to its action on Vallisneria. The circulation instantly stops, and the protoplasm is contracted on to the surface of the primordial utricle. The active dancing of the particles in the vacuole at each end of the frustule has not been observed to change in any way. It is probably Brownian.

It may now, perhaps, be asked whether these experiments throw any light upon the course of the phenomenon. I fear the answer must be that they throw very little light upon it. They are at most confirmatory of the opinion that it lies amongst those phenomena we at present call vital, because we do not know any physical cause for them.

Explanation of Figures.

Fig. 1 and 1*a* show how the gyration of the cell contents may be produced either by absorption and endosmose, or by evaporation, or by all the three. Fig. 1, *a b*, cell containing viscous fluid; *c d*, absorbing surfaces of cell surrounded by water or other thin fluid (*g h*); *x*, endosmotic currents, which result in gyration (*vide* arrows), are thus produced. To the absorbing surfaces, evaporating ones, as at *e n*, *f m*, may be added. Fig. 1*a* shows how gyration may be effected by evaporation alone. *a b*, cell containing viscous fluid; *c f*, *d e*, evaporating surfaces. The arrows (*x*) indicate the direction in which the evaporation acts.—*J. B. Pettigrew.*

Fig. 1*b* shows how fluids washing opposite sides of a cell in opposite directions will cause the cell contents to gyrate. *c*, *d*, capillary syphon tubes, the extremities of which communicate with water in the vessels *a*, *b*, and with a viscid fluid in the cell *h e f g*, made of glass; the one syphon enters the glass cell at *e*, the other at *f*, capillary tubes being inserted at *g* and *h* to carry off the superfluous fluid (*i*). The fluid within the glass cell gyrates, as indicated by the arrows. This is ascertained by introducing powdered charcoal into the fluid contained within the cell. In the present diagram, the cell has been placed on a lower level than the water contained in the glasses, but it might have been placed as high above the water as it is below it, the gyration within the cell not being produced by the gravitation of the water in the vessels acting through the syphon tubes, but by capillarity alone.—*Ibid.*

Fig. 2.—This hardly requires special explanation; *a a* are two strips of copper or tinfoil; *b* is the section or portion of leaf; *c*, the covering glass which should be kept dry on its upper surface, and not larger than the space between the metal strips; *d*, spring clips. Connection with battery may also be made by allowing the pendent ends of the strips to dip into mercury cups into which the battery wires are led.

Fig. 3.—Diagrammatic representation of completed change in the protoplasm of Chara under certain conditions. *a*, Zoosporelike aggregation of protoplasm with embedded chlorophyll granules; *b*, vacuolar space; *c*, endochrome; *d*, protoplasm of cell contracted from cell wall *c*, *d*; space between *c* and wall *c*, much increased in dimensions by contraction of *c*.

---

* It adds greatly to the comfort of using the Bunsen in a small laboratory if the nitric acid employed be saturated with bichromate of potash.

† A friend to whom I exhibited it (at the Leeds Naturalists' Field Club rooms), likened it to putting a strong "break" on—a very good comparison.

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.*

BY J. BURDON SANDERSON, M.D., V.P.R.S.,

Jodrell Professor of Physiology in University College, etc.

LECTURE II.

(*Concluded from page* 750.)

RELATION BETWEEN SEPTIC PROCESSES AND THE PRODUCTION OF FEVER.

We must now apply ourselves to the consideration how far the organisms with which we have been occupying ourselves have to do with the processes of disease. As I said, the inquiry must be approached from the pathological side. As naturalists, we may be interested in all the lessons to be learnt from bacteria: in studying the remarkable influence of the conditions under which they originate and grow, in modifying their form, or the question how they come into existence, as it were, out of nothing. But all this is beside the mark; at all events, beside our mark as pathologists. To us, who are concerned about disease, and have its prevention and cure as our ultimate object, the subject loses its interest the moment it becomes unconnected with bodily disorder. Life is short, and the work to be done long and difficult. We must, therefore, keep close to our own subjects, if we wish to make progress.

There are three sorts of diseased processes in which bacteria are supposed to be concerned: the process of fever, certain processes dependent on inflammation, and the various processes of specific infection. The relation of the development of bacteria to the febrile process can be investigated experimentally; for liquids are within our reach that have this property, viz., when introduced in a very small dose into the circulating blood of a living animal, they produce fever—a fever which derives its claim to be so called not merely from its being attended with rise of temperature, but from its consisting of the successive stages which go to make up a febrile accession or attack; viz., a period of latency, a rigour with rapid rise of temperature, followed by loss of muscular power, and a period of decline, the whole process being of short duration—not more than five or six hours, and not being accompanied by any local disease whatever, but being throughout a blood process.

The liquids in question are exclusively derivable from one of two sources; viz. (*a*) products of inflammation, (*b*) products of putrefactive decomposition of blood, muscle, or other animal tissues. I shall speak of them as pyrogenic liquids. Among inflammation products, those of serous and catarrhal inflammations are the most frequent sources. As regards the former, *i.e.*, liquids of serous inflammation, those are most active which are of infective origin, *i.e.*, those of which the producing processes are secondary. Of catarrhal products, there is one which has been used by Senator, and which I have also used myself as a source of pyrogenic material. I refer to the expectoration of the purulent stage of phthisis. From this liquid (which is of course always to be had in any quantity), an extract can be obtained by treating it with two per cent. solution of common salt, which admits of filtration. This extract is always pyrogenous.

It is to be noted first that all of these liquids are apt to contain bacteria; they are not, however, putrid in the ordinary sense; the last mentioned, for instance, retains the peculiar odour of purulent expectoration; and, secondly, that all of them are more active when freshly prepared than at any subsequent period. If, *e.g.*, they are subjected to the temperature suitable for putrefaction, they very rapidly lose their activity, and the rate at which this occurs varies with that of the putrefactive process. This must not be understood to mean that they were not at first in a state of decomposition, but simply that the *pyrogen* (as we may, for shortness, call it, whatever its chemical nature) is a product which is produced at an early stage in the septic process.

But there is, as I have said, another source from which pyrogenous material can be derived, viz., from any animal liquid or tissue in the early stage of septic decomposition. The favourite tissue for the purpose is muscle. If a quantity of muscle be chopped up and placed in water at a temperature of from 60° to 70° F. for a couple of weeks or so, an infusion is obtained which is pyrogenous. The exact period at which it acquires this property depends on various conditions, more than all, on temperature. If this period be allowed to go by, the pyrogenous activity declines, while the obvious signs of putrefaction become more apparent. If the extract be used in the crude state, the result of introducing it into the circulation is often rapidly fatal. The reason of this is that embolism occurs. Little plugs are formed which find their way into the pulmonary artery and produce sudden death.

Even if the liquid be strained, the production of fever (the effect which at this moment interests us) is not the only one which presents itself. Local effects are produced of the class to which I have applied the term secondary inflammation, viz., infective nodules in the internal organs—serous and mucous inflammation. Those animals which are prone to tuberculosis become, in consequence of such an injection, eventually tuberculous, although at the time they may apparently recover from the immediate effects. These effects—all of which must be regarded as in so far embolic that they are dependent on the circumstance that the liquid contains particles of irritating material, which are carried by the blood-stream to various parts of the body, and there prove foci or centres of infective inflammation—have evidently no necessary connection with fever in the sense in which we have agreed to use the word, viz., as consisting in rapid augment of temperature, attended with the characteristic muscular phenomena of rigour, followed by adynamia, and succeeded by a much more gradual decline.

It may, however, be possible by suitable methods to obtain this purely pyrogenic effect without the others. In other words, there may be in muscle extract, at an early stage in the process of putrefaction, a substance which possesses the pyrogenic activity without that of producing secondary inflammation.

Before proceeding to state what others have done, and what I have done myself, in the effort to find such a substance, let me draw your attention to the remarkable fact that no therapeutical agent, no synthetical product of the laboratory, no poison, no drug is known which possesses the property of producing fever. The only liquids which have this endowment are liquids which either contain bacteria, or have a marked proneness to their production.

Further, let me remind you that, whatever effort we may make to discover a disease-producing agent, we must take, both as our starting point and as our guide post, the one fact that we know about it—viz., its pathological action. For our problem is this. In a mixed liquid we have reason to believe that a body exists which has the property of producing fever. Let us suppose that, by the use of appropriate chemical methods, we succeed in separating from it a crystalline principle which forms compounds of definite characters and constitution. To us this is of no value, unless it can be shown that the body so obtained contains the fever-producing property. Or let us suppose that a certain organic form is present, and that, by appropriate methods, we can determine its botanical characteristics, it is of no interest unless it can be proved that the form encloses the property. It was from forgetting this principle that Hallier, whose inde-

* Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal.*

fatigable labours as a botanical investigator of the forms of vegetation which he believed to associate themselves with diseased products were referred to in the last lecture, lost his way. He forgot that, in the investigation of morbific agents, pathological experiment and observation are the only safe guides. His results are valueless, not so much because the botanists say they are wrong botanically, but because he went on developing form out of form, without ascertaining as he went along, by repeated experiments, that the clue he was following was the right one.

Let me now return to my own experiments. I will not weary you by detailing the steps by which I was led to adopt my present method, but will content myself with reminding you that the purpose is (assuming that, in all probability, the pyrogenous is separable from what has been called the "phlogogenic" action of the material n question—viz., the septic extract of muscle) to effect his separation by obtaining the "pyrogen" in a convenient form.

The plan is as follows:—The liquid is first precipitated by absolute alcohol. The precipitate is separated by decantation, again extracted with boiling alcohol, and then filtered. The residue, after having been freed from alcohol by placing it *in vacuo*, is extracted with distilled water. The water extract is at once filtered. It is a limpid liquid, which, on injection into the circulation, proves to be pyrogenous. It contains 1·2 per cent. of solids. The dose required to produce a characteristic access of fever in a moderate sized dog is five cubic centimetres, that is, three-quarters of a grain of solid matter.

From this experiment, two conclusions suggest themselves—1. That the agent, of whatever nature, is soluble in water, insoluble in strong alcohol; 2. That it cannot consist of bacteria, or have anything to do with them. Both of these conclusions would be erroneous; and this leads me to what I regard as the kernel of the experiment—viz.: We have an apparently homogeneous and transparent solution which is pyrogenous. Are its constituents really in solution? Is it really homogeneous? If I had not from other experiments learnt that no "animal poison" is really soluble, I should have answered the first question unhesitatingly, Yes. To test it, we apply a method first introduced into pathological investigation by Professor Klebs, of Prague—namely, filtration under pressure through porous cells. By applying this method, I obtain a second filtrate. I test it physiologically, and find that it is not pyrogenic. Pyrogen, therefore, is a substance which passes through filtering paper, but not through porcelain. Further, I find, on microscopical examination, that the first filtrate, although at first it contains no bacteria, is not entirely free from particles; and, if I repeat the examination after an hour, bacteria are present in considerable numbers. If I examine the second filtrate in the same way, even twenty-four hours later, it remains barren. The porcelain has, therefore, removed from the liquid, along with the pyrogenous agent, that on which the development of bacteria depends.

We can scarcely overlook the bearing of these facts on the question of the mode of origin of bacteria; for, considering that bacteria in their ordinary state are destroyed, as Dr. Bastian and others have shown, at the temperature even of boiling alcohol, and that, without reference to temperature, they are inevitably killed by immersion in absolute alcohol, it is clear that our fever liquid as used contains no active bacteria. It is equally clear that it contains that particulate material out of which bacteria spring, for otherwise it could not be deprived of its fertility by filtration. It must, therefore, contain particles which, although they resist alcohol and heat, yet are endowed with a latent capacity of development. I may add that the existence of such particles has been inferred on other grounds by mycologists, who have compared their condition to that of the winter-spores (*Dauersporen*) of the fungi.

GUMS AND MUCILAGES.*

BY M. GIRAUD.

The author has recently communicated to the French Academy the results of a comparative study of some gummy substances which swell in water,—particularly of gum tragacanth,—in which he has sought to ascertain the differences which exist between these bodies and the gums properly so called.

With the exception of gum arabic, the curious composition of which has been indicated by Fremy, the investigation of all the other gums remains incomplete. Although the gums and the organic substances which swell in water present points of physical resemblance, the author states that there exist considerable chemical differences between them, and that amongst the latter class there occur very clearly distinctive characters.

As the result of his researches M. Giraud has found that the mucilaginous substances which swell in water may be divided into three groups. In the first he places gum tragacanth, characterized by the presence of a body capable of forming pectic compounds. To the second belong the mucilages—containing no pectic principles—which are rendered insoluble in water by the weakest acids. This group is represented by the mucilage of the quince, which contains a considerable quantity of cellulose (20 per cent. of the dry mucilage) that can be isolated by the prolonged action, with heat, of acids, or even concentrated alkalies. The third group comprises the mucilaginous bodies—devoid like the preceding of pectic compounds—which are not precipitated by dilute acids, but are transformed rapidly by heat into a substance comparable to dextrine and a saccharine substance.

These different bodies have the common property of becoming transformed under the more or less prolonged action of dilute acids and heat into a sugar differing from ordinary glucose. This sugar crystallizes readily, does not ferment, and possesses a more energetic reducing power than glucose; it appears to belong to the class of sugars named by Berthelot "galactoses."

Having established this classification M. Giraud proceeded to the investigation of them successively, commencing the chemical examination with one of the most important, gum tragacanth, the proportion of which he describes as follows:—

Gum tragacanth is very slightly soluble in cold water; it is far from giving, as has been stated, 30 to 50 per cent. of soluble gum. The filtered product is a mixture of different bodies and not a definite principle like arabin. When it is digested in a water bath with fifty times its weight of water, after about twenty-four hours all the gummy substance is converted into soluble gum, having lost the property of swelling after drying. This new substance is not arabin, as has been asserted, but pectin. Submitted to the action of acidulated water (1 per cent.), in a water bath, this gum is modified after two or three hours, becoming entirely soluble. The new product is not arabin, but principally pectin, and combines with alkalies to form pectates and metapectates; it is precipitable by alcohol. The quantity of glucose formed during this action scarcely corresponds to one-tenth of the matter employed.

For the foregoing reasons the author came to the conclusion that gum tragacanth contains more than one-half of its weight of a pectic principle insoluble in water, which appears identical with that named by Fremy pectose, and exists in the utricular tissue of fruits and roots.

These facts being established the author proceeded to the preparation of some pectic acid from this source. For this purpose some tragacanth was digested with fifty times its weight of water containing 1 per cent. of hydrochloric acid in a water bath until dissolved; it was then filtered and excess of baryta water added. The

* *Comptes Rendus*, vol. lxxx, p. 477.

precipitate, which formed slowly, was pectate of baryta. When of a suitable consistence, this was washed, suspended in water and treated with excess of hydrochloric or acetic acid, which left a precipitate of pure pectic acid. As the result of numerous determinations it was found that by this method about 60 per cent. of pectic acid can be obtained from gum tragacanth. Some analyses of the pectic acid so produced, and of the pectates of lead and baryta prepared with it, gave results which agreed closely with the numbers obtained by Fremy in his investigation of pectic acid obtained from fruits.

Having thus ascertained the nature of the principal compound contained in gum tragacanth, the author proceeded to ascertain the percentage composition of the gum, which he found to be as follows:—

Water	20
Pectic Compound	60
Soluble Gum	8 to 10
Cellulose	3
Starch	2 to 3
Mineral Matters	3
Nitrogenous Bodies	traces.

This result, he considers, establishes sufficiently clearly the chemical constitution of gum tragacanth, and the characters which distinguish it from other gums.

THE EXPLOSIVE SUBSTANCES BILL.

A Bill to amend the law with respect to manufacturing, selling, carrying, and importing gunpowder, nitro-glycerine, and other explosive substances has been brought forward in the House of Commons by the Home Secretary and read a first time. It is of considerable length, and it will affect the storing, dealing, etc., of a large variety of substances, since the term explosive under the Bill is, according to clause 3, to mean gunpowper, nitro-glycerine, dynamite, gun-cotton, blasting powders, fulminate of mercury or of other metals, coloured fires, and every other substance whether similar to those above mentioned or not, used or manufactured with a view to produce a practical effect by explosion or a pyrotechnic effect. It is also to include fog-signals, fire-works, fuzes, rockets, percussion caps, detonators, cartridges, ammunition of all descriptions and every adaptation or preparation of an explosive as above defined. By clause 102 it is further provided that Her Majesty in Council may extend this definition of explosives to include other explosives also.

The Bill is divided into four parts; the first part deals with the law relating to gunpowder; the second with the law relating to other explosives; the third with the administration of the law; and the fourth contains certain supplemental provisions, the order of legal proceedings, exemptions, and definitions.

The first part commences with the subject of the manufacture and keeping of gunpowder. By clause 4, every part of the process of the manufacture of gunpowder —except for the purpose of chemical experiment and not for practical use or sale—in an unlicensed factory, is prohibited under a penalty of one hundred pounds per day. Clause 5 provides that gunpowder in quantities exceeding thirty pounds in weight, except when in charge of a carrier for the purpose of conveyance, shall only be kept in "factories," "magazines," "stores," or "registered premises," as defined by the Bill. Before a new factory or magazine for gunpowder is established, an application for a licence is to be sent to the Secretary of State, accompanied by a plan of the proposed factory or magazine, and details as to the nature of the processes to be carried on, the amount of wholly or partially mixed gunpowder to be kept in stock, and the maximum number of persons to be employed; this proposal the Secretary of State is to be free to accept, modify, or reject. Application has also to be made to the local authority for its assent to the site for the new factory or magazine, and provision is made for the hearing of objections on the part of neighbours or others. Stringent rules are laid down for the regulation of factories and magazines, and the Secretary of State is to have the power to rescind or alter or add to those rules as he may deem necessary. Every occupier of a gunpowder factory or magazine also is to be allowed to make special rules for the persons employed in such establishment, and such special rules are to be enforcible by penalties not exceeding forty shillings after they have received the sanction of the Secretary of State. A factory or magazine for gunpowder used at the time of the passing of the Act is not to be deemed to be lawful unless a certificate in respect of it be obtained from the Secretary of State within six months.

"Store" licences are to be obtained from the local authority, subject to its approval of the arrangements, on payment or a fee not exceeding five shillings. Certain general rules are drawn up to be observed in every gunpowder store, and the construction and situation of stores, and the maximum quantity of gunpowder to be kept in them is to be regulated by an Order in Council.

The 21st clause commences that part of the Bill which relates to the retail dealing in gunpowder, and the registration and regulation of premises in which it is kept for this purpose. It is important to note here that by a clause in Part II. of the Bill all the provisions respecting the storage and sale of gunpowder are, with some modifications that will be mentioned, made to apply to the storage and sale of *all explosives*, as defined in the first paragraph of this abstract. In consequence, therefore, of the importance of this portion of the Bill to the retail dealer who may keep any of those substances in store, clauses 21 and 22 are quoted verbatim.

"21. A person desirous of registering with the local authority any premises for the keeping of gunpowder shall register his name and calling, and the said premises (in this Act referred to as his registered premises) in such manner and on payment of such fee, not exceeding *one shilling*, as may be directed by the local authority.

"Such registration shall be valid only for the person registered, and shall be annually renewed by sending by post or otherwise notice of such renewal to the local authority, together with such fee, not exceeding *one shilling*, as may be fixed by that authority.

"22. The following general rules shall be observed with respect to registered premises:—

"(1.) The gunpowder shall be kept in a house or building, or in a fire-proof safe, such safe, if not within a house or building, to be at a safe distance from any highway, street, public thoroughfare, or public place; and

"(2.) The amount of gunpowder on the same registered premises shall not—

"(*a.*) If it is kept in a substantially constructed building exclusively appropriated for the purpose and detached from a dwelling house, or in a fire-proof safe outside a dwelling house, and detached therefrom, and at a safe distance from any highway, street, public thoroughfare, or public place, exceed two hundred pounds; and

"(*b.*) If it is kept inside a dwelling house, or in any building other than as last aforesaid, exceed fifty pounds, unless it is kept in a fire-proof safe within such house or building, in which case the amount shall not exceed one hundred pounds; and

"(3.) An article or substance of an explosive or highly inflammable nature shall not be kept in a fire-proof safe with the gunpowder, and in every case shall be kept at a safe distance from the gunpowder or the safe containing the same; and

"(4.) Neither the building exclusively appropriated for the purpose of keeping the gunpowder nor the fire-proof safe shall have any exposed iron in the interior thereof; and

"(5.) All gunpowder exceeding one pound in amount shall be kept in a substantial case, bag, canister, or other receptacle made and closed so as to prevent the gunpowder from escaping.

"In the event of any breach (by any act or default) of such general rules in any registered premises,—

"(a.) All or any part of the gunpowder in respect to which, or being in any building, room, place, safe, or receptacle in respect to which, the offence was committed may be forfeited; and

"(b.) The occupier shall be liable to a penalty not exceeding *two shillings* for every pound of gunpowder in respect of which or being on the premises in which the offence was committed."

By clause 30, the hawking, selling or exposing for sale of gunpowder is illegal, rendering offenders liable to a penalty of forty shillings and forfeiture of the gunpowder. By clause 31, all gunpowder exceeding one pound in weight, when publicly exposed for sale or sold, is to be in a substantial case, bag, canister, or other receptacle made and closed so as to prevent the gunpowder from escaping, and (except when the same is sold to any person employed by or on the property occupied by the vendor for immediate use in the service of the vendor or on such property) the outermost receptacle containing such gunpowder is to have attached thereto a label in conspicuous characters, with the word "gunpowder."

The next section of the Bill relates to the conveyance of gunpowder from place to place. It prescribes general rules as to the packing of gunpowder; it makes it compulsory upon harbour authorities to draw up bye-laws, subject to the sanction of the Board of Trade, as to the conveyance, unloading and loading of gunpowder within their jurisdiction; also upon every railway or canal company over whose railway or canal gunpowder is carried to make similar bye-laws; the occupiers of wharves on which gunpowder is unloaded are placed under a like compulsion; whilst bye-laws as to the conveyance of gunpowder by road, etc., are to be issued by the Secretary of State.

Part II., as before mentioned, applies the foregoing provisions as to gunpowder to other "explosives," subject to certain modifications and additions. Of these the following appear to apply to the retail dealer:—

"(5.) Two or more descriptions of explosives shall not be kept in the same store, or registered premises, except such descriptions as may prescribed in that behalf; and, when so kept, shall be kept subject to the prescribed conditions and restrictions; and

"(6.) Where any explosive, other than gunpowder, is allowed to be kept in the same store or registered premises with gunpowder, the maximum amount of gunpowder to be kept therein shall be the prescribed amount in lieu of the amount fixed by Part One of this Act; and

"(7.) The label shall contain the name of the explosive, with the addition of the word "explosive," and if such label is false in any material particular, the person selling or exposing for sale the same, and also the owner of the explosive, shall be liable to a penalty not exceeding *fifty pounds*"

Clause 42 gives power to the Privy Council to deal with the manufacture, keep, importation, conveyance, and sale of any explosive which is of so dangerous a character as to make interference in the interest of the public safety expedient. The next following clauses contain provisions in favour of makers of blasting cartridges not containing within themselves the means of ignition; also in favour of makers of new explosives for experiment, gun-makers making cartridges, owners of mines and quarries as to charges for blasting, and "small" firework manufacturers.

Part III. relates to the administration of the law and provides for the appointment by the Secretary of State of Government Inspectors; it also defines their powers. An Inspector is to have the power of entering a "factory," "magazine," or "store," at all times by day and night; and of entering and inspecting "registered premises" at all reasonable times by day; and he may require and take samples of any explosives he may find there, upon payment for them, and officers are empowered to seize and detain explosives liable to forfeiture. He is to give notice to remedy dangerous practices, etc., under a penalty for non-compliance; but the occupier has the opportunity of appeal to arbitration, provision for the appointment of which is made in a Schedule to the Bill. The section relating to accidents provides that notice shall be sent to the Secretary of State of all accidents connected with explosives causing loss of life or personal injury, and that buildings destroyed by such accidents are not to be reconstructed without written permission from that authority. The Secretary of State is also empowered to order a formal investigation in serious cases.

Part IV. relates to certain Supplemental Provisions, Legal Proceedings, Exemptions and Definitions. Clause 77 authorizes the arrest, without warrant, of persons committing dangerous offences under the Bill. Clause 78 authorizes imprisonment for a period not exceeding three months of a person guilty of a wilful act or neglect endangering life or limb. Clause 79 prescribes a penalty not exceeding £5 for throwing or firing any fireworks in or into any highway, street, thoroughfare, or public place. According to the 90th and following clauses, offences under this Bill may be dealt with either summarily or by indictment. Power is given in certain cases to the offender to elect to be tried on indictment; provision is also made for appeal from a summary conviction to the quarter sessions. Amongst the exemptions from the operation of the Bill are the Government factories, magazines, stores, etc., rocket and fog stations, and certain magazines in the Mersey. Clauses 107 to 112 contain the necessary provisions for the application of the Act, if passed, to Scotland and Ireland.

THE ACTIVE PRINCIPLES OF THE OFFICIAL VERATRUMS.*

A Chemico-Physiological Study.

BY CHARLES L. MITCHELL,

Graduate and Member of the Philadelphia College of Pharmacy.

Part I.—Botanical,

Veratrum Viride.—The rhizoma of Veratrum viride, U.S.
Veratrum Album.—The rhizoma of Veratrum album, U.S.
Sabadilla.—The seed of Veratrum sabadilla, U.S.

Veratrum. *Nat. Order*, Melanthaceæ. *Suborder*, Melantheæ. *Gen. Char.*, Hermaphrodite. Calyx, none; corolla six-petalled; pistils three; capsules three, many-seeded. *Male*, Calyx, none; corolla six-petalled; stamens six; pistils, a rudiment. (Willd.)

Veratrum Viride (U. S. Disp., p. 886), American hellebore, Indian poke, poke-root, swamp hellebore. An herbaceous plant, indigenous to the eastern portion of the United States, and flowering from May to July. The root is perennial, thick, fleshy, the upper portion

* Read before the American Pharmaceutical Association. Reprinted from the 'Transactions.'

tunicated, the lower solid, and beset with numerous rootlets. The stem is from three to six feet high, annual, round, solid, striated, and pubescent; furnished with bright-green leaves, and terminating in a panicle of greenish-yellow flowers. The leaves gradually decrease in size as they ascend. The lower are from six inches to a foot long, oval, acuminate, plaited, nerved, and pubescent, and embrace the stem at their base, forming a sheath for a considerable portion of its length. Those on the upper part of the stem, at the origin of the flowering branches, are oblong lanceolate. The panicle consists of numerous flowers distributed in racemes with downy peduncles. Each flower is accompanied with a downy pointed bract much longer than its pedicel. There is no calyx, and the corolla is divided into six oval, acute segments, thickened on the inside at their base, with the three alternate segments longer than the others. The six stamens have recurved filaments and roundish two-lobed anthers. The germs are three, with recurved styles as long as the stamens. Some of the flowers have only the rudiments of pistils. Those on the upper end of the branchlets are barren, those on the lower portion fruitful. The fruit consists of three cohering capsules, separating at the top, opening on the inner side, and containing flat, imbricated seeds. This plant is found in low, marshy ground.

Veratrum Album (Woodville's 'Med. Bot.,' p. 754), white hellebore. An herbaceous plant, indigenous to Central Europe, and found in mountainous districts. The rhizome is perennial, about an inch thick, externally brown, internally white, and beset with many strong fibres. The stalk is thick, strong, round, upright, hairy, and usually about four feet high. The leaves are numerous, very large, oval, entire, ribbed, plaited, without footstalks, of a yellowish-green colour, and surround the stem at its base. The flowers are both hermaphrodite and male, existing in very long, branched racemes, and are of a greenish colour. They appear from June until August. The hermaphrodite flowers are without calyces, the corolla consisting of six petals, which are oblong or lance-shaped, veined, persistent, and of a pale-green colour. The filaments are six, closely surrounding the germens, shorter than the corolla, and terminated by quadrangular anthers. The germens are three in each flower, erect, oblong, and ending in short hairy styles, which are crowned with flat spreading stigmata. The capsules are three in number, oblong, compressed, erect, two-celled, opening inwardly, and containing many oblong, compressed, membranous seeds. The male flowers differ from these only in not containing the germens.

Veratrum Sabadilla (Carson, 'Ill. Med. Bot.,' vol. ii., p. 50). An herbaceous plant, indigenous to Mexico. The stem is erect, simple, round, and from three to four feet high. The leaves are numerous, spreading on the ground, all radical, oblong-ovate, obtuse, with eight to fourteen ribs, and glaucous underneath. The flowers are rather nodding. The pedicels are very short, and approximated in twos and threes; those of the fertile flowers eventually becoming turned to one side, those of the sterile flowers deciduous and leaving a scar. The segments of the perianth are ovate, lanceolate, veinless, and of a blackish-purple. The ovaries are three, oblong, and connate-obtuse. The styles are acute and dilated downwards. The stigmata are simple. The capsules are three in number, in form resembling those of the larkspur, and opening at the apex inside. The seeds are three in a cell, imbricated, curved, blunt on one side, sooty, and acrid.

These three drugs belonging to the nat. order Melanthaceæ, genus Veratrum, now included in the United States' Pharmacopœia, present to the eye of a careful student one of the most interesting groups of plants known to science. All belonging to the same genus, and all having a marked similarity in their physical characteristics, they sustain the similitude also in their chemical and physiological relations to each other. Two of them are roots alike in nearly every respect, and differing only in the accidental circumstances of preparation for the market, while the third, although a seed, still bears a strong resemblance to the others in taste, odour, etc., and it is highly probable that the root of this latter plant would show a still more striking resemblance, if brought into comparison with the first two. They are all extremely poisonous, have an acrid and burning taste, and all produce violent irritation when brought into contact with the denuded cuticle.

The theory has long been entertained, that if plants, having nearly the same physical and botanical characteristics differ from each other only in a few comparatively unimportant particulars, their chemical constituents will be found to bear nearly as close a relation, the degree varying according to the general similarity of the plants. This theory has been fully proved in the case of the plants belonging to the nat. orders of the Solanaceæ, Menispermaceæ, Berberidaceæ, etc., and it is partly the purpose of the present essay to demonstrate the correctness of this theory, as far as regards this subdivision of the nat. order, Melanthaceæ. Before going farther, I shall treat briefly of the appearance and physical differences existing between these three drugs, first taking up veratrum viride. As found in commerce, veratrum viride is usually in slices and fragments, generally with the rootlets attached. The rhizoma has apparently been quartered longitudinally, then each piece subdivided into two parts, and thus dried. Very rarely it is found whole, and as far as my experience goes, never without the rootlets. In fact, this is one of the main features which serves to distinguish it from veratrum album. The rhizoma when entire is from one to two inches in length, by about an inch in thickness at its broadest part, tapering from that to a very obtuse or truncated extremity, and closely covered with numerous yellowish rootlets. Externally it is of a blackish colour, obscurely annulated and marked with close set indentations, and generally having a tuft at the top, caused by the remnants of the sheathing leaves. Internally it is of a dirty white colour, very hard and horny when dry, and showing a brown ring under the bark, inside of which can be noticed numerous small, irregular, annular markings. For use the portions of the dried stem and rootlets should be rejected, as they are inert. Veratrum viride has a slight peculiar odour, much more noticeable when moistened, and a bitter, acrid, burning taste, resembling both pyrethrum and aconite. When snuffed up the nostrils, it occasions the most violent sneezing, and applied to a portion of the surface denuded of the cuticle has caused great irritation, and sometimes even nausea and vomiting.

Veratrum album, its congener and ally, bears such a close resemblance to it, that the two can only be distinguished by their appearance in the market; veratrum album being always found whole, and divested of rootlets. The rhizoma is from one to three inches long, by about an inch or less in diameter, cylindrical or in the shape of a truncated cone, and often many-headed. At the top it is tunicated, being the remains of the sheathing leaves. Externally it is of a blackish or brownish-grey colour, obscurely annulated, and marked with numerous whitish scars, where the rootlets have been removed. Internally it is hard, of a dirty white colour, and exhibits the same ring under the bark and annular markings as is noticed in veratrum viride. In its taste it also closely resembles that root, being bitterish and acrid, and it has the same irritating effect on the mucuous membrane and cuticle.

These two roots are so much alike, that when both are divested of their rootlets, it is almost impossible to separate them. I have consulted several high authorities on this subject, and find it is the general opinion, among the best pharmacognosists of this country and of Europe, that there is no reliable method of determining between them, except by the presence or absence of the rootlets. One French author, indeed, attempts to prove a slight difference in the size of the cells in the rootstalk, but his deductions are unsatisfactory and indefinite.

Sabadilla or cevadilla seeds generally occur in commerce mixed with the fruit. This consists of three coalescing capsules or follicles, which open above and appear like a single capsule with three cells. They are three or four lines long, and a line and a half in thickness, obtuse at the base, light-brown or yellowish, smooth, and contain in each capsule two or three seeds. These are elongated, pointed at each end, flat on one side and convex on the other, somewhat curved, two or three lines long, wrinkled, slightly winged, black or dark-brown on the outside, whitish within, hard, inodorous, and of an exceedingly acrid, nauseous, burning, durable taste.

Part II.—Chemical.

In order to properly understand the main points under discussion in this paper, it will be necessary to review briefly the different theories advanced as to the composition of these three drugs.

Soon after the publication of Norwood's memoir on Veratrum Viride, Mr. H. C. Worthington (*Am. Journ. Pharm.*, 1838) published an analysis of the root, claiming to have isolated an active principle identical with veratria. His discovery was confirmed in 1857 by Mr. J. G. Richardson (*Ibid.*, xxix, 204), and in 1862, Mr. G. J. Scattergood also examined the root with similar results, finding, however, in addition, that the resin was much more powerful than the alkaloid. Up to this date, all investigators had agreed in pronouncing the alkaloid found in this root to be identical with veratria, but in 1865 (*Ibid.*, Sept., p. 321, and March, 1866, p. 97), Mr. Charles Bullock, of Philadelphia, published a very complete paper on this subject, in which he announced that the alkaloid in question was not veratria, differing from it chemically in not answering to Trappe's test; while the resin which Scattergood found so active owed its power to the presence of another alkaloid, characterized by its insolubility in ether. Dr. George B. Wood, in the thirteenth edition of the U. S. Dispensatory, suggested provisionally for these principles the names of Veratroidia and Viridia. Mr. Bullock's paper was soon after ably supplemented by an essay published by Dr. H. C. Wood, Jun. (*Am. Journ. Med. Sci.*, Jan., 1870), in which the physiological properties of these alkoloids were investigated and described, in comparison with veratria. The subject now seemed closed, but in May, 1872, Dr. Eugene Peugnet, of New York, published, in the *Medical Record*, an elaborate paper on both veratrum viride and veratrum album, in which he asserted that Mr. Bullock was partly mistaken in his discoveries; viridia being a mixture of veratroidia with another alkaloid, which he (Peugnet) claimed was identical with the jervia, discovered by Simon in veratrum album, and possessing only feebly poisonous properties. The paper is very incomplete, the physiological experiments upon which his arguments are mainly based being indefinite and unsatisfactory. The subject created considerable discussion between him and Dr. H. C. Wood, Jun., the main points being left unsettled. In 1874, while making some investigations on verat. viride, I also noticed the presence of jervia (*Amer. Journ. Pharm.*, March, 1874), not being aware until after publication of my paper, that I had been anticipated by Dr. Peugnet. This comprises our knowledge of veratrum viride up to the present time,

Our knowledge of the chemistry of veratrum album is still more incomplete. Pelletier and Caventou, in 1819, appear to have been the first to investigate its chemistry, and found an alkaloid which they called veratria. Simon, in 1837, believed he had found two other alkaloids, one of which he called jervia and the other barytina. Subsequently he transferred the name of jervia to the barytina, discarding it as lime, and recognized the jervia as being identical with sabadillia. Peugnet (see *loc. cit.*) examined the root and found it to contain jervia, no veratria, but instead an alkaloid identical with veratroidia, and ascribed the difference in the physiological action of the two roots to the presence of an active resin in veratrum album, which, when isolated, produced all the poisonous and peculiar effects occasioned by an overdose of the root.

Veratrum sabadilla seeds, according to Pelletier and Caventou, contain veratria, cevadillic acid, a peculiar fatty matter, etc. M. Couerbe discovered two other principles which he named "Le Veratrin," and "Sabadillia; the latter being white, crystallizable, soluble in hot water, and insoluble in ether, and the former a brown resinous matter left after treating impure veratria with pure ether, soluble in acids, and precipitated by alkalies. Simon claims that sabadillia is identical with jervia. Hübschmann confirms the former statement (Couerbe's) as to the separate existence of sabadillia (*Amer. Journ. Pharm.*, xxv, 133). Dr. Mossel ('Sur la Veratrine,' Paris, 1868) considers sabadillia indentical with barytina (jervia). The separate existence of sabadillia seems thus to be involved in considerable doubt.

Some time in the month of December, 1873, I first commenced my investigations on veratrum album, subsequently taking up veratrum viride, and still later sabadilla, thinking that viewed in the light of my previous experiments with the other two veratrums, I might possibly be able to elucidate some points in its chemical composition which had hitherto seemed obscure. In all these experiments the physiological action of the alkaloids was carefully studied as I progressed, by both Dr. H. C. Wood, Jun. (who had previously experimented with the alkaloids prepared by Mr. Bullock), and also by myself. I am also indebted to Dr. Peugnet for some few experiments. The main points to which I directed my investigations were these:—

(1.) What is viridia? Is it a separate alkaloid?

(2). Is viridia identical with jervia?

(3). Does veratroidia also exist in veratrum album, or is there a distinct alkaloid differing from the viride veratroidia?

(4). Does the resin of veratrum album owe its toxic power to an alkaloid like the resin of veratrum viride?

(5). Do the alkaloids exist in sufficient proportion in verat. viride and verat. album to be profitably extracted?

(6). Does jervia exist in veratrum sabadilla?

(7). Are jervia and sabadillia identical?

(8). Is the "Le Veratrin" a separate principle, or only an intimate mixture of veratria and resinous matter?

(9). Do the alkaloids of these three drugs bear a definite relation to each other in their chemical and physiological characteristics?

(*To be continued.*)

EMULSION OF COD-LIVER OIL AND HYPOPHOSPHITES.

The following formula is published in the *Canadian Pharmaceutical Journal*:—

Powd. Gum Tragacanth	½ oz.
Glycerine	3 oz.
Water	9 oz.

Rub the tragacanth with the glycerine, and add the water gradually. To this mucilage add the following solution:—

Hypophosphite of Lime	4½ drs.
Hypophosphite of Soda	2¼ drs.
Hypophosphite of Potash	2¼ drs.
Sugar	¾ lb.
Boiling Water	12 oz.

Make the admixture gradually, with brisk trituration. To this medicated mucilage add the following, as a flavour and preservative:—

Otto Almonds, bitter	10 drops.
„ Cinnamon	5 drops.
„ Canella	5 drops.
Alcohol	6 oz.

The whole will now form a semi-transparent mucilaginous liquid of about thirty-seven fluid ounces in bulk. To this add gradually an equal measure of cod-liver oil, and mix thoroughly. In practice it is advisable to work on small quantities, say half-pint of each, in a number eight mortar. If care is taken the product will be very satisfactory.

The Pharmaceutical Journal.

SATURDAY, MARCH 27, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF FOOD AND DRUGS BILL.

As the consideration of this Bill in Committee was again deferred from Friday, the 19th inst., until last Monday, it was just possible that the Bill might have advanced another stage before the Journal of the present week was in the hands of our readers. However, this has been prevented by another postponement until Monday, the 5th of April. In the meantime we are glad to note that the amendments adopted by the Government, as well as some others proposed by independent members of the House of Commons will, if carried, materially improve the measure, as first drafted, by rendering it more definite and distinct.

It is to be observed that Mr. SCLATER-BOOTH and Mr. CLARE READ adhere to the use of the word "*knowingly,*" against which such strenuous objections have been made, and we have reason to believe they will continue to uphold the principle of this limitation. If it be considered how much yet remains to be ascertained as to the means of detecting adulteration and distinguishing it from accidental impurity, there is much to be said for the justice of this course. Whatever may be advanced to the contrary, we are disposed to maintain that, in view of the admitted deficiency of knowledge on this subject, the endeavour to stamp out adulteration by the inevitable conviction of retailers would involve an unjustifiable slaughter of innocent persons. We admit readily enough that it is the duty of every dealer to make himself acquainted with the nature and property of the articles in which he deals, but however much we may wish to advance that desirable condition of things, we must, in legislation, adapt our laws to present circumstances. We could name many articles of daily consumption now sold by *unskilled* dealers who have no means of testing their absolute purity save the judgment which every consumer can form as to their being *generally* good or bad. Butter is a notable example of this. Mr. WANKLYN, a very high authority, says he can so prepare a sample of common fat that the best analyst shall be unable to distinguish it from butter. It is well known that large quantities of fat exported from England are again imported as excellent butter. Would the enthusiasts for purity first fine a dealer fifty pounds and then send him to the treadmill for six months for being imposed on in the wholesale market by this commodity? Even analysts themselves cannot say that the fat so manipulated and butter made from the finest cream are not identical substances, for it should be remembered that they may be both the products of one animal. The use of some such material as a substitute for butter made in the usual way seems to be gaining ground, and short of its substitution in trade for the latter the manufacturer who thus finds for an ever increasing population a less expensive substitute, of high quality, for one of the common necessaries of life, is a benefactor rather than a defrauder of his country.

But our readers are more interested in the Bill as it affects drugs, and our opponents may say that at least druggists should be *skilled* traders. We, whose mission it is to promote the highest education in those who practise pharmacy, and the keenest sense of the moral responsibility attaching to them in the exercise of their business, cannot utter a word in contradiction of this. But, here again, we must take things as they are, and although we fearlessly assert that "drugs" (we use the term as interpreted by the Bill to mean generally "*medicine for internal or external use*"), whatever Dr. DUPRÉ may say to the contrary, have, in the last thirty years, been changed from a state of impurity and sophistication to their proper condition mainly by the instrumentality of the Pharmaceutical Society. We know that having to depend on collectors in every quarter of the globe, entirely beyond our control, certain drugs still come into the English market in a condition which would subject dealers in them to prosecution, even though they may be of high quality. We have no sympathy with the man who buys a second rate article and palms it on his customers as the best, but he who selects the best goods the market supplies, pays a fair price for them, and retails as he bought them, should at least be allowed to prove his innocence.

It is this proof of innocence which would be open to him by the retention of the word "knowingly." It cannot for a moment be supposed that the onus of proving *actual knowledge* would be thrown on the prosecutor. It may be granted that the druggist's assumed knowledge should be *presumptive* evidence against him, but that should not be final; he should be allowed to purge himself of the charge of fraud. This is the more necessary when it is remembered for what a multiplicity of acticles a druggist would be imperilled as compared with other traders, and how different those articles are to ordinary food or drink. Accepting for the moment the dictum that all drugs are injurious to health, it would become a question whether any commixture of them could be regarded as harmless, and whether, in truth, some of our contemporaries are not right in urging that drugs and food cannot fairly be made the subject of one rule. On this point, Dr. LYON PLAYFAIR'S proposed amendment of section 3 is good where he requires that the ingredient added to any article *must render the mixture injurious to health* to constitute an offence, and not be merely itself injurious.

The Doctor is not so fortunate in his proposition to shut out from the office of analyst every person who is "engaged in the trade of buying or selling any article of food or drug." It is an undoubted fact that a chemist of the very highest class might fail to possess one of the most important qualifications for an analyst under the Sale of Food and Drugs Bill, inasmuch as he would have no experience as to the natural or commercial condition of the articles referred to him for examination. On this latter point the suggestion offered by the deputation which attended at the Local Government Board a fortnight ago has been adopted, providing an exemption for *unavoidable* admixtures occurring in the process of collection or preparation.

We are glad to see that the Council of the Pharmaceutical Society has not been intimidated by the absurd and unwarranted charges brought against it of encouraging adulteration, but persists rather in endeavouring to make the Bill so simple and reasonable that when passed into law it may be found practicable and effective. A second deputation, consisting of the President, Vice-President, and Treasurer, Messrs. Greenish, Hampson, and Sandford, accompanied by Mr. R. Bremridge, the Assistant-Secretary, and Mr. Barclay, of Farringdon Street, who is watching the Bill on behalf of the compounders and vendors of proprietary medicines, had a further and more satisfactory interview with Mr. Clare Read on Friday, the 19th inst.

THE FARADAY LECTURE.

On Thursday the 18th inst. a crowded meeting of the Chemical Society was held in the theatre of the Royal Institution, for the purpose of hearing the Faraday lecture, which was on this occasion delivered by Professor A. W. Hofmann, of Berlin. The subject selected by the lecturer was "Liebig's Contributions to Chemical Science." Instead of entering into a minute recapitulation of that great philosopher's voluminous labours, he restricted himself to a selection of some few of Liebig's more memorable additions to chemistry proper; but to attempt giving an abstract even of this selection—in itself an elaborate discourse—would fail to do justice either to the memory of Liebig or to the lecturer. We therefore refrain from the attempt in the hope that before long we may be enabled to publish the lecture *in extenso.*

At the conclusion of the lecture the President of the Society presented to Dr. Hofmann the Faraday Medal, the highest honour it is in the power of the Society to confer. In doing so he also paid a graceful and well-merited compliment to the lecturer by remarking, that although the name of Liebig had always been honoured in England for his scientific work there was a further especial reason why this should be the case, since we owed to him the early training of a Hofmann and the direct as well as indirect advantages we have thereby derived. It would be superfluous to dwell here on the fact that we are indebted to Professor Hofmann for having been the chief means of establishing in this country anything like a system of chemical education. It must have been highly gratifying to him to recognize among his audience last Thursday many of his old pupils at the College of Chemistry, who now occupy distinguished and useful positions as professors and otherwise, thus testifying to the beneficial results of his arduous and energetic labours.

AMERICAN OPINION UPON RECENT ENGLISH ADULTERATION PROSECUTIONS.

The *American Journal of Pharmacy*, referring to the numerous prosecutions which have taken place in this country under the Adulteration Act, selects two cases as being especially "curious in some of their features," and as showing to "what annoyances persons may be subjected who endeavour faithfully to comply with the spirit of the law."

The first is a conviction at Wolverhampton for the sale of soda-water certified to contain no carbonate of soda but a considerable quantity of carbonate of lime. Commenting upon these points of the certificate, our contemporary remarks that any American manufacturer of soda water would be liable to a penalty under British laws, particularly if he used hard water.

The other case selected is the milk of sulphur prosecution at Leeds. The analyst is described as "fairly writhing under the searching cross-examination," and as a person who "while admitting that two distinct substances were sold under distinct trade names would insist that they ought to be chemically alike." In conclusion a hope is expressed that if ever an Adulteration of Food Act is passed in the United States, it may be so far perfected by the experience of other countries, that it may not be possible to use it as a "means for annoyance under erroneous preconceived opinions on the part of prosecutors."

THE LATE DR. WELWITSCH'S COLLECTIONS.

The collections made by the late Dr. Friedrich Welwitsch during his exploration of the African Provinces of the Kingdom of Portugal have become the subject of a suit in the Court of Chancery, in which the King of Portugal is the plaintiff, and Mr. Carruthers, of the British Museum, and another, are the defendants. The prayer of the Bill is for an order of the Court to restrain the defendants, as executors, from complying with the terms of Dr. Welwitsch's will, which directs the disposal of the collections in various ways, amongst others, the offer of his "study set" of African plants to the Botanical Department of the British Museum at the rate of £2 10*s.* per century. The plaintiff alleges that it was part of the deceased Doctor's duty, under the terms of the appointment he held from the Portuguese Government whilst engaged in his explorations, to collect in the African provinces botanical specimens and other natural objects, and to make the necessary notes and descriptions explanatory of them, on behalf and for the use of Her Majesty Dona Maria and her successors, so that all such collections, including the notes and descriptions, should become, in the right of the Crown of Portugal, part of the public property of that nation. The suit came on for hearing on Monday last, when Vice-Chancellor Sir C. Hall expressed an opinion that with the aid of a scientific person some arrangement could be arrived at which would satisfy both parties, and with that view ordered the cause to stand over without prejudice to either party.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 18th March, 1875. Professor Odling, F.R.S., President, in the chair. After the ordinary business of the Society, the President called on Dr. Hofmann to deliver the Faraday Lecture, the title of which was "Liebig's Contributions to Experimental Chemistry." After noticing the labours of the great experimental thinker in whose honour this lectureship was founded, he gave a succinct account of Liebig's chief contributions to chemistry, drawing the attention of his hearers to the fact that it was he who first founded the great institutions for chemical education, and that he was not only the discoverer of numerous general methods and the investigator of innumerable organic compounds, but that therapeutics and agriculture were especially indebted to him. The lecture, which was experimentally illustrated by Professor McLeod, took place at the Royal Institution in the presence of His Royal Highness the Prince of Wales, and a crowded audience, among whom were nearly all the leading chemists of this country.

The next meeting of the Society will be held on Thursday, April 1, when there will be read a paper "On the Action of the Copper-Zinc Couple on Organic Bodies, No. VIII. : On Chloroform, Bromoform, and Iodoform," by Dr. Gladstone and Mr. Alfred Tribe.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture IV.

The position of Alcohol as a food. Its effects on the animal temperature. Hygienic considerations.

The question next for discussion is short and definite. It is included in the three words : Is alcohol food ?

We have studied in the previous lecture the purely physical action of alcohol on the animal body, that which stands apart from the action of food, and we have learned from the study that over the nervous system and over the vascular supply this spirit exerts a specific influence. We now inquire whether the influence ends there, or whether there may be, in addition, either a sustaining, and constructing, or a heat-giving power—that is to say, a force-giving quality in it. If there be, then the simple physical effects are perchance tolerable, or at all events are not sufficient to militate against the advantages which lie on the food side of the question.

It may be well to rest for a moment to consider the position of men and animals upon the earth in relation to the means given to them for their support as living, moving, and, in the higher animals, thinking structures. This position is well defined. The theory that man was made originally out of the dust of the earth is, after all, the most scientific theory that has ever been advanced as to his primeval origin, if the word *dust* be only extended so as to include the actual compound substance of the earth. For in the earth are to be found not only all the elements out of which he is constructed, but even certain of the elements in the same kind of combination as we find them in him. In the earth, water, salts, and organic matter are found ; in man the same are found. The man is in many respects of motion a reflex of the motion of the earth, presenting periodicities of movements, and of movements in a circle in like mode. As if to complete the analogy, this remains true, that the earth yields spontaneously to man, either from herself directly or from the vegetable kingdom which lies between her and man, all the requirements for his existence. Whatever, therefore man invents, though it may seem to be a great necessity, is not a necessity except to those who, being trained to its use, have been led artificially to believe it essential. Thus nature has produced water and milk for man to drink, and they are, in truth, all the fluids that are essential. This lesson, which nature teaches by the rule of provision for the necessities of animal life, is supplemented by many other facts, each equally authoritative. There is ever before us the great experiment that all classes of living beings beneath man require as drink none other fluids except those I have named. We see the most useful of these animals performing laborious tasks, undergoing extremes of fatigue, bearing vicissitudes of heat and of cold, and enduring work, fatigue, and vicissitude for long series of years, sustained by their solid food, with no other fluid than simple water. We see again whole nations and races of men who labour hard, endure fatigue and exposure, and who live to the end of a long and healthy life, taking with their solid sustenance water only as a beverage.

When we turn to the physiological construction either of man or of a lower animal, we discover nothing that can lead us to conceive the necessity for any other fluid than that which nature has supplied. The mass of the blood is composed of water, the mass of the nervous system is composed of water, the mass of all the active vital organs is made up of the same fluid ; the secretions are watery fluids, and if in any of these parts any other agent than water should replace it, the result is instant disturbance of function that is injurious in proportion to the displacement.

When we turn therefore to the use of such a fluid as alcohol under any of its disguises—as spirit, as wine, as beer, as cider, as perry, as liqueur—we are driven *à priori* to look upon it as something superadded to the necessities of life ; to look upon it, in a word, as a luxury. In such sense, it has always been received amongst those nations which have most indulged in it. It is something added to the ordinary life ; something unnecessary, but agreeable. Wine, added to the meal, transforms the meal into a feast ; it is supposed to make glad the heart, but it is never supposed that if the wine were not possessed the life would be shortened. When now we offer wine, it is, by the effect of habit and education, an offering of a thing that is super-necessitous, and in such wise a compliment, an indication of desire or of willingness to be exceedingly hospitable.

All the evidence of a general kind which can be gathered from these observations points to the uselessness, for man, of so artificial an agent as alcohol. But, after all, an assumption so derived may be false. We have already seen that when alcoholic spirit is taken into the animal body it produces in it exceedingly marked effects ; it may therefore, by accident, I might almost say, play in some manner the part of a food and supplement water. Indeed, it is a form of water in which a compound of carbon and hydrogen has replaced hydrogen. Let us, then, ask the question : Can alcohol be in any sense accepted as performing any other part in the body save that physical part which we have considered ? Can it have happened that man, by his invention, has added to nature a food ? And let us answer the question as candidly as the facts of experiment and experience will permit.

Constructive Materials of the Body.

The living animal body is constructed out of a few simple forms of matter which possess, during life, the power of motion. It is, in its living state, a noun and a verb. Whatever helps to maintain it in perfect order of construction, whatever enables it to move of its own mere will and motion, may be considered as a food. The one help gives matter, and mass, the other gives force or spirit to the mass. With the progress of organic chemistry, after the discovery of the art of organic analysis, it soon became evident that what are called foods are divisible into two great classes ; those which supply material or tissue, and those which supply heat or

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

other variety of force. Gradually it was detected that the building foods all contain the element nitrogen as an essential part, and that the force-supplying foods are free of nitrogen, are hydrocarbons, substances that will undergo combustion by oxidation, and thus liberate force for the motive uses of the economy. So, foods have for a long time been sharply classified as nitrogenous or tissue-feeding, and as respiratory or heat-producing. At the present moment this long-accepted view is undergoing some modification. It is being elicited that the nitrogenous foods are to a certain degree heat-producing, but I need not at this stage enter on the nice question involved. I may safely, for the practical purpose we have in view, let the division of the classes of foods remain as described above.

The nitrogenous foods exist in the animal body in the form of what is called colloidal matter, the word *colloidal* being a term signifying a jelly-like substance. The purest form of this matter is found in the blood in the white, elastic, plastic matter, called fibrine. By repeated washings of a portion of this substance, I have prepared from the blood of the ox, a beautiful specimen of this colloid of the blood. Of a similar colloidal substance the moving muscles are formed. In a fluid state, and permanently fluid at the temperature of the living body, the colloid called albumen forms part of organic structure. Under the names of gelatine and chondrine, a nitrogenous colloidal substance forms the organic matter of the skeleton, of the cartilages, of the sheaths of muscles, of the tendons. The eye-ball is constructed out of a series of colloidal tissues. All the membranes which envelop the visceral organs, and which possess elasticity, are colloidal. The outer covering or skin is colloidal, the nails are the same. Even in the brain and nervous matter there is distributed a colloid. Thus, if we sum up the various parts of the body, we may say that all the active masses of structure are nitrogenous and colloidal.

In combination with this active matter, there are, however, two other material ingredients, viz., water and saline substance. Upon this combination with water the activity of the colloid depends. Upon the saline rest the various kinds of combination of the colloid with the water. In bone the gelatine is combined with a salt, called phosphate of lime, with carbonate of lime, and other salts, in much larger proportion than itself. In fibrine the colloidal substance is nearly divested of saline; but in all parts these three material compounds make up the animal structures.

Lying outside these structures in the natural state, but really as an adventitious formation, is one other animal product, viz., fat; a substance detrimental to the motion of the active parts when present in excess, but at the same time capable of combustion, and of yielding heat by the process.

We have now before us the constructive or building parts of the animal body. Excepting the water, the salts, and the fat, they all contain nitrogen, and they take their specific quality from that specific fact. We know that the source of them is the vegetable kingdom, that they are formed by nature in that kingdom, are transferred from the vegetable to the animal, are not made by any natural process within the animal, have not yet been made by any artificial process known to the chemist, and can therefore only be supplied from the one natural supply.

Alcohol contains no nitrogen, it has none of the qualities of these structure-building foods; it is incapable of being transferred into any of them; it is therefore not a food in the sense of its being a constructive agent in the building up of the body.

In respect to this view there is, I believe, now no difference of opinion amongst those who have most carefully observed the action of alcohol. There is, however, a difference in relation to its action as a fat-forming food. It appears to be on evidence that men and animals beginning, while in a perfect state of health, to take in excess certain fluids containing alcohol become fattened. Notoriously, ale and beer fatten; and in some parts of the country certain animals—calves for instance—are rapidly fattened by the process of feeding them with a mixture of barley flour and gin. But through all these apparent evidences there may run an error. The fattening may not be due to the alcohol itself, but to the sugar or the starchy material that is taken with it. As a matter of general experience on which I have tried to arrive at the truth with as much accuracy as can be obtained, I am led to the conclusion that pure spirit drinkers among men, I mean those who do not mix sugar with the spirit, and who dislike spirit which is artificially sweetened, are not fattened by the spirit they take. This tallies also with the observations on the action of absolute alcohol on inferior animals, for they certainly, under that influence, if they are allowed liberty to move freely, do not fatten.

The question of the effect of alcohol in fattening presents still another difficulty. Alcohol, when it is largely taken, unless the will of the imbiber be very powerful, is wont to induce desire for undue sleep, or at least desire for physical repose. Under such conditions there is an interference with the ordinary nutritive processes. The wasted products of nutrition are imperfectly eliminated, the respiration becomes slower and less effective, and there is set up a series of changes leading, independently of the alcohol as a direct producer of fat, to development and to deposit of fatty tissue in the body. All these circumstances militate against the hypotheses of the origin of fatty material direct from alcohol, nor is there any obvious chemical fact that supports the hypothesis. We understand chemically the transformation of starchy matter into one form of sugar, and we infer that in the animal body sugar is transmutable into fat. We know also that we can transmute sugar into alcohol, but as yet we see no way back from alcohol into sugar; if we did, the difficulty of tracing alcohol into fat would probably be over.

Physiological argument nevertheless lends some countenance to the view that alcohol may, by an unknown process, be transferable into fat. It is true that some confirmed alcoholics who do not wax fat in the ordinary sense of the term, that is to say, who do not fill out with fat, from the separation of fatty matter in their cellular tissue outside the vital organs, do, in certain instances, undergo a process of fatty change within their organic structures. Their muscles, including the heart, become the centres of the degeneration called "fatty," and by the interposition of cells of fat in the minute muscular elements, the activity of the fabric is destroyed, sometimes to a fatal destruction. The same degenerative change may extend also to other organs, to the brain and to such active glands as the liver and the kidney.

At first view it occurs to the mind that here is evidence of effect upon cause. At the same time, it is not so clear that the effect is direct from the cause; for when few proceed to examine into all the data that lie before us, we discover such an absence of uniformity in differing examples of the fatty change that we lose alcohol as the clue to discovery. Some alcoholics truly present the fatty modification of tissue, other alcoholics do not present it, so that alcohol may be in active operation and may neither be promoting the production of fat from other material nor yielding it. Lastly, the fatty change of tissue may progress, in the absence of alcohol, in the tissues of those who altogether abstain.

In conclusion, therefore, on this one point of alcohol, its use as a builder of the substantial parts of the animal organism, I fear I must give up all hope of affirmative proof. It does not certainly help to build up the active nitrogenous structures. It probably does not produce fatty matters except by an indirect and injurious interference with the natural processes.

If alcohol be not a substance out of which the animal tissues are formed, may it not be a source of energy of actual motion; may it not supply the power of doing work? Alcohol, we see, contains two elements that will burn in the presence of oxygen, viz., carbon and hydrogen, and although by their combination already with oxygen in the alcohol a certain measure of their potential energy is lost, they are still capable of combining with more oxygen. This is proved by various experiments. When alcohol is burned, that is to say, when, with its combustible elements, free oxygen combines, there results from the chemical combination a certain degree of heat. The heat produced does not approach that obtained by an equal weight of hydrogen, it is not so great as that produced by an equal weight of carbon, but it is greater than that caused by the combustion of phosphorus, and very much greater than that caused by the combustion of sulphur.

The combustion of alcohol thus spoken of is that active combustion which is excited when a light is brought into contact with it so that its vapour may burn. But it is not actually necessary that such instant active combustion should be set up. If we distribute alcohol over a wide surface in the presence of some chemical substances it will then by its combination with oxygen liberate a greater or lesser degree of heat. If I saturate a portion of paper with alcohol and on that paper pour a little of that finely-divided powder called platinum black, I at once get evidence of heat which may be so active that perfect combustion may ensue. In this instance the alcohol is transformed, as in burning, in great part, nay it may be altogether, into carbonic acid and water, which means the completed combustion. If in place of absolute alcohol, in this experiment, I use alcohol diluted with water, then instead of obtaining the active combination and combustion I get a slower oxidation with the production of substances to which attention has already be given, viz., aldehyd, acetic acid, and volatile acetic ether. In this jar I have in progress these various changes in alcohol produced by the mere exposure of the vapour of alcohol to platinum black damped with water, in the presence of the air.

(*To be continued.*)

Parliamentary and Law Proceedings.

Prosecutions undes the Adulteration Act.

Adulterated Pepper.

At the Hanley (Borough) Police Court, on Monday, March 15, Mr. William Cooper, grocer, Hope Street, was summoned for selling pepper as genuine which was adulterated. Mr. C. E. Challinor prosecuted on behalf of the Corporation, and Mr. Ackrill appeared for the defence. Mr. John Wright, one of the borough inspectors under the Adulteration Act, said he purchased at the defendant's shop, on November 17 last, two ounces of black pepper, which he told the defendant was for the purpose of analysis. After he had bought it the defendant said he did not sell it as genuine. Witness told him that it would be delivered to Mr. Scott, the county analyst. It was subsequently handed over to Mr. Scott in defendant's presence. Mr. Scott's certificate was here put in. It was to the effect that the pepper was adulterated with sharp sand to the extent of 6·96 per cent. The sample was further adulterated with wheat, linseed, and other vegetable matter to the extent of 20 per cent. It was so adulterated as to be distinctly injurious to health. Mr. Ackrill said he altogether disputed the certificate, but he should submit that the case must be dismissed, on the ground that the defendant gave the inspector notice that the pepper was not genuine before the sale was made. Mr. Bodley said the majority of the Bench decided to dismiss the case, as the evidence as to the defendant's statement was not so clear as they could wish. Mr. Ackrill applied for costs. Mr. C. Adams said he hoped the next case of the kind which was brought before the magistrates would be brought forward in a clearer manner than this had been. Mr. Crapper expressed his concurrence in the decision. The Bench decided to grant costs.

Adulterated Pickles.

At the same Court, Mr. Holmes, grocer, was summoned for selling a bottle of adulterated pickles. Mr. Fulford prosecuted. Mr. Bamford proved purchasing the pickles from defendant's shop on November 16, and handing them to Mr. Scott in defendant's presence the following day. The analyst's certificate stated that the pickles were adulterated with sulphate of copper to the extent of 3·27 grains to the imperial pound, which made them very injurious to health. The defendant was fined 10*s.* and 3*l.* 4*s.* costs. He complained that he was being punished for another person's offence, the pickles having been sold as they were received from the manufacturer. The Bench told him that he was not fined for adulterating the pickles, but for selling them. They admitted that the Act as it at present stood pressed unjustly on retail dealers, and hoped that in the new Bill the state of things would be altered.

Supposed Poisoning by a Vermin Killer.

An inquest was held at the Derby Hotel, Whitehall Street, on Monday, 15th March, on the body of James Stott, ironmonger, whose death occurred under singular circumstances from the effects of poison.

Charles Bentley Stott, 20, of No. 132, Yorkshire Street, identified the body as that of James Stott, his late father, who died on the 11th March, and at the time of his death was 51 years of age. On the previous Wednesday morning witness went to see if deceased was about to come down, as he usually got up earlier, and he said he was not so well and would stop in bed. Witness's brother said his father had vomited in the night, and deceased continued to vomit till the doctor was sent for on Thursday. On Wednesday morning witness asked deceased if he had taken poison. He replied, "Yes, Charlie, I have tasted it." He further said he was spreading some poison for the mice on his own bread and butter and tasted some of it. He said he could not tell him what possessed him that he should do it. Witness knew deceased got some drink occasionally, and had seen him intoxicated, but he was not so on Tuesday, neither was he in low spirits. He believed deceased's life was not insured.

Henry Bland, surgeon, said he was first called to see the deceased at about half-past seven o'clock on Thursday night last, and found him in bed. Deceased complained of thirst, and pain in the abdomen. His tongue was clean, and the pulse quick and feeble. The abdomen was swollen and tender, and the bowels distended with flatus. The vomiting had ceased but the purging continued. In answer to a question, deceased told him he had been spreading some poison for rats, and that he had taken some on the point of a knife. Witness did not anticipate his death, and gave him some stimulant, and ordered egg and milk in small quantities. Witness was sent for again at a quarter to eleven the same night, but on his arrival deceased was dead. The symptoms were such as would have been produced by the deceased having taken an irritant poison. The bread and butter produced was sent to witness by deceased's son as part of the bread and butter which deceased had spread to poison the rats. Witness could not say without analysis that there was poison on it.

Thomas Edward Bentley, 31, brother-in-law of the deceased, said that deceased was not in the habit of keeping poison for rats.

The jury returned a verdict that the deceased died from the effects of an irritant poison inadvertently taken.—*Rochdale Observer.*

Illegal Sale of Methylated Spirit.

The *Daily News* reports that on the 18th inst., Mr. Charles W. Pierpoint, chemist,* appeared at the Lambeth Police Court, to a summons, taken out by the Inland Revenue authorities, for having on the 28th January, he not being a distiller or rectifier of spirits or licensed by the Commissioners of Inland Revenue to mix and make methylated spirit, sold half a pint of spirit, whereby he rendered himself liable to a penalty of £50.

Mr. Powell, from the Solicitors' Department, Somerset House, prosecuted.

Alexander Sullivan, an officer of Excise, stated that on the 28th January he went to the shop of defendant in the Old Kent Road and asked to be served with half a pint of methylated spirit, which he sold him after putting in one or two drops of camphor. Witness paid 5*d.* or 7*d.* for it, and then handed it to Mr. Lewis, who took it to the laboratory, Somerset House.

The defendant said the witness asked him to serve him with the spirit as a favour.

Mr. Chance said he had rendered himself liable to a penalty of £50. He would, however, impose the mitigated penalty of £12 10*s.*

* There is no such name on the Register of Chemists and Druggists.

Review.

History of the Conflict between Religion and Science. By John William Draper, M.D., LL.D., Professor in the University of New York, and Author of 'A Treatise in Human Physiology.' London: Henry S. King and Co., 65, Cornhill, and 12, Paternoster Row.

For a philosophical treatise on the relations which have been maintained between recognized religion and science, commend us to this book. It stands alone in its treatment of a subject which has ever provoked more hot blows than kisses. Though unique in these days, we believe it to be the precursor of a literature which will be read with profit and pleasure by all large-minded students of human progress, as assisting to remove a pregnant question from the platform of controversial heat to the cooler and calmer ground of deliberation and research. Many writers, on both sides, have professed to discuss the topic for the instruction and satisfaction of more readers; yet has it soon become evident to the latter that their would-be teachers desire not so much to compare facts and evidence that would lead to independent conclusions, as to expound their own narrow views on matters too broad for their grasp, in a manner less logical than sentimental. Our author is far removed from the stand of such writers, though it is possible to discern on which side his interest lodges. His work differs from theirs as does the summing up of a judge from the pleading of a barrister.

The object of the book is thus stated in the preface:—"What I have sought to do is, to present a clear and impartial statement of the views and acts of the two contending parties. In one sense I have tried to identify myself with each, so as to comprehend thoroughly their motives; but in another and higher sense, I have endeavoured to stand aloof, and relate with impartiality their actions. I therefore trust that those who may be disposed to criticize this book will bear in mind, that its object is not to advocate the views and pretensions of either party, but to explain clearly and without shrinking those of both. In the management of each chapter I have usually set forth the orthodox view first, and then followed it with that of its opponents." So far as we are able to judge after reading the entire book carefully through, the endeavour stated above falls little short of success; as we have previously said, Dr. Draper occasionally shows the tendency of his conclusions. In pursuance of his object, after having discussed the origin of the speculative philosophy of the Greeks (the modern congener of this has found expression in the phrase "the scientific use of the imagination"), and the impetus and extension given to experimental philosophy by the conquests of this great people in the East and in Africa, a philosophy which found its aptest and grandest expression in the Museum at Alexandria, he arrays against each other the extreme parties on either side, Romanism and Science.

In describing the respective attitudes of these contending forces, the author gives historical accounts of the conflicts respecting (1) The Doctrine of the Unity of God, (2) The Nature of the Soul, (3) The Nature of the World, (4) The Age of the Earth, (5) The Criterion of Truth, (6) The Government of the Universe. He then treats of the relation of Latin Christianity on the one hand, and of Science on the other, to Modern Civilization. The book concludes with a review of the position recently assumed by the Romish Church towards the governments of Europe, and dwells on the probable consequences of the struggle. In view of the present state of affairs on the continent of Europe, and the indications afforded by our own country, Dr. Draper's affirmation that "ecclesiastical spirit no longer inspires the policy of the world," cannot be received without question. In no country is policy unaffected by ecclesiasticism, asserted more or less directly.

We feel sure that no intelligent reader can make acquaintance with Dr. Draper's book without being led to thoughtful inquiry, and without learning much that is with difficulty learned elsewhere. Apart from the intense interest which intrinsically attaches to the momentous subject, an added interest arises from the wonderfully clear and lucid language in which the author invariably expresses himself. Each chapter is a picture painted by a master, who so disposes the lights and shadows of his diction as to throw into necessary or desirable prominence the realities he would have observed; minor incidents are not gloomed, but enveloped in the secondary softness that best befits them.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Myringomycosis Aspergillina (Fungus Ear Disease). By James Patterson Cassells, M.D., M.R.C.S., etc. Glasgow. 1875. From the Author.

Note on Salicylic Acid. By Edward B. Squibb, M.D. Brooklyn. 1875. From the Author.

Analytical Report on the Water Supply; also on Impurities in Ice, Snow, and Cistern Water. By Dr. Baker Edwards, Bishop's College, Montreal. From the Author.

Notes and Queries.

RED MARKING INK.—M. Wegler describes (*Pharm. Zeit. f. Russland*) a red ink that can be used for marking linen with an ordinary pen. It is prepared by beating up the white of an egg with its volume of water, straining it through fine linen and then mixing with it some finely powdered vermilion. When the writing is dry a hot iron is passed over the back of the fabric, which coagulates the albumen, and fixes the vermillion in the tissue so that it is not removed by soap, acids, or alkalies.

[433]. POLISHING HORN.—H. H. would be glad to know of a receipt for polishing bullocks' horns.

Correspondence.

*** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Sale of Food and Drugs Bill.

Sir,—In the *Pharmaceutical Journal* of the 20th inst., there appeared a letter from the Secretary of the "Anti-Adulteration Association, Limited," referring to the proceedings of our late meeting. Mr. Payne labours under the disadvantage of being ignorant of what really took place at the meeting in question, with the exception of the necessarily very brief report which appeared in your columns; hence the misconception which apparently induced him so hastily to rush into print.

The lecturer on the occasion referred to, and "the gentlemen taking part in the discussion," were perfectly cognisant of the existence and meaning of section 20 of Mr. Sclater-Booth's Bill. Mr. Wentworth Scott, if our memory serves us right, referred to it somewhat in the following terms:—

"I am aware that later on a kind of half-permission is given to magistrates to reduce the penalties, but this in my opinion would not practically interfere with the obvious spirit and intention of the Bill, which I cannot help designating as, in this respect (*i.e.*, uniform penalties), both unjust and inexpedient."

Mr. Scott considered that what comes out first of all in the working of an Act of Parliament is the point so constantly, and we think rightly, insisted upon by counsel and legal authorities of all grades, viz., the "obvious spirit and intention" of the Act; and it is this which in the main magistrates are chiefly influenced by. Of this general fact we could cite numerous instances, except that we prefer to spare your readers such an infliction. At all events the president, council, and members of this Association after a "lengthy discussion," agreed thoroughly with Mr. Scott as to the necessity for the two resolutions which he moved.

Were the Bill as it is to become law, the magistrates—in that part of the country at least—would certainly go upon what Mr. Scott calls the "Draconian Code applied to Food Legislation," and inflict the full penalty in all cases of adulteration brought before them—whether injurious to health or not—whether in cases of milk, 10 per cent. of clean and wholesome, or 60 per cent. of foul and impure, water has been added; and instead of the principle being affirmed that a *small penalty* should be inflicted, unless for the repetition, or the exceptional gravity of the offence, it may be deemed expedient to award a severer punishment, the very reverse would accrue and the highest penalty would be adjudged as the rule, "according to the obvious spirit and intention of the Act," and it would only be in the most feeble and trumpery cases, and by the most strenuous efforts of a clever advocate for the defence, that the small voiced and apologetic permission to the effect that the full penalty "may be mitigated," *i.e.*, slightly reduced—which appears at section 20, would be acted upon at all.

In the majority of cases too, where the defendant conducts his own defence, this timid mitigation clause would never crop up at all.

The matter is capable of easy amendment by the insertion (in all cases where the words occur) in place of "penalty of," of the words "penalty not exceeding," thus affirming at once the sense of our resolution.

In conclusion, we may state, Sir, that we have now every reason to hope that the spirit of the Bill may be altered in accordance with our wishes, from the exceedingly courteous and favourable way in which our communications have been received by Mr. Sclater-Booth. Mr. Scott was awarded the hearty and unanimous thanks of this Association for the way in which he brought this important matter before us, and we feel sure, Sir, after our somewhat lengthy explanation, that you will agree with us in believing that our resolutions were neither uncalled for nor undeserved.

W. Y. Brevitt, F. J. Barrett, *Joint Hon. Secs.*

The Association of Chemists and Druggists for Wolverhampton and District.

69, *Darlington Street, Wolverhampton,*
March 23, 1875.

Mr. Wigner and the Council of the Pharmaceutical Society.

Sir,—In a leading article of your last week's issue (p. 753), you take the opportunity of referring your readers to a letter from Mr. Wigner at page 759, in which you say "he repudiates the statement he is reported, in the *Chemist and Druggist* of the 15th inst., to have made at a meeting of the Social Science Association," and you further trust that "there may have been a similar inaccuracy," in the same report, of words attributed to Dr. Dupré.

I do not understand from Mr. Wigner's letter that he impugns the accuracy of my report. He says, he "intended to convey" something a little gentler than the expression he actually used can well be reduced to. Before he appears in public again Mr. Wigner had better therefore, curb his rhetoric, or secure an audience of sympathetic analysts alone. Your own pious desire to hear of a "similar inaccuracy" in reference to the report of Dr. Dupré's words, indicates that in this instance your chemical sympathies have overpowered your jealousy for the honour of journalism.

The 'Chemist and Druggist' Reporter.

44*a*, *Cannon Street, E.C.*,
March 22, 1875.

[** Though we are not ungrateful for the good intent of our correspondent's admonition we must remind him that "jealousy for the honour of journalism" should be limited by a wholesome regard to truth and common sense, both of which we consider were violated by the statements reported to have been made at the meeting. Not having been present we cannot undertake to decide whether the blame rests with the reporter or with the speakers.—Ed. Pharm. Journ.]

The Cases of Adulterated Pickles in North Staffordshire.

Sir,—My attention has been directed to an editorial on the above subject in your impression of the 13th inst., in which you unintentionally, while endeavouring to do full justice to the vendors of the said pickles, make an assumption of a not too flattering character either to the analyst or to the prosecution.

As you have evidently been supplied with only half the facts of the case permit me to furnish the remainder. The vendors of the three samples of pickles in question were summoned upon evidence of my certificates, which declared that all three samples were adulterated with "some preparation of, or containing copper," one of them being "grossly adulterated" therewith, and also with sulphuric acid. In all three instances it was decided that the sealed half of the sample remaining in the inspector's (Major Knight's) custody should be referred to an independent analyst, the name of Dr. Thudichum being decided upon by the Bench for two of the samples and that of Professor Attfield for the other one, both sides consenting.

In all three instances the referees absolutely and entirely confirmed the facts given in my certificates; in one—the worst case—Dr. Thudichum reported that the pickles were quite "unfit for human consumption," by reason of the large proportion of copper (which he obtained "in the metallic state") and sulphuric acid therein. In this case a fine of 40*s*. and costs was imposed.

As regards the second sample, the same referee reported that he found it also to be adulterated with copper (which he likewise obtained in the metallic state), but he was not prepared to state that the copper was present in such large proportion as to be materially injurious to health.

In the third case the referee (Professor Attfield) reported that the pickles were adulterated with copper, but, in his opinion, not to such a large extent as to be prejudicial to health.

Under these circumstances the Clerk of the Peace (Mr. M. F. Blackiston) had of course the power of pressing for convictions in both these cases also; but he considered that the ends of justice would be met by his withdrawing the summonses upon costs being paid by the defendants, to whose solicitors this offer was accordingly made, and was duly accepted.

Thus all three samples were proved to be adulterated, one with sulphuric acid and all of them with copper, as certified by me.

WENTWORTH SCOTT, F.C.S., ETC.,
County Analyst.

County Analyst's Laboratories,
Wolverhampton, March 22, 1875.

PHARMACY IN IRELAND.

Sir,—I certainly cannot compliment Mr. Hayes on the tone of his letter in your last issue, and if he wants to enlist the sympathy of the pharmacists in this country on behalf of the Society he represents, it will be advisable for him to be a little more temperate in his remarks for the future.

His allusion in the following words, "Decide the difference between carbonate of ammonia and cyanide of potassium," referring unmistakably to an unfortunate case of poisoning which occurred in one of the establishments of a most respectable firm of apothecaries in Dublin, is, to say the least of it, very questionable, and is far less excusable since his next assertion, referring to the infallibility of druggists and their assistants, is quite contrary to facts.

Within the last three years two or three cases of poisoning through the negligence of druggists or their assistants occurred in Belfast alone, one of which terminated fatally; and no doubt there were others in different parts of Ireland. He remarks that the pure pharmacist is almost extinct in Ireland; this assertion has been so often refuted by other correspondents that it is needless for me to enlarge on it.

Those who live in glass houses should be very careful in throwing stones at other people.

GEORGE CARROLL.

32, *High Street, Bristol,*
March 22, 1875.

Sir,—The burthen and the "refrain" of Mr. William Hayes's reply to my letter of the 9th inst. was wholly undeserved. Yet I do not feel aggrieved; nor need Mr. William Hayes feel alarmed. All things find their due level at the last.

"Hi motus animarum, atque hæc certamina tanta
Pulveris exigui jactu compressa quiescent."

However, to be serious, the "Secretary of the Druggists' Association" has touched upon a matter of which I have myself no personal cognizance, but which in itself furnishes no argument invalidating the position I contended for in my former communication.

CHARLES H. HARTT,
Pharmaceutical Chemist.

March 23, 1875.

Sir,—Having read over the Pharmacy Bill drawn up by the chemists and druggists of Ireland, I beg to offer the following suggestions to those who may take an interest in it. Any Pharmacy Bill framed should define who is or what constitutes a "Chemist and Druggist." No mere fact of selling poisons should constitute one, as the present Bill would include a very wide circle, and in the meantime many parties are selling poisons, such as arsenic, corrosive sublimate, and even cantharides, who are totally unaware of their doses, chemical constitution, antidotes, etc.

To obviate this I suggest that *all* parties who wish to call themselves "Chemists and Druggists" should pass an examination; I do not mean a very severe one, but such as will show that they know what they are dealing in, and only on the poisons. There can be little hardship in this, as a month's reading or a few lessons from a competent person would soon post them up. I would leave the term "Druggist" open to any party that likes to take it, but not to sell any poisons restricted to chemists and druggists. For the dispensing of physicians' prescriptions, I would suggest that only those who pass a proper and fair examination on the subjects needed should assume the title Pharmaceutical Chemist. This is only giving justice to the licentiate apothecary and would not be unfair to those calling themselves chemists and druggists at present.

AN ENGLISH PHARMACEUTICAL CHEMIST IN IRELAND.

Sir,—Mr. Hayes, in his reply to Mr. C. H. Hartt, accuses him of ignoring chemists and druggists in Ireland. I would like if the former gentleman would kindly define what he considers to constitute one, and as he is a prominent member of this body it would have some authority. The mere fact of selling chemicals I should think would not constitute one, and as the manufacture of chemicals is very limited in Ireland that would restrict it to a very few. I even question if one-tenth of those who constitute the Chemists and Druggists' Society would come under it. I hold that the only way to distinguish them is by examination, and this is "the bone of contention."

Mr. Hayes forgets that there would still be a difference between an apothecary and a so-called chemist and druggist, even if they only kept a marine store each. The former would have a qualification while the other's title in the meantime is rather indefinite.

Trusting Mr. Hayes will give us the above information, I am, etc.,

INQUIRER.

Sir,—I have just read in the last issue of your Journal a letter from the Secretary of a trade society in reply to one which appeared in your issue of the 13th inst. regarding the formation of a Pharmaceutical Society for Ireland.

In my opinion the facts stated by your correspondent of the 13th inst. still remain uncontroverted; notwithstanding that this Secretary thinks proper to accuse the writer of "gross misrepresentation."

Now, as your correspondent of the 13th inst. points out, the only recognized pharmacists in Ireland are the licentiates of the Apothecaries' Hall (any others practising pharmacy not only break the law but render themselves liable to a fine), consequently, he is perfectly right in saying that the druggists are incapable of forming the nucleus of a Pharmaceutical Society. They can know nothing at all about pharmacy. How can they, when their knowledge of the subject must have been restricted to the sale of paraffin oil, soft soap, lamp black, etc., etc.? As a matter of course, their idea of chemistry must be equally limited.

It is simply ridiculous to think that such persons are competent to dispense medicines, and it would be obviously most unfair and unjust to place them on an equal footing with the licentiates of the Apothecaries' Hall, who have had, first, to graduate in arts, then undergo a protracted and experienced course of instruction, and a stringent examination in pharmacy, chemistry, botany, and materia medica, for the first half of their diploma, and in medicine surgery, jurisprudence, and midwifery for the second; while those drug-vendors were never required to receive any professional education whatever.

The introduction of the Pharmaceutical Act of 1868, in England, was totally different, inasmuch as that the then existing chemists and druggists were *bonâ fide* compounders of medicine, and as a rule were, at all events, fairly educated pharmacists, but who can say as much for traders who call themselves chemists and druggists in this country? As I said before, it is morally impossible that they could understand pharmacy,—except some who have been unconscientious enough to make up prescriptions in direct violation of the Act of Parliament, and have been in some instances prosecuted by the Hall.

I believe that the cry for the necessity of a Pharmacy Act for Ireland has been got up and greatly exaggerated through the interested motive of these drug-vendors who would be pharmacists.

Surely it is well known, that in Dublin, Belfast, and Cork, and all the large towns in Ireland, there are a sufficient number of licentiates of the Hall, well-educated men and with sufficient skill to meet all pharmaceutical requirements, and I trust the Legislature will well consider the subject and think twice before they recommend the passing of the Bill, promoted by these persons who never had the opportunity of studying or practising pharmacy or chemistry in one of their details, and therefore must be disqualified for the position they seek to occupy.

A MEMBER OF THE ASSOCIATION OF LICENTIATE APOTHECARIES OF IRELAND.

Dublin, March 23, 1875.

Pharmaceutical Remuneration.

Sir,—As a practical man, I am glad to see by the letters of "Veritas" and others that some pharmacists, at least, are giving some little thought to the future, when in the "sear and yellow leaf" of our lives it is but right we should, in quiet repose, enjoy that freedom from strife which, and I say it advisedly, characterizes all those who would emulate our fortunate brother. It is not, however, given to all to thus succeed. Even with the greatest perseverance and aptitude in business, together with the utmost frugality, is it possible in many, many cases to do more than pay rent, taxes, and barely subsist? In corroboration of this statement it is only necessary to look into the returns of the majority of chemists' businesses in London, especially in the suburbs, where a return of from £500 to £1,000 a-year is considered very good indeed, and this sum exists rather as the exception than the rule. It is, however, refreshing to read and hear of those "happy hunting-grounds" in the provinces, where returns of £2,000 and upwards are so readily and certainly made from so small an outlay as £200 or £300. Let "Veritas" put one of his sons in a London suburb, especially a western one, with double the above amount of capital,—which will, by no means, be found too much, especially if the chosen pharmacy is to be fitted in the elaborate way now so generally adopted,—and then let him wait patiently, in the meantime using all the business diligence and astuteness his previous education has inculcated in him and see what the result will be, and how much he will be able to save. If a few years' experience in one of the districts alluded to is of any service, I can fairly say the "puttings by" will probably be nearly nil; for what with high rent and taxes, and the keen competition that always keep our prices down, there is little left for net profits, out of which savings can be made. In mentioning competition I not only refer to the silly suicidal practice that appears to exist in this neighbourhood of opening a chemist's business at every corner of a street, or in any little terrace of shops, advertised by enterprising but selfish builders or agents whose only interest is the certain rent or commission gained, but to the great and growing competition we have to fight against with the drapers and grocers, besides the stores that now exist in many parts of town. A large draper, not a hundred miles from this locality, is selling patent medicines, foreign mineral waters, sundries, and even drugs of all kinds, kept put up in various sized bottles, at ordinary wholesale list prices, such, for instance, as tinctures at 2*d*. per ounce, and 1*d*. for bottle; 10½*d*. for 1*s*. 1½*d*. patent medicines, and so on. And this firm does an enormous and increasing business in these goods, so much so that never a day goes by now without at least five or six customers making remarks upon my charges, observing that they can get the same goods at the establishment above alluded to at the ruinously low charges referred to. The consequence is, the retail is "growing small by degrees and beautifully less," and we have only dispensing left, and when a great part of this is done by medical men, I leave others, perhaps better qualified, to reckon the heavy odds against a chemist ever reaching that El Dorado called independence who essays to commence in a western suburb. My advice, therefore, to those about to commence in such is, like Punch's advice to those about to get married—"don't." "*Verbum sap.*," etc. A Notting Hill Chemist.

What is a "Square" Man?

Sir,—I should like to know from "J. G. C." what he means by a "Square" man, since, unless this term be fully explained, it seems to me quite premature for anyone to take up his very extensive line of argument, and still more so since the illustrations "J. G. C." cites as objections to a "Square" man are applicable in a great measure to the whole body of chemists' assistants and apprentices.

Chas. Shapley.

30, *High Street, Shrewsbury,*
March 15, 1875.

Milk Analysis.

Sir,—As the publication of the various methods in use for the estimation of the valuable ingredients in articles of diet is at the present time of much importance, would you kindly allow me, through your columns, to make known the method which I employ in the estimation of the fat and solids, etc., in milk? It is the result of much working and observation on this point.

The conclusions arrived at by Mr. Edward Lawrence Cleaver, published in your issue of March 6th, are exactly what I arrived at some months ago while working on the different processes for milk analysis. I can, therefore, but feel pleasure that my results do not stand alone against the large number of advocates for those processes involving diametrically opposite bases. Conclusion 2, to the effect that cold ether will not dissolve out the entire amount of fat from milk residue, while it is in a pasty condition, is universally true; but Conclusion 1, to the effect that cold ether will not dissolve out the entire amount of fat from dry residue, does not hold good when circumstances are modified. According to a process, after described, all the fat is abstracted from the dry residue with cold ether, which is proved by carrying on duplicate experiments with hot ether, or by treating the residue left after extraction with potash and acid, and then performing a second extraction.

The following are the principal features in the process, and from experiments, some of which I will enumerate, I prefer it to all others. For the estimation of fat:—Take a small mortar of 3 inch diameter and measure exactly into it 5 c.c. of the milk under examination. Of pure, washed, and ignited sand, add a sufficient quantity to hold all the milk within the interstices. Place in a hot chamber (100° C.). In half an hour the milk and sand will be in such a condition as to admit of a partial trituration. Replace the mortar until the mixture is quite hard, then triturate thoroughly. Bring the mass into a tube blown from a piece of stout German glass of half inch diameter, and wash out the mortar twice with small quantities of pure sand, adding the rinsings to the main portion. Add dry ether, close with cork in preference to glass, and shake up in the cold. Pour the solution directly from the tube through a small filter into a convenient vessel (I use a boiling-point flask, the end of the funnel being drawn out until it passes the side tube). Wash the residue in the tube once with ether, pouring the liquid through the filter. The contents of the tube are then emptied into the filter, and the edges, along with the sandy mixture, carefully washed two or three times with ether. The solution is evaporated, and when a boiling-point flask is used, a current of dry air is drawn over the oil to ensure complete dehydration. It may then be weighed.

The advantages of this method are:—firstly, speed, for although a description indicates complexity, and consequent lengthiness, the evaporations are effected with unusual rapidity; secondly, scientific accuracy, seeing that all the caseous envelopes of the milk fat are thoroughly disintegrated by trituration, in every case giving a higher percentage of fat as compared with results obtained by simple extraction after maceration in alcohol.

The following four triple experiments conducted on two samples of milk from the same cow, at different times of the day, will afford some insight. In every case a larger percentage of fat has been extracted by trituration.

Samples.	By trituration. Direct.	Without trituration. By loss.	Without trituration. Direct.
(1.)	3·15	3·02	2·97
(1.)	3·13	3·05	3.00
(2.)	3·12	3·00	2·95
(2.)	3·10	3·04	3·00

In the determination of total solids, I much prefer to work with sand, as the results are not only arrived at in a shorter time, but in every case they are lower then when simple evaporation to thin layers or to the granulated state is adopted.

My method of manipulation is:—Having ignited a convenient quantity of sand in a porcelain or platinum vessel, take the weight including sand. Weigh out into the dish exactly one gramme of milk. Place in hot chamber (100° C.), and when in a hard, though pliable condition, spread the mass with a platinum wire around the sides of the small vessel. Heat until there is no longer loss in weight. The process generally takes one hour, while the usual process takes three times as long.

Three careful experiments on one sample of milk will be sufficient to show that a lower and therefore truer percentage of solids is obtained by the above method as compared with that by the usual process.

With Sand.	Without Sand.	
1 hour	1½ hours	2½ hours
12·41	12·75	12·61
12·38		12·58
12·40	12·70	12·62

Speed is the great inducement to the adoption of this method, and the fact that there is no sacrifice made on the score of constancy or accuracy, but rather the reverse, is an additional attraction.

In specific gravity determinations, which should always be performed, as they give the means of exactly reducing the fat figures from volume to weight, I employ the very accurate method of adjusting the volume by means of fine tubes of differing capillarity. The apparatus is easily blown from a quill tube. Expand a bulb in the centre of a piece of tube, and close on either side, draw out, taking care to leave one arm considerably wider in bore than the other. Bend the thin arms up and over, outwards, until again in a horizontal position, the bulb hanging between. Place on the thick capillary a graduation mark one half inch from the end, and the instrument is complete. When the bulb is filled completely with any liquid, a few seconds' manipulation with a morsel of blotting paper at the end of the thin capillary will suffice to bring the column of milk exactly to the graduation mark on the opposite arm, when, if constant in temperature, it may be weighed. The utmost accuracy is attainable, and the speed is equal to determination by the float.

At first sight the above methods of manipulation appear to be troublesome. They in reality are not so. From the fact that every point of the process is reduced as far as possible to mere mechanical routine, the mental anxiety towards securing accuracy is much diminished.

The time occupied in an examination is, if anything, less than by the usual methods.

The advantages may therefore be stated as being—firstly, the reduction of the chance of experimental error; secondly, a nearer approach to truth in the actual amount of fat and solid.

G. D. Macdougald.

Chemical Laboratory, 41, *Reform Street*,
Dundee, March 20, 1875.

"Synonyms."

Sir,—Few pharmacists could doubt the ready sale of a book of Chemical, or more correctly speaking, Pharmaceutical Synonyms, provided it is the work of a really experienced man, whose name would be a guarantee to its efficient and exhaustive character.

The form, I would venture to suggest, should be that of an ordinary dictionary, no lengthy description of each article being required, but simply the obsolete name and its present representative, and *vice versâ*, or where necessary the formulæ for its preparation.

A printed letter forwarded to every chemist asking co-operation by supplying any technicalities, would doubtless bring to light many which otherwise might escape notice, and I believe most gentlemen would feel a pleasure in supplying the needed information.

Rebus.

March 23, 1875.

*** In reference to the above subject we have received a communication from Mr. O. D. Owen, stating that he has been engaged for a considerable period in compiling a 'Book of Synonyms,' but that it is yet too incomplete for publication.

Saccharated Calomel.

Sir,—Anticipating some remark would follow from an abler hand than mine I have hitherto held my pen from any observation on the startling paragraph of the presence of perchloride of mercury in saccharated calomel (*Pharmaceutical Journal*, December 26th last, p. 519). I certainly felt rather surprised at such a statement and receive it as purely chemical knowledge. I am also very uneasy respecting using the same, having it in daily use as teething powders for children, and if any of the numerous readers of the *Pharmaceutical Journal* can give me any experience in the use of the same powders for children as to their safety or of the smallest hazard of danger, I shall be glad of the information. At the same time I wish to know if any presence of perchloride of mercury has been detected when calomel is mixed with sugar of milk.

Any correct knowledge of the above will much oblige.

J. B. S.

March 11, 1875.

Physiological Chemistry.

Sir,—It gives me great pleasure to address the editor of one of the leading scientific journals of our time. Truly we live in an age of great enlightenment as regards scientific and analytical research,—one in which the hidden mysteries are dragged ruthlessly before our eyes and the component parts of seemingly intricate compound bodies are laid open to our view and their composition definitely ascertained. So much for the advance in analytical chemistry, and still it goes on with rapid strides, overcoming every obstacle it meets with, and opening new paths for the practitioner of medicine to walk in. But still there are untrodden paths yet to be explored. A brother M.D. in this city (who, by the way, is also a member of the Pharmaceutical Society of Great Britain) is a great enthusiast as regards the proximate analysis of everthing which may lead to the unearthing of anything new in the amelioration of disease, and has had frequent discussions with me in reference to the component parts of diseased structures and the pathological changes which take place in consequence of the alteration of the atomic principles, which by their normal union form the healthy structures of the body.

To make it clearer I will state that any analytical chemist can now tell positively the exact composition of the blood, also the component parts of muscle and of bone. Now, what change analytically speaking takes place when tuberculosis makes itself manifest, or what change takes place in the blood when scirrhus makes its appearance? These are the questions which I think have never yet been answered; but I am satisfied if analytical chemists generally would take the matter in hand and thoroughly investigate all the altered conditions of the atoms, they could supply us with powerful weapons to destroy these "degenerative processes" which are carrying off their tens of thousands yearly, by informing us of the chemical changes which they find by analysis, in those parts which are affected by those diseases.

J. C. McMechan, M.D.

Cincinnati, Ohio, United States,
March 2, 1875.

Absolute Phenol.—A Yorkshire pharmacist writes to state that when lately visiting the metropolis he obtained a sample of this article; but before exhibiting it to friends as the last new thing he fortunately examined it, and found that it was altogether different to what he had expected, it being sulphate of zinc crystals. The said "young man from the country" charitably hopes this was simply a mistake and not an attempted joke.

J. Finch.—Probably the labels would require a stamp, especially if they contained the proposed addition. You are recommended to submit them for the opinion of the Inland Revenue Authorities at Somerset House, who alone can answer your question authoritatively.

F.K.—We believe that up to the present time the lectures have not been published in a collected form.

"*Quintus.*"—*No licence* is required for the sale of quinine wine, if it be made according to the recipe in the British Pharmacopœia and not sold as a proprietary or patent medicine. See *Pharm. Journ.*, Oct. 26, 1872, p. 327.

E. S. V. is referred to the rule respecting anonymous communications.

Irish Pharmacy.—*Errata.*—We are requested by Mr. Hayes to make the following corrections in his letter on p. 759. In col. ii. line 8, *for* "employers" *read* "employees." Line 11, *for* "Decide the difference" *read* "Describe the difference." We have referred to his MS. and find that the words were written as printed last week.

Copies of Prescriptions.—G. H. B. writes in reference to this subject that he considers pharmacists would be consulting their own interests by giving copies gratis, and he states that he has known instances in which a charge has caused great dissatisfaction.

J. P.—The explosion that takes place is not such as you imagine, but is due to the ignition of the hydrogen evolved.

T. Crew.—You will find all the information you ask for in an article in vol. v. of the second series of the *Pharm. Journ.*, p. 33.

Communications, Letters, etc., have been received from Mr. J. Booth, Mr. W. Robertson, Mr. J. Bown, Mr. Atkins, Mr. Pitts, S. G.

THE PRESENCE OF LEAD IODIDE IN SYRUP OF IODIDE OF IRON.*

BY W. A. SHENSTONE.

Some two years since a specimen of syrup of iodide of iron, containing spangles of lead iodide, was exhibited at a meeting of the Pharmaceutical Society by Dr. Attfield, who had it from Mr. Rimmington, of Bradford. A good deal of information concerning the contamination was elicited from some of the members present, but I do not think the matter was much noticed by pharmacists generally, and therefore, having recently met with a case of the kind, I thought it probable that a few words on the subject would not be without interest.

The source of the lead in these cases appears to vary. Mr. Williams, who has met with the difficulty on a large scale, states that in all cases it has been due to the use of impure iron filings, whilst Mr. Umney finds that it only occurs when the iodide is prepared with rough iodine, which sometimes contains lead from having been sublimed into leaden vessels. Obviously the use of pure iron wire and resublimed iodine would remove these causes of trouble, and in the present case these precautions were taken; moreover, the same supply of iron and iodine had been repeatedly used for the purpose, and the solution of iron iodide was prepared in an enamelled vessel, which also had been often previously employed; it appears, however, that on this occasion the mixture of iron, iodine, and water was allowed, by an accident, to become much hotter than usual, and this leads me to think that, under the conditions of the operation, the iodine acted on lead contained in the enamel, and so brought about the mishap. I would, therefore, point out the advisability of avoiding the use of enamelled vessels in preparing iron iodide, if it is intended to apply heat during the process. There are thus three ready means by which lead iodide may get into syrup of iodide of iron, and I wish I could indicate three equally easy methods of getting it out again, but this I am unable to do. Up to the present only one process has been proposed, viz., diluting and decomposing the lead iodide with sulphuretted hydrogen. This is said by Mr. Williams to succeed; but it seems to me that the necessary reconcentration, either by addition of more iron iodide and sugar, or by other means, is a considerable disadvantage, and I have thought it might be avoided by passing the gas into the undiluted syrup kept hot by a water-bath, removing the lead sulphide by subsidence or straining, chasing out excess of sulphuretted hydrogen by a current of carbonic acid gas, and finally warming the syrup with a few fragments of iron wire to remove any hydriodic acid that may remain. I intended subjecting this process to the test of experiment, but unfortunately have not had the necessary time at my command. I have, however, found that all but a very small portion of the lead is converted into sulphide by passing the gas into the hot syrup for a comparatively short time, and therefore feel justified in recommending a further trial of the method, especially as the process by dilution can be just as well resorted to afterwards, in case of the above plan failing.

*Read before the Bristol Pharmaceutical Association, January 22nd, 1875.

A SECOND KIND OF JABORANDI.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

In a recent number of the *Revista Farmacéutica*,* published by the Pharmaceutical Society of the Argentine Republic, Señor Domingo Parodi, gives an account of a chemical investigation by himself of the active principles of jaborandi. Although the drug described by him is not, as he appears to think, identical with the jaborandi of Pernambuco, yet his method of procedure in examining the drug and the results he obtained may be not altogether without interest.

The jaborandi which he has examined is that used by the natives of Paraguay, and is evidently, judging from the botanical description given by him, a species of *Piper*, but it does not, as he suggests, correspond to the *Piper Jaborandi* of Velloso.† According to the author "jaborandi" is a sort of generic name applied to various plants having an acrid or pungent taste, but restricted in Paraguay, in a medicinal point of view, to the *Piper* which he describes. That there may be no misunderstanding as to the plant which Parodi examined, his description is here quoted *verbatim et literatim:—*

"*Jaborandi.*—Suffruticosum, tri-ulnare ramosum, glaberrimum. Caule tereti nodoso inmaculato. Foliis modice petiolatis, usque 9-pollicaria, subcoriaceis s. potius membranaceis, ovatis, opacis; supero oblongo-ovatis, apice breviter attenuatis, basi rotundatis parum inequaliter productis.

"Petiolis super sulcum læviter caniculicatis, non marginatis. Spicæ oppositifoliæ, erectæ, mediocres, breviter pedunculatæ, pedunculis subtilissime pubescens, hermaphroditæ. Bractæ floræ clavate, pressione angulatæ, apice convexæ, margine dense pubescentes.

"Filamenta elongata, crassa, marcescens. Antheræ 2, monothecæ, laterales, apice conniventes, basi divaricatæ, flavæ, siccæ fuscæ, rima laterale. Stylus brevissimus, persistens. Stigmata 3, raro 2, brevia, crassiuscula, divaricata. Baccæ feræ exsuccæ, confertissime, obovato-trigone, albumine farinosa. In sylva, loco humido prope Caacupé."‡

The properties of the Paraguay jaborandi resemble those of Pernambuco jaborandi, being powerfully sialogogue and sudorific.

The former is used for bites of poisonous reptiles, the expressed juice being applied to the wound and a cup of an infusion prepared with the fruiting spikes, leaves or roots, taken every quarter of an hour until copious perspiration ensues.

It is also commonly used for marsh fevers, and generally with a favourable result. Externally it is applied in the form of powder, plaster, or decoction, as a stimulant and detergent.

Being desirous of ascertaining if these properties

* January 1st, 1875, p. 3.

† The plant described by Velloso has four stamens and four stigmas, that described by Parodi has two stamens and three stigmas.

‡ It has before been pointed out that under the name of "jaborandi" several different plants are known in various parts of South America. Leaves of a species of *Piper*, which seem to differ from that above-described, have been imported into England; also a root belonging to some species of the same genus. This root is remarkable for the peculiar persistent salt taste which it leaves in the mouth when chewed. I have not been able yet to ascertain to what species these belong, but the leaves are certainly not those of *Piper Jaborandi*, Vell.

were due to the essential oil alone, Parodi made the following examination of the drug:—

Two kilogrammes of the leaves and spikes, with flowers and young fruits, were macerated for twelve hours in six times their weight of water, and then submitted to distillation.

The first kilogramme of water that came over possessed a pungent and acrid taste, and had an opalescent appearance, with some drops of oily liquid floating upon the surface. This liquid being saturated with chloride of calcium, the greater proportion of the essential oil separated. Its taste was acrid and caustic. A current of hydrochloric acid gas was then passed through the oil, and this produced a crystalline mass similar to artificial camphor. The contents of the retort were then expressed, and the resulting liquid filtered and carefully evaporated to dryness. The extract thus obtained was macerated for two hours with alcohol of 40°, which separated the gummy part. The alcoholic solution was then evaporated, and the residue dissolved in water acidulated with hydrochloric acid, and afterwards treated with pure benzine. The mixture was shaken, the benzine solution separated and then allowed to evaporate in the open air. In this way 2 grammes of an amorphous residue were obtained, which, when redissolved in absolute alcohol, left a little resin, and the alcohol being left to spontaneous evaporation, there appeared in it small groups of interlaced prismatic crystals belonging to the rhombic system. These crystals heated in a tube with soda lime gave off an abundance of ammoniacal vapours. The crystals were easily soluble in amylic alcohol and benzine, but little soluble in dilute acids and in ether. The alcoholic solution is precipitated by phosphomolybdate of soda and by phosphotungstate of soda. This alkaloid has but weak affinities for acids. Sulphuric acid colours it a tawny yellow passing slowly to green. It is fusible at 110° and decomposed at a much higher temperature. The crystals treated with nitric acid give off nitrous vapours and leave a residue of resinous appearance and extremely bitter taste. Gr. 0·50 submitted to analysis gave :—

Carbon	57·30
Hydrogen	5·86
Nitrogen	13·57
Oxygen	23·27
	100·00

One hundred parts combine with 17·5 of hydrochloric acid, giving an equivalent which leads to the formula $C_{20}H_{12}N_2O_6$. The characters of this substance seem to allow of its being placed, under the name of Jaborandine,* in the series of crystalline principles obtained from *Piperaceæ:* viz. piperine, methysticine and kawaine.

THE DETERMINATION OF POTASSIUM AS CHLORIDE OF POTASSIUM AND PLATINUM.†

BY G. KRAUSE.

Probably nowhere is the estimation of potassium by means of platinic chloride practised to the extent that it is in the laboratories of the chemical works at Stassfurt. The author, who is a chemist in Stassfurt, has, therefore, thought it would be worth while to describe the way in which these examinations are made, together with some of those modifications in the manipulation which are carried out in practice, but are more or less left undescribed in the handbooks.

The analysis is conducted in the following manner: the substance to be examined being a potassium chloride, which is an average specimen of the manufactured material, it would consist of about 80 per cent. of potassium chloride, 10 per cent. of sodium chloride, 5 per cent. of magnesium chloride, magnesium sulphate, and calcium sulphate, of the latter two very little, and 5 per cent. of moisture. Sometimes, however, it would be richer in potassium chloride. A larger quantity of sulphuric acid, such as would occur in the manure-salts of this district, must first be removed by barium chloride, using the smallest possible excess of the reagent so as not to cause a useless expenditure of platinic chloride thereby. After the sample has been well pulverized and mixed, a portion of it is dissolved in water. The quantity taken differs, but the best proportion seems to be about 10 grams to 250 c.c. of water. Less of the salt would yield a less exact result through the employment of more water. The solution is filtered to remove mechanical impurities, and 10 c.c. are taken up by means of a pipette, and dropped into a porcelain capsule already fixed in a water-bath. The quantity taken answers to the twenty-fifth part of 10·0 grams = 0·4 gram. The platinic chloride is now added in excess; the mixture is stirred with a glass rod, and evaporated to dryness. The residue is then moistened with a few drops of water, the capsule is quickly cooled and its contents triturated with 2 to 3 cub. cent. of alcohol, 90° to 95°. After standing a little while the liquid is poured upon a filter which, after being dried at 120° to 130° C., has been weighed and moistened with alcohol, there the residue is again washed with alcohol, and the liquid passed through a filter until a drop of the filtrate appears colourless, and no longer gives a chlorine reaction with silver nitrate. The precipitate is now removed by means of a wash-bottle from the capsule to the filter, where it is finally left to drain, and the yet adhering spirit removed by gently drying with blotting paper. The filter is then placed in a drying closet at 120° C. to 130° C. for half-an-hour, and then weighed immediately between tared glasses, pressed together with a clamp. The increase in weight shows the amount of potassium platino-chloride obtained. This multiplied by 0·305 and divided by the quantity employed (= 0·4) gives the weight per cent. of potassium chloride. The factor 0·305 corresponds with the formula :—

$$\underbrace{K_2PtCl_6}_{488\cdot40} : \underbrace{2\,KCl}_{149\cdot00} = 1 : x$$
$$x = 0\cdot305$$

In calculating it as potassium sulphate the figure 0·356 is used :—

$$\underbrace{K_2PtCl_6}_{488\cdot40} : \underbrace{K_2SO_4}_{174\cdot00} = 1 : x$$
$$x = 0\cdot356$$

The quantity of potassium is obtained by 0·159 :—

$$\underbrace{K_2PtCl_6}_{488\cdot40} : \underbrace{K_2}_{78} = 1 : x$$
$$x = 0\cdot959$$

Simple as this operation may appear, and, in fact, is, there are several precautions in the manner of proceeding which have to be observed in order to attain a correct result. In the first place ammoniacal vapours must be avoided, and the formation of platino-chloride of ammonium, $(NH_4)_2PtCl_6$, prevented, as this would increase the apparent weight of the potassium platino-chloride. Likewise it must be kept free from alcohol vapour, in order to avoid a partial reduction to metallic platinum.

* The name Jaborandine having been thus appropriated, it will be necessary, should any crystalline principle be obtained from Pernambuco Jaborandi, to choose some other name for it, such as Pilocarpine.

† Abstract of a paper in the *Archiv der Pharmacie* [3], vol. ii, p. 407.

In any other analysis the use of a large excess of the reagent is avoided, here, however, the platinic chloride must be added in excess. Besides the potassium chloride, all the accompanying salts must be converted into platinum compounds. It is therefore necessary, in fact, to regulate the amount of platinic chloride in the solution by experiment, without confining it within too narrow limits. A potassium chloride rich in magnesium or sodium chloride will naturally require more than one poorer therein, the atomic weights of magnesium and sodium being considerably smaller than that of potassium.

There are certain signs by which it is known whether the platinic chloride is in excess or not. Firstly, in the latter case after evaporation the mass appears of a clear yellow colour, with whitish points on the edges; but when there is an excess of the reagent the fluid remains of a deep yellow colour during evaporation, and the residue is of the same colour. Secondly, sometimes the first alcoholic liquor is not orange coloured, but almost or nearly colourless, and in the capsule, besides the yellow, specifically heavy, crystalline, potassium platino-chloride precipitate, there are noticed light, white flocculent particles, which subside slowly, and are the first to go into the filter. It is particularly to the incompletely precipitated magnesium salt that this appearance is due. Notwithstanding that magnesium chloride is itself soluble in spirit, it is in this case very difficult to wash away. After the addition of the reagent it is evaporated at a temperature of 100° C. An evaporation to dryness is also recommended in order to drive off a small quantity of free acid which the platinic chloride might contain, as the presence of hydrochloric acid would favour the solubility of the potassium platino-chloride in the spirit. There is no need to fear the formation of platinous chloride, since this only commences at a temperature of 200° C. or higher. That salt is difficultly soluble both in spirit and in cold water. The alcohol should be as strong as possible, but neither absolute alcohol nor ether are positively required.

The moistening of the residue with a few drops of water and the rapid cooling of the capsule have for their object to restore the water of crystallization to the sodium platino-chloride ($Na_2PtCl_6 + 6H_2O$) present, which renders it more soluble. The mass does not become pasty upon the addition of water; it only changes colour and assumes a granular appearance. The dried dark yellow, almost brown contents of the capsule become again of a fine yellow colour upon the absorption of water. The precipitate is triturated with strong alcohol in order to separate the soluble compounds, which consist of the double platinum salts of sodium, magnesium, calcium, and barium, respectively. From this it will be seen that the previous removal of bodies compounded of the latter three elements is unnecessary. Fresenius directs the previous removal of the alkaline earths by means of oxalic acid or ammonium carbonate. This operation may therefore be omitted. During the filtration of the washings a suction apparatus is used to hasten the process, for which, without being absolutely necessary, Swedish filter paper should be used. The author employs simply thick blotting paper, selecting the best sheets for the purpose. A filter of this material, notwithstanding its absorptive power does not let the precipitate pass through. It must once more be pointed out that the platino-chloride of potassium must be washed to the last in the capsule by strongly triturating it with alcohol by means of a glass rod. Numerous experiments have shown that it is impossible to obtain a complete washing if all the original contents of the capsule are thrown at once upon the filter. Again it is especially the magnesium salt which is difficult to separate. After the last of the filtrate has drained off, and been tested for chlorine, the filter is taken from the funnel and the spirit absorbed by the paper is removed as much as possible. A neglect of this rule may cause the reduction of a portion of the platinum salt through the evaporation of the spirit. The filter is then folded together so that none of the powder can be lost by falling out, and it is placed in the drying closet, where it is laid upon a thin layer of blotting paper. The paper acts as a slow conductor of the heat, rendering it uniform on all sides, and besides takes up the last trace of the spirit. When the drying apparatus has been raised to a temperature of 120° C., it is sufficient to allow the filter to dry during half-an-hour at from 120° to 130° C. A lower temperature would require more time for a perfect drying; a higher heat would injure the filter and possibly lead to a reduction of the platinic chloride to platinous chloride. After the lapse of the proper time the filter is removed, placed between two watch-glasses, and immediately weighed; the weight of the filter, as above stated, is previously taken.

At this stage there are yet some indications which show whether the operation has been carefully and correctly performed. For instance, if the point of the filter is coloured yellow on the outside, or coated with yellow powder, it is a proof that the potassium platino-chloride has not been sufficiently washed, and the use of suitable reagents will show the presence of magnesia. A browning of the filter at a point below the above-mentioned shows that platinic chloride still remains in excess. The double salt forms a powder of a pure citron yellow colour, and must be free from any whitish appearance which would indicate insufficiency of platinic chloride, and consequently some yet undecomposed salt. In certain cases also it might be in the state of sulphate; for instance, if the sulphuric acid were not entirely removed in consequence of which the corresponding compounds are not dissolved by the alcohol. The entire operation does not require more than an hour and a half.

In all chemical operations it is of great importance to secure the purity of the reagents to be used; in this operation it is especially so. The author therefore proceeds to describe the manner in which the platinic chloride is usually prepared for use in the neighbourhood of Stassfurt from the platinum precipitates and washings of former operations. The process is divided into three parts: (1) the reduction; (2) the purification; (3) the solution of the platinum, to which is added a testing for purity.

(1) *Reduction of the Platinum Compounds.*—The reduction is effected by the action of sodium promoted by the presence of alcohol. The method was shortly described in the "Zeitschrift für analytische Chemie von Fresenius," and has been followed for several years. Formerly the platinum was usually reduced by hydrogen. It is now generally accomplished as follows:—The collected precipitates and the alcoholic washings are mixed together in a porcelain capsule, and the filters used are boiled with water so as to thoroughly exhaust them. The solution is afterwards added to the contents of the capsule. The whole is then warmed and carbonate of soda, free from sulphate, is added until there is a strong alkaline reaction. Probably fused caustic soda might be used for this purpose, as it is soluble in alcohol. If, however, a small quantity of water be added, such as would be required for the boiling of the filters, there would be no reason why the cheaper sodium carbonate should not be used. Care is taken, by frequent stirring with a glass rod, to raise the solution to the boiling point as quickly as possible in order to avoid unnecessary evaporation of the spirit. When this point is attained the platinum is almost suddenly precipitated in a pulverulent form from the solution. The sodium of the carbonate combines with chlorine from the platinum, sodium chloride together with potassium chloride go into solution, carbonic acid is evolved, the oxidized platinum is deoxidized through the action of the spirit, and the oxygen is taken up to form aldehyd, acetic acid, and oxidation products with the higher hydrocarbons.

(2) *Purification of the Platinum Sponge.*—The mixture is boiled a short time longer, and then left to subisde

thoroughly, which requires at least from four to six hours. The clear alcoholic liquor is then drawn off by means of a siphon, and filtered through ordinary filtering paper. Meanwhile water is poured over the powder, in which it is again boiled, in order to remove all the remaining adhering salts,—sodium chloride and carbonate, and potassium, magnesium, calcium and barium chlorides, together with any alcohol yet remaining. The platinum is again allowed to subside, for which less time is requisite now than before; the purer the platinum powder is the more quickly and completely it sinks to the bottom. If care be taken always to decant the liquors off clear they filter rapidly and the very small quantity of pulverulent metal retained by the filter does not retard the filtration. The third boiling is in water, to which a third part of hydrochloric acid has been added; this dissolves any carbonate that may have been formed which is not soluble in water.

The fourth boiling is with undiluted hydrochloric acid, which removes the last contaminations with difficultly soluble salts. In the fifth and sixth similar treatment only distilled water is used. After filtration of the last liquid the platinum powder is transferred to the filter by means of a wash-bottle, and washed with hot distilled water until the filtrate, when evaporated, leaves no fixed residue, and gives no reaction of chlorine. It is not advisable to dry the precipitate by heat. Even at a relatively low temperature, in consequence of the extraordinary capability of platinum black to produce oxidation, the filter begins to glow, and the powder itself is scattered about the drying closet.

(3) *Solution of the Platinum Powder.*—The acids for forming the solvent,—which is an aqua regia, consisting of five parts by weight of hydrochloric acid and one part of nitric acid,—are first weighed out. The former is taken up in a syringe, and used to remove the platinum powder from the filter into a roomy flask. The vessel is then placed in a water-bath, which is brought to gentle ebullition. Ten drops of nitric acid are now added, a drop at a time, mixed by gentle agitation, and the consequent reaction allowed to take place, in which the nitric acid is decomposed with evolution of brownish yellow vaporous compounds, $NOCl_3$ and $NOCl$. In consequence of the finely divided state of the platinum the action of the acid is immediate. A further small quantity of nitric acid is then added; if a large quantity be added at once it frequently happens that, through the violent evolution of vapour, half the mixture is driven out of the flask and lost. For such a contingency it is as well to have a capsule ready in which to collect the sudden overflow from the flask. The solution is completed in an hour. It is then allowed to cool and filtered through Swedish filtering paper, which has been previously washed with water acidulated with hydrochloric acid, in order to remove any trace of iron it may contain. The sandy residue which remains behind upon the filter consists of silicates taken up from the glass vessel. When dried it takes a chocolate-brown colour. The filtrate is evaporated in a well-glazed porcelain basin upon a water-bath, until a portion removed by a glass rod commences to solidify. A small quantity of hydrochloric acid is then added, again evaporating and repeating this with fresh hydrochloric acid until no further trace of nitric acid can be detected. In order to ascertain this, there is another special indication besides the colour and characteristic smell of the vapour. Upon the addition of hydrochloric acid to the concentrated solution, any nitric acid present is decomposed, which becomes perceptible by the effervescence of the solution. The nitric acid must be removed thoroughly, or it will form nitrogen compounds which will contaminate the reagent. This is shown when during the analysis of potassium chloride, after the addition of the platinic chloride and evaporation to dryness, there are formed in the capsule coal-black rings which become yellow upon the addition of water. In such a case the platinic chloride must again be concentrated and the nitric acid removed by hydrochloric acid. If an aqua regia be used, constituted in the proportion of 1 to 5, and the addition of nitric acid is stopped when a reaction is no longer produced, there will be no reason to fear the presence of nitric acid. After the last evaporation there should be no smell of chlorine or of hydrochloric acid perceptible. A crystalline film forms upon the surface of the solution, which is now left to cool, when the platinic chloride solidifies to a red-brown crystalline cake. This is dissolved in two parts of water, filtered through a filter previously treated as before mentioned, and the filter is afterwards washed with a small quantity of water. There remains only an insoluble residue.

Before using the reagent, its purity has to be tested. It should be of a red-yellow colour and as free as possible from an excess of hydrochloric acid; a dark red colour and opacity indicate the presence of platinous chloride, which may have had its origin in the evaporation of the platinum solution over a naked fire. As a further test the platinic chloride is tried with a pure potassium chloride the composition of which is known. Finally a weighed portion of the platinic chloride to be examined is evaporated to dryness, raised to a red heat and again weighed. The residue is examined to see whether it consists solely of platinum, and from this the quantity of platinic chloride is calculated.

The author states that the operation of preparing and testing platinic chloride in the above manner takes from two to three days.

THE BOTANICAL SOURCE OF MEDICINAL RHUBARB.*

Regel's *Gartenflora* for January contains, among other things, not the promised revision of species of *Rheum*, but a figure and description of, and some historical notes on, *Rheum palmatum var. Tanguticum*, by Maximowicz. Although he does not dispute the fact that *Rheum officinale* of Baillon, figured in the December number of the *Botanical Magazine* of last year, yields a commercial Rhubarb, he contends that the drug known in England as Turkey Rhubarb, which came to us through Siberia by way of Kiachta, was the produce of the plant he describes. We say came, because the trade from that source has been destroyed, not, as Maximowicz says, in consequence of the attempt of some of the tribes to overthrow Chinese rule, but, as related in Flückiger and Hanbury's 'Pharmacographia' in consequence of the very strict supervision exercised by the Russian Government. In the work just named a very full history of medicinal Rhubarb is given. Maximowicz's plant was collected by Przewalski, in 1872-3, in the vicinity of Lake Koko Nor, North-West China. It is, or was, extensively cultivated in that district, and the wild plant was also collected. An account is given of the method of its cultivation and preparation, but this part adds little to our knowledge of the requirements and conditions necessary for the profitable cultivation of Rhubarb. The plant figured agrees in all respects with a specimen in the Kew Herbarium labelled "Rheum palmatum, from Pallas," and also with another from Dr. Lindley; and there seems little doubt that the account given of its previous introduction about 125 years back is correct. The Russian officials stationed on the frontier were instructed to obtain seeds or plants of the genuine Rhubarb, if possible; and in 1740 they succeeded in obtaining a quantity of seed, though they had to pay a high price for it. But the "heathen Chinee" was too crafty for them, the plants raised from this precious seed proving to be nothing more than the well-known Siberian *R. undulatum*. However, 1750 the true plant was procured, and from Russia it spread over various parts of Europe, including Britain, so after all we have, according to Maximowicz, been seeking for a plant we already possessed. He goes on: "Let it be admitted that we now possess two species which furnish a superior quality of Rhubarb, still *R. palmatum* has the advantage of being the genuine plant that produced the drug whose repu-

* From the *Gardeners' Chronicle*, March 27.

tation dates from the time of the Arabian and Greek physicians." Speaking of the cultivation in Europe of Rhubarb for medicinal purposes, Maximowicz says that *R. palmatum* has proved rather unprofitable on account of the principal root decaying, and thus leaving only the less valuable lateral ones; and he adds that to a certain extent this has been the case with other species. So far as this country is concerned, we do not think these remarks are applicable. There is certainly a difference in the hardiness of the species. R. officinale was rather severely injured by frost at Kew last spring. We know nothing respecting the constitution of R. palmatum, but R. Rhaponticum, undulatum, and others are hardier than R. officinale.

THE ACTIVE PRINCIPLES OF THE OFFICIAL VERATRUMS.*

A Chemico-Physiological Study.

BY CHARLES L. MITCHELL,

Part II.—Chemical.

(*Continued from page* 770.)

VERATRUM VIRIDE.

Exp. No. 1. Thirty-two ounces of the powdered root were exhausted with alcohol 85 per cent., the first 16 fluid ounces saved, and the next 5 pints evaporated to 16 fluid ounces, and mixed with the first tincture. This fluid extract was now acidulated with 2 fluid ounces of acetic acid, poured into half a gallon of water, stirring constantly, and allowed to stand twenty-four hours. The precipitated resin was separated by filtration, and the filtrate evaporated to 1 pint, a little alcohol added to retain the colouring matter, and the whole precipitated by carbonate of soda in slight excess. On examining the filtrate from this I noticed at once that it seemed to possess considerable activity. It had the bitterish taste of the root, and left a numbing, tingling sensation in the fauces, which lasted for some time. It was, therefore, set aside for future examination. Continuing the process as described by Mr. Bullock, I soon found that I had scarcely any alkaloid left, it seeming to be quite soluble in an excess of the precipitating liquid. The substance I obtained weighed about 3 grains, was soluble in ether, and corresponded to the chemical and physiological reactions of veratroidia. The resin was next treated, in order, if possible, to extract the viridia from it, as according to Mr. Bullock's statements it existed there in considerable quantity, but the alkaloid obtained from it was pronounced by Dr. Wood to be also veratroidia. At a subsequent date, the alkaline residue which had been set aside at the beginning of the process was examined. It was acidulated with acetic acid, concentrated by evaporation, saturated with milk of lime, and the precipitate drained, dried, and exhausted with alcohol. The alcoholic solution gave on evaporation a resinous mass, which showed the colour reaction of veratroidia with sulphuric acid. On purification it yielded 10 grains of an alkaloid, one-third grain of which, when given to a cat, produced death within an hour, attended with all the symptoms of veratroidia poisoning. Jervia was also obtained as a by-product in this experiment, as a granular, white powder.

Exp. No. 2. Ten pounds of veratrum viride were exhausted with a menstruum of 3 parts alcohol and 1 part water, acidulated with muriatic acid, in the proportion of 1 fluid ounce of acid to every pound of root. This menstruum was adopted in order, if possible, to get rid of some of the resin, which had proved to be a source of great annoyance in the first experiment. The first 5 pints of tincture were saved, and the next 10 gallons of tincture evaporated to 5 pints, and mixed with that saved. This concentrated tincture was precipitated in 10 gallons of water, the resin separated by filtration, and the filtrate concentrated to 10 pints. Several different portions of 1 pint each were now tried with various precipitants, with the following results, the precipitate in each case being exhausted with alcohol, and the alcoholic solution evaporated to dryness:—

				Grains in 1 pint.
Carbonate of Soda,	yielded	impure	alkaloids,	10
Carbonate of Potassa,	"	"	"	12
Ammonia,	"	"	"	8
Magnesia,	"	"	"	25
Lime,	"	"	"	24

The precipitate from lime was nearly as great as that from magnesia, so lime, being a much less expensive precipitant, was used throughout the remaining experiments. The remaining 5 pints of liquid were precipitated with lime, and the alkaloids extracted, but I could find no viridia. I found the last menstruum, namely, that of three-fourths alcohol, not so well adapted for extracting the root as that first used, for it took up quite as much resin and an additional quantity of colouring matter, so that I returned to the original menstruum of alcohol. In order to make the plan of the following experiment more clear, let me say here that the main difference between viridia and veratroidia, given by Mr. Bullock, is that viridia is insoluble in ether.

Exp. No. 3. Five pounds of powdered root were exhausted with 85 per cent. alcohol, and a fluid extract prepared as before. To this 5 fluid ounces of acetic acid were added, and the whole poured into 4 gallons of distilled water. After standing twenty-four hours the resin was separated, and the liquid evaporated to 2 pints. During the evaporation, more resin was deposited, which was mixed with that first obtained, the whole dissolved in 2 pints of alcohol, and set aside. (1) Milk of lime was now added in excess to the concentrated acid liquid, and the precipitate separated after standing some hours, washed slightly to free it from colouring matter, drained, and dried. This was powdered, mixed with a small quantity of pure animal charcoal, and exhausted with boiling alcohol. On evaporating the alcohol the alkaloids were left as a hard, dark-brown, resinous mass. This was digested with very dilute sulphuric acid, and set aside for several days. By this means the major portion of the resin and jervia were separated, as a granular, dirty-white powder. This powder was filtered off and also set aside (2), while to the acid filtrate a little alcohol was added, and then a very slight excess of a strong solution of caustic soda (℥iv to Oj). A whitish, flocculent precipitate was produced, which in a short time assumed a semi-crystalline appearance. It was washed slightly, dried and powdered, and then agitated with successive portions of pure ether, carefully freed from alcohol, until all the veratroidia seemed to be removed, and a drop of the ether evaporated on a glass slide gave only a faint colour of the reaction with SO_3. On dissolving the remaining insoluble portion of the powder (which was much darker) in dilute sulphuric acid, adding ether and then excess of soda, more veratroidia was dissolved.

The heavier liquid was washed repeatedly with portions of fresh ether, but on testing the washings with SO_3, they would still give a faint colour reaction, showing that all the veratroidia had not been removed. It was, therefore, thrown on a filter and the insoluble resinous portion separated (*A*). Thinking that viridia when freshly precipitated might be soluble in ether, the ethereal liquids were treated in the following manner, those from the dry powder being kept separate from the washings of the fresh precipitate. They were agitated with successive portions of very dilute sulphuric acid, the aqueous liquid separated, concentrated, and then mixed with excess of sol. soda. The precipitates when washed were white powders, violently sternutatory, and of a bitter tingling taste. That from the dry powder weighed 30 grains, that from the precipitate (moist), 10 grains. The two carefully compared acted the same both chemically and physiologically.

---

* Read before the American Pharmaceutical Association. Reprinted from the 'Transactions.'

The insoluble resinous portion separated from the heavy liquid (*A*), was dissolved in water acidulated with SO_3, allowed to stand in order to separate some resin, and then precipitated with soda, washed and dried. It weighed 26 grains, and was of a darker colour than the first alkaloid. On testing this physiologically, it was found to produce all the effects of veratroidia, and by dissolving, separating the resin, precipitating, and washing with ether, several times, I succeeded in removing all the veratroidia, and found the portion which was still insoluble to be a mixture of resin with some jervia sulphate. The washings from all these different precipitates had been carefully saved, and were lastly examined, in order to ascertain if the viridia were dissolved in them. They were evaporated to dryness, treated with hot alcohol until everything soluble had been removed, the alcoholic solution decolorized with animal charcoal, evaporated to dryness, digested with very dilute sulphuric acid, and set aside. On standing a slight precipitate of resin separated, which was filtered off, a little alcohol added, and then sol. soda in excess. The precipitate washed and dried weighed 13 grains. It was found to be soluble in ether. Thus far most certainly no viridia.

The resin was next examined. The alcoholic solution previously set aside was agitated repeatedly with petroleum benzin, until all fatty matter had been extracted and the benzin solution evaporated. It left a greenish, oily, inert liquid, having a strong odour, and weighing 240 grains. Five drops of this injected into a pigeon had no effect. The alcoholic solution of the resin, freed from oil, was now acidulated with 5 fluid ounces of acetic acid, and precipitated in 2 gallons of water. This treatment was repeated several times, the acid liquors concentrated and precipitated with lime, etc., as before, yielding 50 grains pure alkaloid. It proved to be quite soluble in ether. The insoluble resinous portion gave the same result as before, being only veratroidia with resin and some jervia. This alkaloid was compared with the first veratroidia and proved to be the same. It is worthy of remark here, that the quantity of jervia separated from the resin was largely in excess of that obtained from the concentrated alcoholic tincture of the root. I, therefore, found no viridia in the resin. The jervia precipitates were mixed together, boiled with a strong solution of carbonate of soda to decompose the jervia sulphate, and the precipitate separated, washed until free from alkali, and dissolved in acetic acid; precipitated by sol. soda, washed and dried. It weighed 69 grains. I discovered one curious fact in connection with this alkaloid I had not before noticed, and which, I think, is worthy of mention. All authors speak of its insolubility in sulphuric acid, but I have observed that when very impure, and intimately mixed with resin and veratroidia, it appears to partake for the time of their solubility, and becomes quite soluble in that acid. When once purified it loses this property. I could therefore find no principle possessing the same solubilities and chemical reactions which characterize Mr. Bullock's viridia. Thinking that perhaps I might have made some error, my investigations were twice repeated, but with the same result. An experiment was also tried of exhausting the root with diluted acetic acid, but my experience was that it did not do it thoroughly.

The alkaloid veratroidia thus extracted is a white powder, uncrystallizable, of a bitter taste, leaving a tingling sensation in the fauces, violently sternutatory, and extremely irritating. It fuses at 265°. It is soluble in alcohol, amylic alcohol, ether, chloroform, carbon bisulphide, and when precipitated very slightly in petroleum benzin. It forms soluble salts with the acids, most of which are uncrystallizable. The alkalies and their carbonates precipitate it from acid solutions in white, semi-crystalline flakes, which are slightly soluble in excess of the precipitant, especially when ammonia is used.

Jervia is a white powder, capable of crystallizing from an alcoholic solution, tasteless, not sternutatory, and of a slight alkaline reaction. It is insoluble in water. It is freely soluble in alcohol and chloroform. With acetic and phosphoric acids it forms very soluble salts; with sulphuric, hydrochloric, and nitric acids, it yields salts sparingly soluble in alcohol and water, and precipitated from the more soluble acetate and phosphate. When heated it melts to clear oil, at a little above 400° F. turns brown, and when the temperature is raised still higher, it burns with a smoky flame.

The resin when freed from alkaloids is dark-brown, tasteless, inert, soluble in alcohol and alkaline solutions, and very slightly soluble in diluted acids.

The yield of alkaloids from veratrum viride varies considerably in different lots of the root, as does also the amount of resin. I append the yield per pound of three different lots, as compared with the results of Mr. Bullock and Dr. Peugnet.

	Lct. 1.	Lot 2.	Lot. 3.	Bullock.	Peugnet
Veratroidia, grs.	18·3	24·5	28·6	4·6	4·3
Virida, ,,	..	..	..	14·3	..
Jervia, ,,	16	18·2	20·5	..	7·5
Resin, ,,	115	110	192	..	..
Oily matter, ,,	10	25	50	..	..

Lot No. 3 was a fine sample of veratrum viride, the others were ordinary specimens. The quantity of resin and alkaloids very probably varies with the time of gathering. I do not think the alkaloids can be profitably extracted.

The results of this investigation differ considerably from those of Mr. Bullock, but I think they are in the main correct. Most certainly there did not exist in any of the lots of veratrum viride which I examined (and they were all good, fair samples of the root, and ground directly under my personal supervision), any active principle which corresponds chemically to viridia. I have every time succeeded in finding both jervia and veratroidia, even in the preliminary experiments. The question immediately arises does there exist such a principle in verat. viride, besides the other two alkaloids? I say no, and as the physiological experiments will prove, jervia has all the physiological effects of viridia on the system. Mr. Bullock must therefore have confounded the two, as he makes no mention of jervia anywhere in his paper.

The most efficient preparations of this root are the officinal tincture, fluid extract, and extract. If its virtues are desired in a more concentrated form they may be obtained by the following formula, which gives a powder corresponding to the eclectic "veratrin."

Grd. Verat. Viride . .	1 lb. av.
Calc. Magnesia . . .	100 grs.
Alcohol	q. s. or 4 pints.

Exhaust the verat. viride with the alcohol, evaporate the tincture to syrupy consistence (about 2 fluid ounces), add the magnesia, mix well, and then gradually add 1 pint of water, stirring constantly. Separate the precipitate, drain, dry, and powder. Yield, 330 grains. This contains all the active principles of the root, and acts powerfully in doses of from ¼ to ½ grain.

The following is the result of a quantitative analysis of the root of veratrum viride:—

NaCl,	·490	Percentage of water lost by drying root four days, 8·45.
Na_2O,	1·370	
K_2O,	23·020	After drying as above, total percentage of ash in dried root, 4·63.
CaO,	17·730	
MgO,	6·065	(The determination of the total percentage of ash in the root being a very important point, great care was taken, and five parallel experiments made, with good results; the above stated percentage may, therefore, be regarded as nearly correct.)
SiO,	5·670	
FeO,	6·420	
P_2O_5,	9·380	
SO_3,	8·190	
CO_2,	11·200	
Sand,	11·920	
Carbon,	·149	
	101·604	

VERATRUM ALBUM.

The preceding experiments with veratrum viride, made many of the preliminary investigations unnecessary for the examination of veratrum album, so that the following process was at once followed out.

Ten pounds of powdered root were moistened with 1 gallon of alcohol 85 per cent., allowed to macerate twenty-four hours, and then percolated with q. s. alcohol to exhaust. The alcoholic tincture was evaporated to 5 pints, acidulated with 5 fluid ounces of acetic acid, and precipitated in 5 gallons, previously acidulated with 5 fluid ounces of acetic acid. The resin was separated, and the filtrate evaporated to 4 pints, the deposited resin being removed, mixed with that first separated, and the whole dissolved in 2 pints of alcohol, and set on one side. To the filtrate was added milk of lime in excess, the precipitate separated, washed, dried, powdered, mixed with a little animal charcoal, and digested repeatedly with boiling alcohol, until nothing more was taken up. The alcoholic tincture was evaporated to dryness, and the resinous mass left, digested with dilute sulphuric acid, and after everything was dissolved, concentrated to a small bulk and allowed to cool. A considerable quantity of jervia sulphate separated, which was filtered off, and set on one side for purification, while to the filtrate a little alcohol was added and then sol. soda in slight excess. The precipitate produced was separated, washed, and dried. It weighed 136 grains, and when treated with pure ether behaved in a similar manner to veratroidia, fully dissolving when freed from jervia and resin. The alkaloid extracted from the dry powder and that from the fresh precipitate were kept separate, in order to be physiologically tested, and marked respectively "Alkaloid A," and "Alkaloid B." The alcoholic solution of resin previously set aside was freed from oil and fatty matter, by frequent agitation with petroleum benzin, and after the addition of 10 fluid ounces of acetic acid, was precipitated in 2 gallons of distilled water. This treatment was repeated several times, until the resin seemed to be totally deprived of active matter. The acid liquors yielded 134 grains alkaloid, which was found when freed from resin to be wholly soluble in ether. It was the same as the alkaloid first obtained. The filtrates and washings from these different precipitations yielded 30 grains more of alkaloid.

The benzin washings gave when evaporated a yield of 3 ounces of oily matter, a much larger proportion than that existing in veratrum viride.

The jervia precipitates when purified yielded 84 grains of jervia. The resin weighed 2400 grains, and appeared like the resin of veratrum viride. It was tasteless, odourless, and as far as my experiments went, nearly inert.

About this time I received from Dr. Peugnet, with whom I had been carrying on quite a discussion, a few grains of the resinoid (as he termed it), which he had found so active, $\frac{1}{20}$ grain of it having killed a pigeon within an hour. It was dissolved in alcohol, acidulated strongly with acetic acid, and kept warm for some time; after which it was poured into 6 fluid ounces of water, the resin carefully separated, and the filtrate evaporated to a small bulk. The evaporation caused the separation of more resin, which was filtered out, and the clear solution precipitated with sol. soda. This precipitate when dried weighed nearly 2 grains, and proved to be an alkaloid identical in its reactions with the one I had previously obtained in my experiments. Several physiological experiments were made with a solution of this alkaloid, and a solution of the resin from which the alkaloid had been removed. The results proved conclusively, that the resin of verat. album is, like the resin of verat. viride, nearly inert. The error of Dr. Peugnet lay probably in the fact that his impure resin was treated in the solid form with the diluted acids, in which condition the alkaloids can be but partially removed, instead of dissolving the resin in alcohol, then acidulating, and finally precipitating in water.

(*To be continued.*)

MEDICAL SCALE FOR EMIGRANT SHIPS.

INSTRUCTIONS TO SUPERINTENDENTS OF MERCANTILE MARINE OFFICES.

The annexed Scale of Medicines and Medical Stores for Emigrant Ships has been issued and caused to be published by the Board of Trade, and is intended to supersede the Scales hitherto in force.

SCALE OF MEDICINES, MEDICAL STORES, AND INSTRUMENTS.

For every 100 Passengers, when the length of the passage, computed according to the Passengers Act, is 100 days and upwards. Half the quantity of the medicines indicated, and the same kind and quantity of Medical Stores and Instruments to be taken, when the passage is less than 100 days.

Directions for Druggists.	———	Lbs.	Oz.	Dr.
All medicines to be prepared according to the British Pharmacopœia, and all indicated thus (*) to be marked with a red poison label. All bottles to be stoppered, and packed in a convenient form for dispensing.	Acid. acetic	0	6	0
B.P.	* „ carbolic	0	1	0
Pale fluid; a mixture containing in each 100 parts not less than 80 parts of carbolic (or phenic) and cresylic acids, and their homologues; and not more than 20 parts of water	* „ „	8	0	0
Crude liquid acid	* „ „	16	0	0
A powder containing not less than 20 per cent. of pure carbolic or cresylic acid.	„ „	112	0	0
	„ citric	0	3	0
	„ gallic	0	1	0
	* „ hydrocyanic dil.	0	0	4
	* „ nitric	0	1	0
	* „ sulph. dil.	0	6	0
	Æther	0	1	0
	Alumen	0	1	0
	Ammon. carb.	0	6	0
	Amylum	1	0	0
	Calx chlorata	7	0	0
	Camphor	0	6	0
	Charta epispastica	6 square feet in case.		
	*Chloride of zinc (Burnett's solution of)	16	0	0
	*Chloroform	0	8	0
	Copaiba	0	8	0
	Creasote	0	0	2
	Cupri sulph.	0	1	0
	Empl. cantharidis	0	1	0
	Ferri et quinæ citr.	0	1	0
	„ sulph.	0	0	4
	Glycerinum	0	6	0
	„ acidi tannici	0	4	0
	*Chloral hydras	0	1	6
	Hydrarg. cum cretâ	0	0	4

Directions for Druggists.	———	Lbs.	Ozs.	Drs.
	Hydrarg. subchlorid.	0	0	4
	Lini farina	6	0	0
	Lin. camph.	0	8	0
	* ,, opii	0	2	0
	,, saponis	1	0	0
	*Liq. atropiæ	0	0	1
	,, calcis...........	1	0	0
	* ,, morphiæ acetatis.........	0	1	0
	* ,, plumbi subacetatis	0	2	0
	,, potassæ.........	0	2	0
B.P. or Condy's fluid (crimson).	* ,, ,, permanganatis	3	0	0
	Magnes. sulph.......	4	0	0
Omit extract of liquorice and substitute aromatic spirit of ammonia, 1 oz. to 1 pint of the mixture.	Mist. sennæ co......	3	0	0
	Ol. croton	0	0	1
	,, lini	0	8	0
	,, menth. pip.......	0	0	2
	,, morrhuæ.........	3	0	0
	,, olivæ	1	0	0
	,, ricini	2	0	0
	,, terebinth.........	1	0	0
	*Opium	0	0	1
All pills to be made and marked 5 grs.	Pil. aloes cum myrrhâ	3 dozen.		
	,, col. co.	4 ,,		
	,, col. c. hyosc...	4 ,,		
	,, hydrarg.	3 ,,		
	,, ,, chlorid. co.	3 ,,		
	,, ipecac. c. scillâ	5 ,,		
	,, quiniæ	6 ,,		
	,, rhei co..........	6 ,,		
	,, sapon. co.	6 ,,		
	*Plumbi acetatis	0	1	0
	Potassæ bicarb. pulv.	0	4	0
	Potassii iodid.	0	2	0
	Pulv. antimonialis	0	0	3
Double the quantity indicated to be taken to all tropical ports: Pulv. catechu co., pulv. cret. arom. c. opio, equal parts.	,, astringens ...	1	0	0
	*Pulv. cretæ arom. cum opio ...	0	2	0
	,, ipecac.........	0	2	0
	,, ,, co......	0	2	0
	,, jalapæ co. ...	0	3	0
	,, potassæ nitratis	0	4	0
	,, rhei co.........	0	4	0
	,, scammon. co.	0	0	6
Double the quantity indicated to be taken to all tropical ports ...	Quiniæ sulph.......	0	1	0
	Sodæ bicarb.	1	0	0
	Sp. æther. nitrosi...	0	8	0
	,, ammon. arom. ..	0	8	0
	,, rectif.	0	4	0
	Sulph. sublimatum.	3	0	0
	Syr. ferri iodid. ...	0	4	0
A neutral solution containing 4 grs. in a dram, and so marked. To be labelled—*For hypodermic injection*	*Sol. morph. acetat.	0	0	4
	Tr. arnicæ............	0	6	0
	,, camph. co.	0	8	0

Directions for Druggists.	———	Lbs.	Ozs.	Drs.
	Tr. digitalis	0	0	6
	,, ergotæ............	0	6	0
	,, ferri perchloridi	0	4	0
	* ,, opii	0	6	0
	,, scillæ	0	2	0
	,, valerian. ammon	0	3	0
	Ung. cetacei.........	1	0	0
	,, hydrarg.	0	2	0
	,, ,, ox. rub.	0	1	0
	,, resinæ.........	0	6	0
	,, sulphur	1	0	0
	,, zinci	0	2	0
	Vinum colchici......	0	1	0
	,, ipecac.	0	1	0
	Zinci sulphat.	0	1	0
	Desiccated soup	4	0	0

Medical Stores.

Lint	1 lb.
Tow	3 lbs.
Strapping, "Dreadnought"	3 yards.
Male Syringe	1.
,, ,, Glass	1.
Female Syringe	1.
,, ,, Glass	1.
Phials (assorted)...	2 dozen.
Phial Corks	6 ,,
Sponges	3.
Bed Pan	1.
Paper of Pins	1.
Hernia Truss, No. 8, right and left	1.
Paper of Pill Boxes	1.
Gallipots	6.
Leg and Arm Bandages	6.
Calico	3 yards.
Flannel Bandages, 7 yds. long, 6 ins. wide ...	2.
Flannel	2 yards.
Triangular Bandages, base 48 ins., sides 33 ins. each	2.
*Minim Measures	2.
*1 oz. ,, ...	1.
*2 oz. ,, ...	1.
*Set of Splints	1.
Waterproof Sheeting	4 yards.
Oiled Silk	1 yard.
*Enema Syringe and Stomach Pump	1.
*Box of Small Scales and Weights	1.
*Wedgwood Mortar and Pestle	1.
* ,, Funnel	1.
*Spatulas	2.

Instruments.

To be included in one strong case.

1 Amputating Saw.
2 ,, Knives.
1 Bone Forceps.
1 Tenaculum.
1 Artery Forceps.
1 Operating ,,
3 Tooth ,,
1 Skull ,,
1 Midwifery ,,
1 Trephine.
1 Elevator.
1 Hey's Saw.
1 Trephine Brush.
2 Scalpels.
1 Finger Knife.
1 Curve Bistoury Probe Point.
1 Curve Bistoury Spear Point.
1 Hernia Knife.
2 Trocars.
1 Aneurism Needle.
1 Hernia Director.
1 Tourniquet.
12 Needles.
1 Skein Ligature Silk.
2 Silver Catheters (Nos. 4 and 8).
4 Elastic Gum do. (Nos. 3, 5, and 7.)
3 Lancets.
1 Clinical Thermometer.
1 Hypodermic Syringe.
1 doz. charged Tubes for Vaccination.

* One set only of these articles required, irrespective of number of passengers.

The Pharmaceutical Journal.

SATURDAY, APRIL 3, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACY IN IRELAND.

OUR columns, during the last few weeks, have borne testimony to the existence of a somewhat acute state of agitation on the other side of St. George's Channel in regard to the subject of pharmaceutical legislation. In performance of our duty as journalists, we have from time to time recorded such information as was obtainable in reference to this matter, but under the peculiar circumstances of the case we have deemed it advisable to confine ourselves, as far as possible, to the mere statement of what was taking place.

Naturally, correspondents have come forward to make known their particular views, and we have freely given them opportunity of doing so, although some of them have taken exception to what we have said on the subject and have assumed that we were labouring under a delusion. Whether this be the case or not we will not now stay to inquire, since we are sensible of a deficient acquaintance with the actual facts. At the same time, we must so far defend ourselves as to state that we have, in any remarks on the subject of Irish Pharmacy, impartially received the statements made by the various parties concerned, and, conscious of the deficiency we have already admitted, confined ourselves to general considerations upon those grounds.

Mr. HARTT was the first to object to the course we have taken, and, in doing so, he asserts that the classes we spoke of, viz., chemists and druggists, as well as pharmacists, are "non-existent in Ireland;" in short, that there are only apothecaries who are really qualified medical practitioners, and druggists keeping general stores, but destitute of that knowledge which would qualify them for dispensing prescriptions.

Though we are unable to express any decided opinion as to the general qualification of the druggists who are debarred by the Apothecaries Act from dispensing medicine, we cannot, in common fairness, ignore the fact that there is an association of persons calling themselves chemists and druggists and contending that on the ground of their ability to do the work of the pharmacist they should be freed from disabilities under which they have hitherto laboured. This association also seeks to establish a system of educational training and a means of testing the competence of persons desirous of obtaining the qualification to dispense medicines. In the abstract we heartily sympathize with this endeavour, and we cannot disregard the fact that it receives the countenance of distinguished members of the medical profession in Ireland. Moreover, there is the fact that this association has among its members several whose names are honourably known as pharmacists of unquestionable attainments. In short, we think that, if delusion prevail at all on this subject, it is our correspondent who labours under it in supposing that we should support the attempt to give a dispensing qualification to any individual who was not able demonstrate his claim to it.

Our second correspondent—"Common Sense"—raises objections of a different nature. "Where," he says, "are the funds to come from?" That is, however, a matter of detail to be dealt with by these who are endeavouring to establish an amendment of the existing state of things, and we must assume they are prepared to face this question.

The letters of some subsequent correspondents, including one from an "Irish Licentiate Apothecary," all seem to betray a fear that the passing of an Irish Pharmacy Act would open the door for incompetent persons to dispense medicines and assume the status of the pharmacist; but we cannot share this apprehension. None of the Bills that have been proposed justify it in any degree, for they all stipulate that qualification is to be granted only on the basis of examination. Indeed, the condition of matters in Ireland is such that there is much less difficulty to be overcome in framing a Pharmacy Act for that country than there was in Great Britain. There is no habitual right to dispense medicines except that pertaining to the licentiate apothecary. Those who, while outside this privileged body, claim to share an equal privilege with them must certainly submit to the demand that in the interests of the public they shall be subjected to the same tests of practical skill and knowledge that are required of the apothecary in regard to pharmacy. We are not aware that there is any dissent from this proposition on the part of the Chemists and Druggists' Association, though an objection is reasonably urged by that body against the present more extended examination of the Apothecaries' Hall, which presupposes an educational curriculum sufficient to qualify for medical practice as well as pharmaceutical practice.

The object to be attained in regulating the practice of pharmacy in Ireland seems indeed a very simple one: it is that of merging in one, the pharmaceutical qualification of the apothecary and the pharmaceutical qualification of the druggist. This plan is not only obviously desirable when regarded from an abstract point of view, but it has also in a very essential particular the support of practical experience, for it is a fact that a large number of the apothecaries of Ireland confine their attention solely to the practice of pharmacy, although they have had to undergo a medical and surgical training as well as the pharmaceutical education. On the other hand, the qualification of the Apothecaries' Hall for the practice of medicine seems to be generally regarded as insufficient for that purpose, since most of the apothecaries who practise medicine have some other medical qualification besides, on the strength of which they act as general practitioners.

But though on the ground of practice and in the abstract, the course to be taken is clear enough, and though the difficulties which beset the Pharmacy Act of 1868 do not exist in Ireland, there is still an obstacle to be overcome. A moribund corporation has to be eliminated, in order to make place for the more appropriate system; its vested rights are the object of admiration to some and of antipathy with others; hence personal feelings, which have already been manifest in our correspondence on the subject, will array on opposite sides many who have in reality the same object in view, and for a while the real merits of that object will be obscured by the contest as to the means by which it is to be attained.

We hope very shortly to be in a position to furnish further information as to the proposed reform of Irish Pharmacy by publishing the Draft Bill of the Chemists and Druggists' Association.

MEDICAL SCALE FOR EMIGRANT SHIPS.

The revised scale of medicines, medical stores, and instruments, which we have printed *in extenso* this week (p. 787), has just been issued by the Marine Department of the Board of Trade (who are now responsible for the official conduct of emigration business), and is intended to supersede the scales hitherto in force. There can be little doubt that, for several years, this revision has been very much needed. Two scales of medicines and medical stores have existed up to the present time; the one referring to vessels about to proceed on voyages of more than 100 days' duration, the other to "short voyage" ships. Both these lists were much behind the age, having been compiled about half a century ago. The medical advisers of the Board have, in the present instance, somewhat simplified matters by correcting the two lists, and arranging that, in the matter of medicines, half the quantities ordered shall be sufficient for "short voyage" ships. Many of the special "Directions for Druggists" given are precisely similar to those in the "Scale of Medicines for Merchant Ships" revised some six years ago. All pills are to be ready made, and a uniform five grains' standard is adopted. Double the quantity of astringent powder and quinine are to be provided for all ships proceeding to tropical ports, and a neutral solution of morphia is ordered for hypodermic injections. Desiccated soup is added to the list of stores, which contains, besides, several important additions in way of bandages, etc., including the simple triangular bandage so much used in the Franco-German war, and specially described and illustrated in the last edition of the authorized 'Ship Captains' Medical Guide.' And it is also to be noted that the list includes a set of instruments, which are not, as before, recommended, but must, as we suppose, be supplied either by the owner or the surgeon in charge of the emigrants.

All of our readers interested in this revised scale will at once perceive that its adoption will necessitate many changes in the form and arrangement of ships' medicine chests, cases, etc. It is to be observed that though only half the medicines indicated need be carried in "short voyage" ships, the full quantity of stores must be taken, except those marked with an asterisk. Of course, only one set of instruments is in any case required. We reserve critical comments until the revised scale is fairly floated; but may say that a vigorous effort has been made to simplify and, so to speak, codify the old lists as much as possible.

Many of our readers will be glad to learn, as we are to state, that Dr. J. Baker Edwards, of Montreal, formerly of the Royal Institution, Liverpool, has been appointed Consulting Chemist to the Inland Revenue Department of the Dominion of Canada. This appointment will include the duties of Food Analyst, under a recent Act for the prevention of the adulteration of food, drink, and drugs, and of Gas Analyst, under another Act in the same department. It is in contemplation to establish ultimately a laboratory for the department in the public buildings at Ottawa, but, for the present, the head-quarters will be in Montreal.

It is anticipated that some of the difficulties and inconsistencies experienced in Great Britain in carrying out the Adulteration Acts will be avoided by placing the entire executive in the hands of the Crown. In selecting Dr. Baker Edwards to this highly responsible office, another laurel is won for the pharmaceutical profession and for the pioneer band of early students at Bloomsbury Square. We heartily congratulate him on his appointment to this important post, and hope occasionally to hear of the results of his labours.

On Wednesday evening next, March 7th, the last Evening Meeting of the Pharmaceutical Society for the present session will be held. Professor Hofmann, of Berlin, has kindly promised to exhibit and briefly describe on that occasion the specimens used in illustration of his recent Faraday lecture on Liebig's Contributions to Chemical Science. The following papers also will be read,—"On the Identity of Chrysarobine or Araroba," by Mr. E. M. Holmes; "Notes on the Pharmacy of Atropine," by Mr. W. Willmott; and "Ergot and its Liquid Extract," by Mr. A. W. Gerrard.

At the recent Annual General Court of the Governors of the Royal Hospital for Diseases of the Chest, Dr. Horace Dobell, who has for sixteen years discharged the duties of Physician to the Hospital, was elected a Consulting Physician.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

At a meeting of the Bristol Pharmaceutical Association, held on Thursday, March 25, a paper was read by Dr. Spencer, of Clifton, on "The Relations of Modern Medicine to Modern Pharmacy." The paper will be published *in extenso* in an early number of this Journal.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The sixth scientific meeting of the session of this Society was held in Anderson's University, on Wednesday evening, February 17. Mr. W. Whyte, Vice-President, in the chair. Mr. Emmerson MacIver, F.C.S., delivered a lecture on "The Spectroscope," which was highly interesting and instructive. At the close the customary vote of thanks was awarded to Mr. MacIver. Several new members were enrolled, and donations announced.

On March 17, the seventh scientific meeting was held in the usual place. Mr. J. Currie, President, presided. There was a good attendance. Dr. Hugh Miller, delivered an address on "Some of the Laws of Health." The address was delivered in a popular style, being interspersed with humorous anecdotes illustrative of the different heads under which the speaker had divided his subject, and showing the difficulties which medical men experienced in getting even educated people to understand and act up to the simplest laws, such as a careful selection of food, having it well cooked, and partaken in moderate quantities and at regular intervals. Pure air, pure water, good dwellings, personal cleanliness, including frequent use of the bath, climate, soil, winds, and the seasons, and their effects upon health, were each referred to by the lecturer, together with a minute description of the human body, pointing out the necessity for its welfare, that those laws he had alluded to should be strictly adhered to. But so long as public works, especially chemical works, were permitted to send into our cities and towns their obnoxious vapours, so long as ill-ventilated houses were crowded together and built on badly drained soil, so long would typhoid, small-pox, and other contagious diseases continue in our midst.

Mr. William Dittmar, F.C.S., the new Professor of Chemistry in the Andersonian University, was afterwards introduced, and delivered a lecture on "Artificial Illumination." In the course of the lecture he described in a most interesting manner the nature of heat and light, the various theories which have been given out regarding them, and their respective properties and uses in the economy of nature, referring *seriatim* to the different heads, energy, conduction, expansion, convection, radiation, refrangibility, the spectrum, etc., each point being illustrated by a series of striking and beautiful experiments.

At the close the Chairman proposed a cordial vote of thanks both to Dr. Miller and Mr. Dittmar, for their very valuable and able lectures. He said Dr. Miller's paper had doubtless cost him a great deal of careful research and thoughtful study, and they would derive much benefit from the intelligent rehearsal he had given them of his observations and experiences. As regards Mr. Dittmar's lecture it was sufficient of itself for one night; the subject was a vast one, but Mr. Dittmar had done it justice. His statements had been made so clear and his experiments had been so successfully performed that all must have followed him with pleasure, and as teacher of chemistry to the association, they must be proud of their connection with him and the "Andersonian." The votes of thanks were unanimously and enthusiastically responded to. The consideration of the Food and Drugs Bill and other business were deferred till next meeting.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

The fifth meeting of the session was held February 16th, 1875, the President, Mr. Dillwyn Parrish, in the chair.

Mr. Walling exhibited a specimen of an impure carbolic acid, which had been recently offered as creasote, and spoke of the difficulty experienced in obtaining genuine wood-tar creasote.

Professor Remington remarked that the dealers in the United States were in the habit of supplying coal-tar creasote, unless wood-tar creasote were specified in the order.

Professor Maisch called attention to the variable composition of creasote as displayed in six specimens exhibited by him, all of which were free from carbolic acid, yet differed more or less in smell and reaction. He believed that the reactions and properties of creasote made in different countries and by different manufacturers would continue to vary, until creasote ceased to be a mixture of several products of the dry distillation of wood and its correct chemical composition had been ascertained. At present, he thought, that perhaps the most reliable test was its miscibility with collodion without coagulating it.

Mr. W. McIntyre said he had procured some of the oil of Ceylon cinnamon referred to at the previous meeting (see before, p. 690) and with it prepared some cinnamon water which he found to possess the sweet taste he had presumed was characteristic of cinnamon water prepared by distillation.

A paper was read by Dr. Miller entitled, "Notes on Pronunciation and Orthography," urging that more attention should be paid to the correct rendering of many words in common use. Two papers on Suppositories were also read, one by Mr. R. V. Mattison, advocating the making of these preparations in moulds, the other by Mr. Kemble, recommending the hand method.

Professor Remington read a letter enclosing the first thesis presented to the California College of Pharmacy, of which the following is an abstract:—

Volatile Oil of Oreodaphne Californica.
(*California Bay Laurel*).

BY J. P. HEANEY.

The *Oreodaphne Californica*, more familiarly known by the name of "California Bay Laurel," is an evergreen tree indigenous to California and the Pacific slope. It acquires considerable size and age, and grows abundantly throughout the State, particularly in the vicinity of ravines and moist, shady localities; it flowers in June. The wood is much valued for ornamental cabinet-work, on account of its grain, which, when polished, presents a fine appearance. The tree is never attacked by insects, owing, as it is supposed, to the volatile oil it contains. Some of the native Californians have peculiar ideas concerning this tree. It is believed by them to aggravate asthmatic complaints, and that sleeping in the vicinity of the tree will even produce asthma. That it is not without some action on the system has been proved by the inhalation of its odour often producing dizziness and violent headache.

All parts of the tree contain volatile oil, but the leaves yield the most, about four per cent. being obtained by distillation. The oil is of a straw-colour, limpid, and has a pungent aromatic odour, resembling a mixture of nutmegs and cardamoms. Its taste is warm and camphorous. It burns with a bright, smoky flame, leaving a carbonaceous residue. Its specific gravity is ·936. It is soluble in about 1000 parts water, and mixes in all proportions with alcohol and ether. The oil, when inhaled, produces dizziness and headache, and is therefore deemed to have a marked action on the nervous system, a property which has been applied to its medicinal use. Dr. Silver recommends the smelling of the oil in nasal catarrh and nervous headache, and speaks of successful results.

Examination of the Oil.—The method of investigation adopted was that recommended by Frederick Rochleder in his work 'On the Proximate Analysis of Plants and Vegetable Substances.'

The oil being neutral to test-paper, it was tested for aldehydes with a concentrated solution of bisulphite of soda, with which no combination could be effected, even after the application of heat.

A fragment of sodium introduced into the oil, previously dried by contact with chloride of calcium, produced no effect until a gentle heat was applied, when the metal dissolved slowly, with the disengagement of numerous gas bubbles, the oil assuming a reddish-brown colour. It now possessed an alkaline reaction, and the peculiar pungent odour was not distinguished.

To prove whether the oxygenated body present was a compound ether, the oil was treated with ammonia without producing an amide, and no acid was separated by prolonged treatment with baryta.

By slow distillation, with an excess of coarsely-powdered soda lime, a colourless, limpid distillate was obtained, of an aromatic odour, resembling oil of nutmegs. It gave a slight reaction with sodium, but, after redistillation over soda lime, and again over sodium, it was obtained neutral. It possessed all the characteristics of a hydrocarbon, free from oxygenated bodies.

Two fluid ounces of the crude oil, freed from moisture by contact with chloride of calcium, were introduced into a small glass retort having a thermometer inserted in its tubulure. It was slowly heated up to 190° C., and about four drachms of a colourless oil were obtained. The thermometer rose with the successive portions obtained as follows: three fluidrachms were obtained from 190° to 202° C., three fluidrachms between 202° and 205° C., three fluidrachms between 205° to 220° C., two fluidrachms between 220° to 230° C., and one fluidrachm between 230° to 245° C. The remaining oil in the retort possessed a very dark colour and a thick consistency. Its odour was also less decided, the taste greatly less pungent, and it ignited less readily than the crude oil, burning with a brilliant but sooty flame; evaporated from bibulous paper, the vapour first given off was very pungent, while the latter portion was almost devoid of this odour. The boiling-points of the different fractions were next ascertained by heating them in a test-tube, with a thermometer inserted. The first fraction began to boil at 175° C., the second at 180° C., the third at 185° C., the fourth at 196° C., the fifth at 214° C., and the sixth at 220° C. The existence of two distinct oils in the crude oil is therefore quite probable; but, by cooling the oil with ice for twenty-four hours, no separation could be effected.

Two fluidounces of the crude oil were carefully and very slowly distilled from a small glass retort, having a thermometer inserted, at a temperature not exceeding 180° C.; about one ounce of an almost colourless distillate was obtained, possessing the penetrating, pungent odour of the crude oil to a high degree. On gradually raising the temperature to about 210° C., but not to exceed 220° C., a distillate of about six fluidrachms was obtained, which was of a light straw-colour, less limpid, and had an acrid, pungent odour, differing greatly from that of the crude oil or the previous distillate. Its taste was sharp and camphorous. The residue in the retort had turned quite black, and of the consistency of syrup.

The fraction obtained at 180° C. was treated with sodium, with which no reaction was observed until the application of a gentle heat. The second fraction, obtained at 220° C., gave, with sodium, the characteristic reaction of an oxygenated oil.

To avoid the oxidizing action of the atmosphere and the decomposing influence of direct heat, two fluidounces of the crude oil were again distilled from a glycerin bath, and carbonic acid gas, dried by passing through sulphuric acid, conducted into the retort. The distillate obtained at 175° C. was colourless, limpid, and had lost nearly all of its pungency, having a pleasant aromatic odour, resembling oil of nutmegs; it gave less reaction with sodium than in the previous experiment. The second distillate, at 220° C., was of a much lighter colour and a more agreeable odour, but retaining its previous pungency. All the oil which came over under, but not to exceed 175° C., was reserved for the separation of the hydrocarbon, while that between 175° and 220° C. was used for the separation of the oxygenated oil. The fractions having the lower boiling-point were rectified in an atmosphere of hydrogen over caustic potassa and over soda lime, both processes yielding identical results—the distillates being obtained absolutely free from oxygen when rectified over sodium. The portion with the higher boiling-point distilled completely between 180° and 210° C., and was collected in three fractions, each of which commenced to boil between 205° and 210° C. when heated separately.

Hydrocarbon.—The pure hydrocarbon is a colourless, limpid liquid, possessing an agreeable aromatic odour, bearing some resemblance to a mixture of camphor and oil of nutmegs. Its taste is like that of cardamoms. Its specific gravity is ·894 at 15·5° C., and its boiling-point is 175° C. It is very volatile and highly inflammable, burning with a brilliant, slightly smoky flame. It is nearly insoluble in water; soluble in about five parts by volume of 95 per cent. alcohol. It dissolves iodine slowly, acquiring a deep red colour. Nitric acid, added to it and heated, causes a violent reaction, with the disengagement of nitrous acid fumes, the production of a yellow colour, and the disappearance of the odour of the hydrocarbon. Nitrous acid occasioned a rapid and violent reaction, with the production of heat. When heated with sulphuric acid, a thick, reddish mixture was obtained, becoming black, and disengaging sulphurous acid gas.

Oreodaphnol.—This is the oxygenated portion of the crude oil, and was obtained between 175° and 220° C. It is an oily liquid, of a light straw colour, and of a pungent and penetrating odour. Its taste is hot and camphorous; its specific gravity ·960. It is very inflammable, burning with a bright flame, giving off pungent vapours, and leaving a carbonaceous residue. Its boiling-point is 210° C. It dissolves iodine, with the generation of a slight heat, and the production of a reddish-brown solution. When treated with sulphuric acid a reaction was observed, accompanied with increase of temperature and the disengagement of sulphurous acid. Nitric acid exerted no action in the cold, but when heated, a violent reaction resulted, and nitrous acid fumes were given off. Treated with sodium, a reaction was observed.

Oreodaphnene.—Oreodaphnene is generated when oreodaphnol is distilled with glacial phosphoric acid, in an atmosphere of dry hydrogen gas. Thus obtained, it exhibits a light straw colour, and possesses a pungent terebinthinate odour. Its taste is hot and camphorous, followed by a feeling of acridity, which remains in the mouth for a length of time. It is specifically lighter than oreodaphnol, its specific gravity being ·934, and it has a boiling-point of 204° C. It burns with a white flame, giving off very pungent vapours. It is soluble in about 4 parts of 95 per cent. alcohol. Iodine dissolves in it, producing a reddish-brown solution. Nitric acid changes its colour to a deep red, with the elevation of temperature and disengagement of nitrous acid fumes. Nitrous acid gave a violent and rapid reaction, and sulphuric acid a reddish-brown solution. Treated with sodium, no reaction was observed. It is therefore the hydrocarbon of oreodaphnol, generated by the abstraction of water.

The hydrocarbon and the oreodaphnol are contained in the crude oil in about the proportion of one part of the former to two parts of the latter. It is upon the oreodaphnol that the peculiar pungency of the crude oil depends.

This was followed by the reading of a paper entitled—

DEER TONGUE (*Liatris odoratissima*) IN PERFUMERY.

BY DR. MILLER.

Deer tongue, or Southern vanilla (*Liatris odoratissima*, Willd.), seems destined to become a commercial staple of some importance, chiefly, so far, on account of its large consumption as a flavour for tobacco. It is stated to be also used to some extent in the South for the purpose of preserving clothing, woollen fabrics, etc., from the attacks of moths. To the best of my knowledge, these are the only applications which have yet been found for these highly odoriferous leaves. The chemistry of deer tongue has been treated of very ably and exhaustively by Professor Procter, proving it to contain a large percentage of coumarin.

As it has been a matter of surprise to me that no perfumer has, as yet, availed himself of the Southern vanilla, I have contrived the following formulæ, which, in my opinion, furnish quite satisfactory results.

Tincture of Deer Tongue.—Percolate two ounces of ground deer tongue leaves with Cologne spirits until one pint of tincture is obtained. This is of a handsome light green colour, so that it can be readily employed as an addition to various extracts, Colognes or toilet waters. In its pure state, it may be used as a substitute for the essence of May wine (a tincture of the fresh leaves of *Asperula odorata*), which is used extensively in Germany as a pleasant addition to wine, converting it into the so-called May drink (*Maitrank*).

Extract of New-mown Hay.

Tincture of Deer Tongue	8 ounces.
Extract of Rose from Pomade	4 ,,
,, Orange Flower from Pomade	4 ,,
Oil of Rose, Virgin Serail	16 drops.

New-mown Hay Sachet Powders.

Ground Deer Tongue Leaves	2 ounces.
,, Florentine Orris Root	
,, Damascene Rose Petals	
,, Orange Flowers . . . . . of each	1 ounce.

Mix thoroughly and sift.

Sachet Bouquet.

Ground Deer Tongue Leaves	2 ounces.
,, White Santal Wood	½ ounce.
,, Florentine Orris Root	1 ,,
,, Ambretta Seeds	½ ,,
,, Benzoin	¼ ,,
,, Damascene Rose Leaves	1 ,,

Mix, and sift to remove coarse particles.

'Gray's Botany' states that the leaves, when bruised, exhale the odour of vanilla, but I cannot confirm the assertion. I have tried various combinations of vanilla and deer tongue, with a view to its use as a flavour, but each of them was unsatisfactory. The odour and taste of coumarin appear to be so much stronger and so much more persistent than that of vanilla, that it is only spoiling good vanilla to add tonka or deer tongue to it.

Deer tongue is specially adapted to imitating the odour of new-mown hay, as the perfume of this also resides in the coumarin contained in *Anthoxanthum odoratum*, Lin., or sweet-scented vernal grass.

Professor Maisch read a paper on the "Constituents and Properties of the Genus Potentilla."

SOCIETY OF ARTS.

ALCOHOL, ITS ACTION AND ITS USES.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

LECTURE IV.

(*Concluded from page 775.*)

DISPOSAL OF ALCOHOL IN THE ORGANISM.

We are brought now to one of the most important parts of our study. We see that, under favouring conditions, alcohol will oxidize in the presence of the air. We see that it will oxidize in two ways—actively with the production of much heat and with the formation of carbonic acid and water; passively with the production of aldehyde and acetic acid.

In the human body do any similar changes take place? Throughout the whole of this vast sheet of the minute circulation there is ever in progress, during life, a process of slow oxidation of carbon and hydrogen, by which heat is produced, and carbonic acid and water are produced. The heat is proved by the animal warmth which is ever present in our bodies while we live; the carbonic acid and water, as products, are proved by their continued presence in the secretions from the lungs, skin, and other organs.

Alcohol, we have seen, is carried by the blood into this minute circulation. Is it possible it can pass through that ordeal and undergo no chemical change? If it does undergo any changes, what are their nature? These questions have occupied the attention of many gifted minds; but they are not yet solved. Let me endeavour to put the position in which they stand plainly before you.

The earlier physiologists of this century came naturally enough to the conclusion that the alcohol taken into the body is consumed there with the evolution of heat. A certain development of heat in the superficies of the body, and a certain sensation of glow which follows upon the imbibition of spirit lent countenance to this suspicion. But in course of time, independently of any knowledge of the effect produced by alcohol in the minute circulation of the blood it began to be doubted whether alcohol was disposed of in the organism by its combustion. Some observers had noticed, in conducting the examination of the body after death from excess of alcohol, that the odour of the substance was present in the tissues, especially in the nervous tissue, and it was doubted whether the alcohol might not under some circumstances remain in the organism without undergoing any change at all. In 1860 three eminent Frenchmen—Lallemand and Perrin, assisted by Duroy, published a prize essay on alcohol, in which this view was maintained, or as the authors would probably say, was originated; for in truth they were the first to state the view on direct scientific evidence. From the result of many experiments, they came to the conclusion that alcohol taken into the living body accumulates in the tissues, especially in the liver and in the brain, and that it is eliminated by the fluid secretions, notably by the renal secretion, as alcohol. They sought in the different tissues for evidence of the secondary products of the oxidation of alcohol, for aldehyde acetal, acetic acid, and they found none of those products, except some acetic acid in the stomach, which acid they concluded was formed from the alcohol received directly into the stomach, and from the action exerted upon it there by the gastric juice. The experiments carried on by these inquirers were so numerous and careful, and the results they arrived at were so definitively stated, their labours were for a season accepted as conclusive by many men of science, and by the majority of the public. It was ascertained by other experimentalists that alcohol is eliminated by the system in the direct way, as alcohol, and the question of elimination rested as if it had been solved.

The interval of credence in these assertions was not very prolonged. An English physician soon commenced to cross a lance with his learned French peers, and to point out certain distinct errors in their results. I have no doubt many of you know, before I mention his name, that he to whom I refer was the physician who last year lost his life from the performance of his professional duties—the late Dr. Anstie. Respecting this observer, whose friendship I owned for many years, it is meet for me to pay this public tribute of respect; that no man I ever knew combined with vigour of mind such incomparable industry and courage, or a more honourable regard for scientific truth and honesty. The subject we are now considering has lost no investigator more ably learned for the work that still remains to be done.

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

From Dr. Anstie came the earliest expression of doubt relative to this hypothesis of what is called the direct elimination of alcohol by the secretions, and from him have come the latest objections. His arguments have been sustained abroad by Schulinus, and in this country by Drs. Thudichum and Dupré, whose work on wine will, even in another century, be more highly prized, if that be possible, than it is now. The sum and substance of the labours of these observers is stated in a few words. They prove that while it is true that, under certain circumstances, alcohol taken into the body will pass off in the secretions unchanged, the quantity so eliminated is the merest fraction of what has been injected, and that there must be some other means by which the spirit is disposed of in the organism. In a lecture I delivered on this subject in the year 1869, I ventured to suggest, in commenting upon a series of Dr. Thudichum's remarkable researches that perhaps one element of research was wanting to prove conclusively the fallacy of the direct elimination hypothesis. I thought that sufficient time had not been allowed between the administration of the spirit and the final determination made for it in the excreted fluids. It was not, I argued, shown how much spirit the tissues would hold unchanged. The objection was sound, and it has been renewed by more recent experiment.

In the last research conducted by Anstie, in which he was assisted by Dupré, the results of the experiments were unmistakable in their bearing on the points now under our consideration. The history of these labours is recorded in full in the last paper written by Dr. Anstie, and published in the journal called the *Practitioner*, for July, 1874.

The test that had been commonly employed for determining the presence of alcohol in the fluid suspected of containing it, was the colour test. A solution is made of bichromate of potassa, with sulphuric acid. When to this solution alcohol is added, there is a change of colour from the brownish red to green; owing to the reduction of the chromic acid to the green oxide of the base chromium. By marking the difference of colour produced a scale can be adopted, which will show the extent of the reduction, and thereby the amount of the spirit that has caused the change. This process was improved by Dr. Dupré. He distilled the fluid in which alcohol was believed to be present, and then after treating the distillate with the bichromate and sulphuric acid solution, he tested with a standard solution of soda for the amount of acetic acid which would be produced by the oxidation of alcohol were that fluid present.

This modification of test was and is a very considerable advance, since it enabled the observers to conduct their determinations with greater accuracy of detail. In the research they conducted with it two facts of singular interest were elicited. The first fact was discovered by Dr. Dupré. It was, that from the secretions of persons who do not drink alcohol at all a fluid can be distilled which affects the chromic test as if alcohol were actually present in the secreted fluids, and that this hitherto unsuspected product is oxidized into an acid so like acetic acid it cannot be distinguished from it, and is apparently identical with it. To be plain, Dr. Dupré's discovery suggests that no man can be, in strict scientific sense, a non-alcoholic, inasmuch as " will he nill he "—he brews in his own economy a " wee drap." It is an innocent brew certainly, but it is brewed, and the most ardent abstainer must excuse it. " Argal, he that is not guilty of his own death shorteneth not his own life." The fault, if it be one, rests with nature, who, according to our poor estimates, is no more faultless than the rest of her sex.

The second fact, which came chiefly from the labours of Dr. Anstie, was that from animals under alcohol, not one of the secretions, not all the secretions combined, yielded any more than a fractional amount of the alcohol that had been administered. The experiments were by necessity made on the inferior animals, but they supplied none the less conclusively the fact stated. It was proved that an animal, a terrier dog, weighing 10 lbs. could take with comparative impunity nearly 2000 grains of absolute alcohol in ten days, and that on the last day of this regimen he only eliminated by all the channels of elimination 1·13 grains of alcohol. This fact was of itself sufficiently remarkable, but another still more important remains to be told. In completion of his research after an animal had been treated with alcohol, as above described, Anstie killed it, instantly and painlessly, two hours after it had received the last quantity—95 grains—of spirit. Then the whole body, including every fragment of tissue with all the fluid and solid contents, was subjected to analysis, with the result of discovering only 23·66 grains of spirit.

We are driven by the evidence now before us to the certain conclusion that in the animal body alcohol is decomposed; that is to say, a certain portion of it (and if a certain portion why not the whole?) is transmutable into new compounds. The inference that might be drawn is fair enough that the alcohol is lost by being burned in the body. It is lost in the body, and out of the body it will burn. If it will burn in the organism it will supply force, for it enters as the bearer of so much potential energy. In combining with oxygen is there then a development of force or heat to the extent that would be developed in the combustion of the same quantity in the lamp, or from the distribution of it over the platinum black? At the same time, and in corroboration, is that product of its combustion, carbonic acid, to be discovered in the excretions? If there be heat, and if there be product of carbon consumed in oxygen, then alcohol must rank as a heat-forming food.

Does Alcohol Increase the Animal Heat?

In putting before you this inquiry, I am prepared to answer it by direct knowledge gained from individual experiment. In the course of some researches I had to make for reports rendered to the British Association for the Advancement of Science, it became part of my duty to ascertain what effect certain chemical agents exert over the animal temperature. Amongst these agents was alcohol.

At the time when my researches commenced, viz., in the year 1864, there was nothing definitely known on the subject. The thermometer was not then in such general use as it is now, and it had not been applied, as far as I know, to this particular determination. Generally, however, it had been assumed by the majority of persons that alcohol warms the body, and to " take just a drop to keep out the cold " had been the practice which the experience of ages seemed to justify. It is fair, at the same time, to say that Dr. Lees, and some other far-seeing observers, had for many years held and asserted a different view. They had not entered into minuteness of experimental detail, but they had observed from the effects of alcohol on those who had been exposed to cold in the extreme North and in other regions of ice and snow, that the drinkers did not live on like other men. Thus, in so far as I had what is called experience to guide me, I found conflict of opinion. It was not my business, however, to accept guidance of this kind, but to appeal to the only safe guide, the direct interrogation of nature by experiment.

It were impossible for me to recount the details of the long research—extending, with intervals of rest, for three years—which was conducted in my laboratory, to determine the influence of alcohol on the animal temperature. The effects were observed on warm-blooded animals of different kinds, including birds; on the human subject in health, and on the same subject under alcoholic disease. Similar experiments were made in different external temperatures of the air, ranging from summer heat to the degrees below freezing point. The whole were carried on from experiment to experiment, without regard either to comparison or result until the general character of result began to proclaim that a rule existed which could hardly be considered exceptional. The facts obtained I may epitomize as follows:—

The progressive stages of change of animal function from alcohol are four in number. The first is a stage of excitement when there exists that relaxation and injection of the blood vessels of the minute circulation with which we have become conversant. The second is the stage of excitement with some muscular inability and deficient automatic control. The third is a stage of rambling, incoherent, emotional excitement, with loss of voluntary muscular power, and ending in helpless unconsciousness. The fourth and final stage is that in which the heart itself begins to fail, and in which death in extreme instances of intoxication closes the scene. These stages are developed in all the warm-blooded animals, and the changes of temperature throughout the whole are relatively the same.

In the first stage the external temperature of the body is raised. In birds—pigeons—the rise may amount to a full degree, on Fahrenheit's scale; in mammals it rarely exceeds half a degree. In man it may rise to half a degree, and in the confirmed inebriate, in whom the cutaneous vessels are readily engorged, I have seen it run up to a degree and a half. In this stage the effect on the extremities of the nerves is that of a warm glow, like what is experienced during the reaction from cold.

The heat felt in this stage might be considered as due to the combustion of the alcohol; it is not so; it is in truth a process of cooling. It is from the unfolding of the larger sheet of the warm blood and from the quicker radiation of heat from that larger surface. During this stage, which is comparatively brief, the internal temperature is declining; the expired air from the lungs is indicating, not an increase, but the first period of reduction in the amount of carbonic acid, and the reddened surface of the body is so reduced in tonicity that cold applied to it increases the suffusion. It is this most deceptive stage that led the older observers into the error that alcohol warms the body.

In the second stage, the temperature first comes down to its natural standard, and then declines below what is natural. The fall is not considerable. In birds it reaches from one and a half to two degrees. In other animals, dogs and guinea pigs, it rarely exceeds one degree; in man it is confined to three-fourths of a degree. In a room at the temperature of 65° or 70° the decrease of temperature may not actually be detected, but it is quickly detected if the person in whom it is present pass into a colder atmosphere, and it lasts, even when the further supply of alcohol is cut off, for a long period, viz., from two and a half to three hours. It is much prolonged by absence of food.

During the third degree the fall of temperature rapidly increases, and as the fourth stage is approached it reaches a decline that becomes actually dangerous. In birds the reduction may be five degrees and a half, and in the other animals three. In man it is often from two and a half to three degrees. There is always during this stage a profound sleep or coma, and while this lasts the temperature continues reduced.

It is here worthy of incidental notice that, as a rule, the sleep of apoplexy and the sleep of drunkenness may be distinguished by a marked difference in respect to temperature. In apoplexy the temperature of the body is above, in drunkenness below, the natural standard of 98° of Fahrenheit's scale.

Under favourable circumstances a long period is required before the body recovers its natural warmth after such reduction of heat as follows the extreme stage of alcoholic intoxication. With the first conscious movements of recovery there is a faint rise, but such is the depression that these very movements exhaust and lead to a further reduction. I have known as long a period as three days required, in man, to bring back a steady natural return of the full animal warmth.

Through every stage, then, of the action of alcohol—barring that first stage of excitement—I found a reduction of animal heat to be the special action of the poison. To make the research more perfectly reliable, I combined the action of alcohol with that of cold. A warm-blooded animal, insensibly asleep in the third stage of alcoholic narcotism, was placed in a chamber—the air of which was reduced in temperature to ten degrees below freezing point—together with another similar animal which had received no alcohol. They both sleep under these circumstances, but the alcoholic sleeps to die; the other simply sleeps more deeply than is natural, sleeps and lives so long as the store of food it is charged with continues to support life. Within this bound it awakes, in a warmer air, uninjured, though the degree of cold be carried even to the act of freezing of the extreme parts.

One more portion of evidence completes the research on the influence of alcohol on the animal temperature. As there is a decrease of temperature from alcohol, so there is proportionately a decrease in the amount of the natural product of the combustion of the body. The quantity of carbonic acid exhaled by the breath is proportionately diminished with the decline of the animal heat. In the extreme stage of alcoholic insensibility—short of the actually dangerous—the amount of carbonic acid exhaled by the animal and given off into the chamber I constructed for the purposes of observations was reduced to one-third below the natural standard. On the human subject in this stage of insensibility the quantity of carbonic acid exhaled has not been measured. But in the earlier stage of alcoholic derangement of function the exhaled gas was measured with much care by another earnest worker, whose recent death we have also to deplore—Dr. Edward Smith. In these early stages Dr. Smith found that the amount of carbonic acid was reduced in man, as I have found it in the lower animals, so that the fact of the general reduction may be considered as established beyond disputation.

We are landed then at last on this basis of knowledge. An agent that will burn and give forth heat and product of combustion outside the body, and which is obviously decomposed within the body, reduces the animal temperature, and prevents the yield of so much product of combustion as is actually natural to the organic life.

What is the inference? The inference is that the alcohol is not burned after the manner of a food which supports animal combustion, but that it is decomposed into secondary products, by oxidation, at the expense of the oxygen which ought to be applied for the natural heating of the body.

For some time to come the physiological world will be studiously intent on the discovery of the mode by which alcohol is removed from the organism. It is a subject on which I shall one day be able to speak, I hope, with some degree of experimental certainty, but on which at this moment I am not prepared to offer more than an indication of the probable course of research. I may venture to add, in advance, two or three suggestions to which my researches, as far as they go, point.

Firstly, I believe there is a certain determinable degree of saturation of the blood with alcohol, within which degree all the alcohol is disposed of by its decomposition. Beyond that degree the oxidation is arrested, and then there is an accumulation of alcohol, with voidance of it, in the unchanged state, in the secretions.

Secondly, the change or decomposition of the alcohol in its course through the minute circulation, in which it is transformed, is not into carbonic acid and water, as though it were burned, but into a new soluble chemical substance, probably aldehyde, which returns by the veins into the great channels of the circulation.

Thirdly, I think I have made out that there is an outlet for the alcohol, or for the fluid product of its decomposition, into the alimentary canal, through the secretion of the liver. Thrown into the canal it is, I believe, subjected there to further oxidation, is in fact oxidized by a process of fermentation attended with the active development of gaseous substances. From this surface the acid product is in turn reabsorbed in great part and carried into the circulation, and is disposed of by combination with bases or by further oxidation.

Here, however, I leave the theoretical point to revert to the practical; and the practical is this, that alcohol cannot by any ingenuity of excuse for it, be classified amongst the foods of man. It neither supplies matter for construction nor heat. On the contrary, it injures construction and it reduces temperature.

Effect on Muscular Power.

Behind the question of the effect of alcohol upon the animal temperature was another subject for inquiry. It was fair to ask whether, if heat were not produced by it, some additional stimulus might be communicated by the spirit to the muscular fibre. There is nothing in what we see relating to the action of alcohol in man that would lead us to suppose it capable of giving an increased muscular power, and it is certain that animals subjected even for short periods of time to its influences lose their power for work in a marked degree. Indeed, if we were to treat our domestic animals with this agent in the same manner that we treat ourselves, we should soon have none that were tameable, none that were workable, and none that were edible. I thought it, nevertheless, worth the inquiry whether at any stage of the alcoholic excitement living muscle could be induced to show an extra amount of power; I therefore submitted muscle to this test. I gently weighed the hinder limb of a frog until the power of contraction was just overcome; then by a measured electrical current I stimulated the muscle to extra contraction, and determined the increase of weight that could thus be lifted. This decided upon in the healthy animal, the trial was repeated some days later on the same animal after it had received alcohol in sufficient quantity to induce the various stages of alcoholic modification of function. The result was that through every stage the response to the electrical current was enfeebled, and so soon as narcotism was developed by the spirit, it was so enfeebled that less than half the weight that could be lifted in the previous trial by the natural effort of the animal could not now even be raised under the electrical excitation.

In man and in animals, during the period between the first and third stages of alcoholic disturbance, there is often muscular excitement, which passes for increased muscular power. The muscles are then truly more rapidly stimulated into motion by the nervous tumult, but the muscular power is actually enfeebled.

Hygienic Considerations.

The facts I have endeavoured to lay before you in this as well as in the last lecture will suggest to your minds many thoughts bearing upon the health of individuals and communities, in so far as health is affected by the potent agent, alcohol. I heed hardly, indeed, presume to offer any suggestions, but one or two of a specially practical and everyday character may be ventured.

I am bound to intimate that the popular idea of administering alcohol for the purpose of sustaining the animal warmth is an entire and dangerous error, and that when it is brought into practice during extremely cold weather it is calculated to lead even to fatal consequences, from the readiness with which it permits the blood to become congested in the vital organs. I cannot too forcibly impress the fact that cold and alcohol act, physiologically, in the same manner, and that, combined in action, every danger resulting from either agent is doubled.

Whenever we see a person disposed to meet the effects of cold by strong drink it is our duty to endeavour to check that effort, and whenever we see an unfortunate person under the influence of alcohol it is our duty to suggest warmth as the best means for his recovery. These facts prompt many other useful ideas of detail, in our common life. If, for instance, our police were taught the simple art of taking the animal temperature of those persons whom they find in the streets in a state of insensibility, the results would be most beneficial. The operation is one that hundreds of nurses now carry out daily, and applied by our police-officers it would enable them not only to detect the difference between a man in an apopletic fit and a man intoxicated, but would suggest naturally the instant abolition of the barbarous practice of thrusting the really intoxicated into a cold and damp cell, which to such a one is actually an anteroom to the grave.

Once more: I would earnestly impress that the systematic administration of alcohol for the purpose of giving and sustaining strength is an entire delusion. I am not going to say that occasions do not arise when an enfeebled or fainting heart is temporarily relieved by the relaxation of the vessels which alcohol, on its diffusion through the blood, induces; but that this spirit gives any persistent increase of power by which men are enabled to perform more persistent work is a mistake as serious as it is universal.

Again, the belief that alcohol may be used with advantage to fatten the body is, when it is acted upon, fraught with danger. For if we could successfully fatten the body we should but destroy it the more swiftly and surely; and as the fattening which follows the use of alcohol is not confined to the external development of fat but extends to a degeneration through the minute structures of the vital organs, including the heart itself, the danger is painfully apparent.

In conclusion, whatever good can come from alcohol, or whatever evil, is all included in that primary physiological and luxurious action of the agent upon the nervous supply of the circulation to which I have endeavoured so earnestly to direct your minds. If it be really a luxury for the heart to be lifted up by alcohol; for the blood to course more swiftly through the brain; for the thoughts to flow more vehemently; for words to come more fluently; for emotions to rise ecstatically, and for life to rush on beyond the race set by nature; then, those who enjoy the luxury must enjoy it—with the consequences.

Parliamentary and Law Proceedings.

Attempted Poisoning by Red Precipitate.

At the Somerset Assizes, held at Taunton, on Saturday March 27, Sarah Ann Cross, 16, labourer, was indicted for feloniously administering red precipitate of mercury to George Cross, her father, with intent to murder him, at Winsford, on the 17th February. Mr. Warry, who prosecuted, stated in his opening, that the prosecutor worked for a farmer named Liddon. His wife died about three years ago, and since then the prisoner had been his housekeeper. On the 16th of February, Mr. Milton, a miller, told the prosecutor there was 2*s.* owing for grinding corn. Cross had given his daughter the money to pay for it, and asked her what she had done with it. She insisted that she had paid for the grinding, and he told her that she was telling falsehoods, but nothing further happened. Next day the prisoner sent her niece, a child seven years old, to the field with her father's dinner of fried potatoes, but he had no sooner tasted the food that he was sick and vomited, and so was a man named Pope, who also tasted the potatoes. Cross put the potatoes back, and took them home, and on the food being analysed, red precipitate was found in it. When the prosecutor came home the prisoner left the house, and did not return. She was, however, apprehended three days afterwards. On the day the poison was found in the food the prisoner had gone to Bridgetown and purchased some red precipitate. The packet was labelled "Poison."

Mr. W. W. Stoddart, of Bristol, the county analyst, proved the presence of red precipitate on the plate and knife used by the prosecutor.

The prisoner, who shed tears copiously during the trial, merely stated in her defence that she "did not do it." In summing up, the learned commissioner said it seemed to him a very dangerous thing for a young girl like the prisoner to be allowed to purchase such a deadly poison without much inquiry. The prisoner was found guilty of administering the poison with intent to do grievous bodily harm, and sentenced to seven years' penal servitude.—*Daily Bristol Times.*

Supposed Poisoning by Colocynth.

Mr. C. C. Lewis, coroner, has held an inquiry at West Ham, touching the circumstance of the death of Fanny Sharp, of Plaistow Grove, West Ham, who died from the effects of colocynth, or bitter apple. The following evidence was adduced :—

Sarah Whitehead, a married woman, living at West Ham, deposed : I have known deceased seven months. I acted as midwife to deceased last October. The child is still alive. Deceased has not been able to suckle it, she having been in a very weak state. She was the wife of James Sharp. Deceased sent for me on Sunday morning. She was retching and purged, and was very weak. She told me she had brought it on herself, as she had taken two-pennyworth of bitter apple. Up to Sunday afternoon she had not ceased retching and purging, and she believed she was going to die. She took it because she believed she was pregnant, and she did not want to have any more children. I remained with her half an hour, and saw her again in the afternoon. She was very bad, and I remained with her till a doctor came. On Monday morning she died, about twelve.

Mary Tyler, a child of deceased, thirteen years of age, deposed : She was sent to the chemist's on Saturday morning last for two-pennyworth of bitter apple, and she was served by the assistant. It was a powder in paper ; it had "bitter apple" written upon it. Nothing was written upon it as to how much was to be taken. Her mother took it in water about half-past seven. Father did not know anything about it. Just after, she and her father went to Stratford, and returned about ten. Her mother was in bed. Her mother said the bitter hung about her mouth, and she was retching. She heard her mother retching in the night and during Sunday.

Mr. Price, assistant to Dr. Levick, deposed : Dr. Levick was sent for at half-past four on the Sunday afternoon. He was ill in bed and unable to leave his room, and at five I went and saw deceased. She was in bed, retching violently, and severely purged, and very prostrate ; extremities cold and pulse very weak. She told me she had not taken anything, and in answer to me said she had gone a week over the month. The midwife told me deceased had taken two-pennyworth of bitter apple, and that explained her symptoms. Bitter apple is a powerful purgative. The proper dose was from two to eight grains, and in her condition she should have taken no more than five grains, and she took about 120 grains. There is no doubt that she died from exhaustion from the effects of an overdose of the bitter apple. I prescribed chlorodyne.

Thomas Samuel Minett, assistant to Mr. Cowles, chemist, Stratford, deposed : I sold some bitter apple last week to a child. The child asked for bitter apple. I did not ask her what it was for. Two-pennyworth would be a quarter of an ounce ; less than 120 grains. The dose is from two to eight grains ; five or six grains is the ordinary dose, eight grains the maximum. "Bitter apple" was written on the paper, but no directions or dose. Scarcely a chemist in Europe has a label printed for bitter apple, and I think no one would have directions. It would be a most difficult thing to draw a line with regard to the dose. It is neither necessary nor customary to put on a label with directions.

The Coroner said he considered it right that directions should be on the paper.

Foreman of the Jury : Do you think it right to sell it in that way, without asking what it is for ?

Witness : Most certainly. I do not question people except for actual poisons.

Coroner : There is no law to compel them to label it or make any inquiries.

Juryman : Is it used for anything else ?

Witness : Yes, for moth, but not at this time of the year.

Juryman : Would it hurt you to take a pennyworth ?

Witness : You would run the risk.

Juryman : Because I have known women take a pennyworth.

The Coroner, in summing up, remarked that the woman was very weak, in fact, in the last stages of consumption ; and believing she was in the family-way, having gone over her monthly period, she sent for the bitter apple, and as no one knew of her taking it, she alone was responsible for her death. A verdict was returned in accordance with the evidence.

A Fatal Prescription for Gout.

William Carrick, aged 58 years, residing at Croydon, was admitted into the Croydon General Hospital on the 15th ult., under the care of Dr. Adams, with symptoms of irritant poisoning. It appeared, from the statement of his wife, that in order to relieve an attack of gout he took a wine glassful of a mixture made by himself from a receipt given to him by a friend. The ingredients were to be three-pennyworth of potass, two-pennyworth of flowers of sulphur, and two grains of the best gunpowder. Carrick sent a child out to different places for each ingredient, and for the potass the child went to an oil-shop, where, instead of iodide of potass (which was intended), common caustic potash was given. When taken to the hospital everything was done by the resident house surgeon, Dr. Ilott, in the way of antidotes, and Carrick lingered on until Sunday, when he sank from inflammation of the bowels, caused by the caustic alkali he had swallowed.—*Standard.*

Obituary.

DANIEL HANBURY, F.R.S., etc.

By the sudden death of Mr. Daniel Hanbury in the prime of life, pharmacology and the allied sciences in their relation to pharmacology have lost one of their most assiduous and successful students, and deep will be the sense of personal loss of very many engaged in the same studies both at home and abroad. As a frequent contributor to this Journal the character and value of his work has long been known to our readers, and the following particulars of his life, though unavoidably fragmentary, will be read with interest.

Daniel Hanbury was born 11th September, 1825. He was the eldest child of Daniel Bell Hanbury, who for many years was a valued member of the Council of the Pharmaceutical Society, and for eleven years its Treasurer. In early life he showed superior ability. At school he always maintained a foremost place, and attained a considerable degree of proficiency in classical studies, and also in water-colour drawing.

In the year 1841 he commenced his business training under the firm of Allen, Hanburys and Barry, of which his father was an active member. Here his peculiar abilities were speedily manifested and appreciated.

His innate love of precision and accuracy were stimulated by the example and influence of Mr. Barry;* he became an exquisitely neat experimenter, and his handwriting assumed the form which those familiar with it will never forget, combining in a singular degree, firmness, force of character, and complete accuracy of detail.

---

* See *Pharm. Journ.*, July, 1864.

Whatever he undertook was done with uncompromising thoroughness. He never spared himself any labour, nor sought the notice of those around him by talking of any effort he made, but quietly brought his fine abilities to bear with painstaking conscientiousness on the one matter immediately before him, whether dispensing a prescription, posting an account book, or writing à scientific paper. With such qualities he not only accomplished a very large amount of work, but the quality of what he did was almost faultless.

In the year 1844 he studied at the laboratory of the Pharmaceutical Society.

His pursuits early brought him in contact with the late Dr. Pereira who treated him with great consideration, and a warm friendship sprang up between the professor and his pupil, which lasted till the death of the former, and the remembrance of which has since often been manifested by Mrs. Pereira. His first contribution to this Journal was we believe on "Turnsole," in January, 1850. From that time to the present his papers are scattered thickly through our volumes, numbering, according to the index, sixty-one, the last being incorporated in an article entitled "Cinchona or Chinchona," published on the 13th of February in the present year.

The series of papers on Chinese Materia Medica, published in the years 1860-1-2 were highly esteemed by those most capable of appreciating them and afford a characteristic example of accurate and careful research.

He never wrote without having original information to impart, and his papers uniformly bear evidence of careful investigation and thorough knowledge.

Most happily the work upon which he had been engaged for many years in conjunction with Professor Flückiger, the 'Pharmacographia,' was completed and published last year. This work is a storehouse of reliable information to which future generations will have recourse, and it is by his part in this important work that he will hereafter be best known. No one can read the historic sections of the book without being struck by the vast variety and extent of reading to which they bear witness.

Narratives of travels were especially attractive to him. He took nothing at second hand, but always sought his information from the fountain head. His library contained many Latin volumes of the early Portuguese, Dutch, and Spanish voyagers, to which he constantly referred, and he eagerly read modern books of travel likely to throw light on his favourite studies.

Whilst alluding to his writings we must not omit to mention the important part he took in the preparation of the Pharmacopœia of India, a work involving much labour. He was also one of those deputed to draw up the Admiralty manual of scientific inquiry. Botany was the science to which he especially devoted his attention. He contributed to the *Transactions of the Linnean Society* the following papers, "Note on Cassia Moschata," H. B. et K., xxiv, 161; "On the Species of Garcinia which affords Gamboge in Siam" (G. Morella), xxiv. 487, and with Mr. Currey, "Remarks on Sclerotium Stipitatum and Similar Productions," xxiii, 93; and numerous papers by him will be found in the *Journal of the Linnean Society.*

We believe he has collected a large mass of original information for a monograph on an important genus, and trust it may yet be given to science.

Occasionally he contributed an article to the literary periodicals. A paper containing curious information on Frangipani in *Notes and Queries*, and another on the botanical origin and country of Myrrh, published in *Ocean Highways*, for April, 1873, will be remembered by some of our readers. He occasionally contributed to the *Athenæum*, and a review of "The Countess of Cinchon and the Cinchona Genus" is about to appear in the *Academy.* He served on the juries of the International Exhibitions in 1862 and in 1867, and in the former year acted as secretary to the jury on vegetable products, the proceedings of which were conducted in French. In the year 1855 he was elected a Fellow of the Linnean Society, repeatedly served on its Council, and held the office of Treasurer at the time of his death.

He was also a Fellow of the Chemical Society, and Member of its Council in the year 1869.

In the year 1867, on his first nomination, he was elected a Fellow of the Royal Society, and a Member of its Council in 1873.

Of the Pharmaceutical Society he was a warm supporter almost from its origin. For many years (from June, 1860, to May, 1872,) he rendered very valuable services as an examiner, often at great personal inconvenience, and he was a very constant attender of the evening meetings, to the usefulness of which he often contributed.

In 1870 he retired from business. He never married, but lived with his parents, to whom he was a most kind and affectionate son. Though possessed of ample means, his habits, we believe, both from principle and taste, were remarkably simple and inexpensive. He disliked and shunned everything approaching ostentation, and luxury and self-indulgence were utterly alien to his life. He was always an early riser, and habitually got through an important amount of work in his library before breakfast, and few indeed were the moments wasted from early morning until he again retired to rest.

Travelling on the Continent was one of his greatest pleasures. He read German. He had some knowledge of Italian, but he spoke French almost as a native, and hence travelling in France was specially attractive to him. It was not only in Paris, where the late Professor Guibourt and other scientific friends always gave him a warm welcome, but in the provincial towns and in the cities of the South wherever there was a botanist of standing he found an open door and often gained an acquaintance who became a valued correspondent able to afford local or other special information.

But his journeys were not confined to France. In the year 1860 he visited the Holy Land with Dr. Hooker, and of late years he frequently spent considerable time at a residence belonging to a brother near Mentone. Here he took great delight in introducing into the beautiful gardens the vast variety of interesting plants which can there be acclimatized.

During these journeys he frequently exercised his skill in water-colour drawing, and the productions of his pencil, like those of his pen, always possessed the rare merit of *truthfulness*, whilst a thoroughly artistic effect was preserved. The same exquisite delicacy of touch was apparent in his drawing, writing or printing, or forming of Arabic, Chinese, or other complicated characters.

In his frequent travels he seemed to have acquired something of the continental practice of using but little meat in proportion to the vegetable food taken. His diet was always spare, and it may be doubted whether his health did not suffer from the abstemiousness of his habit of living, coupled with the constant strain to which he subjected his mental powers. But if this was so the motive was never the gratification of ambition or other unworthy object, but the pure love of action and desire rightly to use the powers bestowed upon him. No feature of his life was in fact more striking than his freedom from that anxious self-assertion which too often disfigures the characters of men of science. Whilst remarkably self-reliant, he never sought to thrust himself into notice, but rather kept out of view until drawn out by those who had learned his worth. Though never robust, his health rarely impeded his activity, and slight ailments were resolutely disregarded. There were no indications of approaching illness until he was attacked with a severe *rigor* about the 6th of March; this was followed by serious inflammation of the mouth, and on the subsidence of this local affection symptoms of typhoid fever appeared. On the 18th his condition first caused serious alarm. With little apparent change his strength gradually failed till the evening of the 24th, when he peacefully passed away.

Long will the memory of his fine, thoughtful features and spare frame dwell with many who have known and valued him, and long will they continue to miss the decided tones in which his clear judgment and exact knowledge were unhesitatingly expressed. With him every benevolent object connected with science or scientific men has lost a munificent supporter.

Mr. Hanbury remained to the last a member of the Society of Friends, amongst whom he had been brought up. With characteristic reticence he scarcely ever alluded to his own religious experience, but his habits of devotion, and an occasional expression, afford evidence of the reality of his Christian faith.

That a man thus endowed with talents both natural and acquired should be taken away ere he completes his fiftieth year, is to us an inscrutable mystery. The light of eternity alone can reveal the full significance of any life.

Notice has also been received of the death of the following:—

On the 23rd January, 1875, Mr. Alfred Glew, Chemist and Druggist, of Peterborough, aged 31.

On the 28th March, 1875, Mr. Joseph Sarjeant, Chemist and Druggist, of Ramsey, Hunts.

Notes and Queries.

[434]. INK FOR PHOTOGRAPHS. — Can any reader inform me of an ink suitable for writing on photographs? Of course the ordinary ink will not do.—W. Robertson.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmacy in Ireland.

Sir,—Having been shown a letter in your Journal of the 20th inst., signed by Mr. William Hayes, and written by him in reply to what I consider a truthful and very sensible communication from Mr. Charles H. Hartt, in your issue of the previous week, I venture to offer a few observations on the subject.

I must characterize the letter of Mr. Hayes as, to use the mildest phrase, disingenuous and calculated to perpetuate the erroneous ideas which seem to prevail in England generally with reference to Irish Pharmacy.

The term "chemist and druggist" is, I assert, utterly inapplicable to druggists in Ireland; they are not entitled to the name, since they have not passed an examination in chemistry, nor are they "dispensing chemists" as the words are applied in England, for they have never been legally entitled to practise as such. There is no analogy whatever between the Irish "druggist," and the English "chemist." The apothecaries of Ireland are the only legal dispensing chemists, and although hitherto required to undergo a medical and surgical as well as a thorough pharmaceutical training, a large number confine their attention solely to the practice of pharmacy; hence I maintain that the pure pharmacist is not "almost extinct." Those apothecaries who practise medicine nearly all possess some other medical qualification in addition, on the strength of which they act as general practitioners.

Allow me also to state distinctly that the general feeling of the Irish apothecaries is that the future pharmacists of the country should correspond in qualification and education to the gentlemen who have passed the "Major" of the Pharmaceutical Society of Great Britain. The mistake of the Apothecaries' Hall has been the persistence in the desire to grant a single qualification in medicine as well as in pharmacy, consequently the standard has been unnecessarily high; but this affords no reason for going to the other extreme and making it too low.

Mr. Hayes can record "no accident to the public which has occurred in Ireland through the ignorance or incompetence of any druggists or their assistants." Two instances recur to my mind as having occurred in this town recently; in one, extract of belladonna was vended by the druggist by mistake for extract of taraxacum, in the other, a coroner's jury found that death resulted from poisoning by a powder, obtained from a druggist's shop as a seidlitz powder.

An Irish Apothecary.

Belfast, March 25, 1875.

Sir,—I have read with interest the somewhat spasmodic correspondence which has appeared at various times in the pages of this Journal on the above subject. Having read your last leader on the subject, I must, with Mr. C. H. Hartt, express my regret and surprise at its tone, and while fully sympathizing with your desire to free the pharmacists from the trammels of the medical profession, must respectfully decline to take a "leap in the dark." As an Englishman I feel ashamed to find my brother pharmacists in England and Scotland continue to hold such obtuse and misty notions on Irish pharmaceutical matters. Though cordially agreeing with you on the desirability of the overthrow of the Apothecaries' Hall dynasty and the establishment in its stead of a Pharmaceutical Society, I emphatically protest against the suggestion of allowing the *quasi* druggists of Ireland to form unreservedly the nucleus of such a society. That the weak *régime* of the Apothecaries' Hall of Ireland should terminate every one interested in the progress of pharmacy in Ireland must acknowledge; for it has not only neglected the interests of its licentiates, but has failed also to do its duty to the public.

As you seem to hold such a high opinion of the dispensing abilities of the druggists of Ireland, and it is very important at the present juncture for pharmacists across the Channel to have a clear apprehension of the present position of the Irish druggist, it will be well to explain his position, so that it may be compared with the position of the British druggist before the Act of 1868.

In Ireland then, at the present time, anyone can assume the title of chemist and druggist and can open shop for the sale of drugs and indiscriminate sale of poisons in spite of the provisions of the Sale of Poisons (Ireland) Bill, but not for the dispensing of medicines. In Great Britain, as you are well aware, the chemist and druggist was in a similar position with regard to the opening of shop, and sale of drugs and poisons, but he was not debarred from dispensing medicines. In this lies the important distinction between the two. The British druggist had a dispensing status which no legislature could deprive him of, the Irish druggist does not possess that status, and has, therefore, not a tittle of claim to it.

In consequence of this restriction, which has been in force for nearly a century, the Irish druggist is not much better able to perform the function of dispensing medicines with either advantage to himself or with safety to the public than the drug-selling grocer or doctor's errand boy in England is.

If the Pharmaceutical Society of Great Britain should unduly favour the approaching legislation they will strike a serious blow at high-class pharmacy in Ireland, and will do dishonour to the name of their glorious founder, Jacob Bell.

The Irish pharmacist-apothecaries (if I may so term them) have done much to raise pharmacy in Ireland to the high position it now enjoys, and this they have been enabled to do on account of the long early training and rigid examinations they have had to undergo. The examinations they have to pass, excluding medical subjects, are similar to those of the pharmaceutical chemists in Great Britain with the superior safeguard of having to serve a seven years' apprenticeship. One of the main arguments used by the agitators in this "levelling up" process in pharmacy is that there is an insufficient number of such high-class pharmacists, and there is consequently a great dearth of, and pressing demand for additional dispensing facilities. So far as I have been able to learn during a ten years' sojourn in Ireland there is very little demand (at any rate on the part of the public, who, I presume, are the best judges) for increased dispensing facilities.

To my mind a Pharmacy Bill for Ireland is as much required to regulate certain irregularities which have been allowed to obtain during the weak *régime* of the Apothecaries' Hall, and for the assimilation of the practice of pharmacy in the United Kingdom, as to provide the public with more dispensing accommodation.

The Pharmaceutical Society of Great Britain, by means of the increased stringency of their examinations, are thinning the number of pharmacists throughout the country; by supporting the claims of the Chemist and Druggists' Society of Ireland they will adopt a different policy here where wealth less abounds, and where prices are proportionately lower than in the sister kingdom.

The establishment of a Pharmaceutical Society for Ireland ought therefore to be proceeded with circumspectly.

The apothecary of Ireland should take the rank of pharmaceutical chemist, and should occupy a similar position in its constitution to that of the pharmaceutical chemist in the British Society.

The chemist and druggist should, on passing, not a Modified, but the new Minor examination of the Pharmaceutical Society, be entitled to the same privileges as the British chemist and druggist. It is the duty, alike imperative on the Pharmaceutical Society and the Irish apothecary, that nothing short of the new Minor examination should admit any Irish chemist and druggist to the privileges now enjoyed by the British. Anything less than that would lower the status of Irish pharmacy, and would be fraught with danger to the public safety.

While speaking of the public safety I cannot close this letter without adverting to the very coarse allusion to a very grave dispensing error, by the Honorary Secretary of the Chemist and Druggists' Society in your last issue. If that is a sample of the language we may expect in the Council chamber of the proposed society, I fear we shall have to make immense progress in pharmaceutical ethics before we are abreast of our English brethren.

Without going very deep into the matter, I may remark that the druggist in Ireland presents a perfect type of a correct dispenser. In this line he is almost infallible, simply for the reason that he has nothing to dispense. The Honorary Secretary of the Chemist and Druggists' Society has certainly a wonderfully convenient memory, but if he will only leave the compounding department and recall to his recollection the numerous errors made by his class in the mere retailing of drugs he must certainly come to the conclusion that the results would be appalling if they were allowed to meddle and muddle in the compounding department without let or hindrance.

A Pharmaceutical Chemist in Ireland.

March 25, 1875.

[*** We have also received from Mr. Hayes a long letter on this subject, the publication of which would, we think, serve no useful purpose.—Ed. Ph. J.]

Pharmaceutical Remuneration.

Sir,—One of my customers informs me on indisputable authority (for he encloses the bill of charge) that he is supplied with a belladonna plaster of the Pharmacopœia, spread on leather, six by eight inches in size, for sixpence. With emp. belladonnæ, B. P., quoted at 7*s*. per lb., and plaster skins at 20*s*., 30*s*., to 36*s*. per dozen, can you, or any of your correspondents, explain how this clever picce of business can be performed?

A Perplexed Druggist.

Saccharated Calomel.

Sir,—Several years ago I brought under the notice of one of the makers of teething powders the case of a poor infant who was completely salivated by taking them, whether only from the calomel which they contain, or from this having become bichloride of mercury, I cannot say. As I believe a vast amount of mischief is done with such powders, used as they are indiscriminately, I never allow them to be sold without informing the purchaser that they contain calomel, and that their use is attended with danger.

B.

[*** We learn that the fact mentioned by Dr. Polk, as to the presence of perchloride of mercury in saccharated calomel which had been prepared a month previously, has been recently confirmed at the request of Dr. De Vrij by one of his former students, Mr. A. C. Cramer, at present superintendent of the pharmacy of the town of Rotterdam. This gentleman in examining a mixture of calomel with sugar of milk, which had been prepared at the same time as the saccharated calomel and in the same proportions, found that it also contained perchloride of mercury, although in a much smaller amount than the saccharated calomel. The total absence of perchloride of mercury in the calomel used for these experiments had been previously carefully ascertained. Mr. Cramer intends to continue his inquiry quantitatively under different circumstances, and to publish his results in this Journal.—Ed. Ph. J.]

Discovery of Cryptopia.

Sir,—In the valuable 'Year-Book of Pharmacy' just issued we observe an error with respect to the merit of the discovery of cryptopia. Mr. H. Ludwig, in his 'Review of the Alkaloids of the Papaveraccæ,' ascribes the discovery alike to Mr. J. Smiles and ourselves. On the contrary, the discovery is ours exclusively.

Mr. Smiles's connection with the matter is confined to having observed and drawn our attention to an unusual condition of certain mother-liquors which we were led to investigate, and our researches resulted in the discovery of cryptopia.

These facts are already published in our paper, which appeared in the *Pharmaceutical Journal*, new series, vol. viii, 1867.

A similar error to that now corrected appeared in Bouchardat's 'Annuaire de Thérapeutique' for 1873, but this publication has spontaneously, in last year's issue, correctly ascribed the discovery to us alone.

T. and H. Smith and Co.

21, *Duke Street, Edinburgh*,
March 30, 1875.

A "Square" Man.—A "Country Pharmacist" suggests in reply to Mr. Shapley's inquiry, "that by a 'Square' man is understood the directly opposite of that other curiosity, the 'Modified' man, who is supposed generally to represent the pharmaceutical round O."

R. S.—We are unable to publish your query, as it would afford an opportunity for interested statements.

A. De la Bracynne.—We are unacquainted with any work of the kind that your refer to.

E. Wiles.—You would become entitled to receive the 'Pharmaceutical Journal' weekly, as published, upon becoming an Associate of the Pharmaceutical Society.

E. S. V.—Proctor's 'Lectures on Practical Pharmacy,' published by J. and A. Churchill.

T. T.—The work is published by Messrs. Chapman and Hall, Piccadilly.

"*Nemo.*"—The article, in our opinion, would be liable to stamp duty, because it is recommended both on label and handbill as a remedy for disease, and it is stated to be prepared only by yourself.

"*Local Secretary.*"—You will find an article on stereotyping in Savage's 'Dictionary of Printing,' but it is probably now somewhat out of date.

W. Thomas.—Oliver's 'Lessons in Elementary Botany,' published by Macmillan, price 4*s*. 6*d*., or Kitchener's 'A Year's Botany,' published by Rivingtons.

W. J. B.—(1) "The Preservation of Plants for Herbaria," 'Pharm. Journ.' [3], vol. iv., 754. (2) The cost of carriage of books to or from Associates not in business is *not* defrayed by the Society.

C. H. Walker.—The first sign indicates that the parts occur in multiples of the number under which it is placed. The second sign indicates that the parts are absent.

S. G.—We do not know, unless it be rectified turpentine.

J. B. L. Mackay—One cubic foot of pure water at 62° F. weighs 62·355 pounds (Watts).

Communications, Letters, etc., have been received from Mr. Atkins, Mr. Challinor, Mr. Mackay, Mr. Stoddart, Mr Ritchie, Mr. Ellis, A Chemist, Country Pharmacist, J.C.H

ON THE IDENTITY OF GOA POWDER AND ARAROBA.*

BY E. M. HOLMES.

During the past few months Goa powder has attracted considerable attention in medical journals as a specific for certain cutaneous diseases, and its identity with araroba, a drug lately imported into this country, has lately been suggested by Dr. Lima, of Bahia. With a view of ascertaining whether they are identical I have endeavoured to trace the araroba to its commercial and botanical sources, and have made a few simple experiments upon both drugs with various reagents.

About a year ago eight casks of araroba were imported into London from Bahia, but did not command a ready sale, as nothing was then known about its properties. It was, however, finally disposed of and disappeared. Some months afterwards the same drug appeared in the Liverpool market, and I am informed that it was imported there direct from Bahia.

The drug as imported consisted partly of lumps of a yellowish substance, some of which was in the state of powder, and partly of fragments of a yellowish wood. The lumps were not all yellow, some had a pink colour when broken, and some were almost entirely made up of grains or layers of a dark red or brown substance. On slicing some of the fragments of wood contained in the araroba, the powder was found to occupy insterstices in the wood in which it must have been deposited during the growth of the tree. As some of the lumps are of considerable size, it appears probable that portions of the woody fibres decay in the heart of the tree, leaving the araroba deposited in the cavities thus formed.

The microscopical structure of the fragments of wood found in it appeared to me to be very similar to that of *Cæsalpinia echinata*, with which I compared it, and partly on this account and partly because Martius in his 'Materia Medica of Brazil,' mentions the name as being applied to a species of *Cæsalpinia*, I concluded that it was probably the heart wood of a species of that genus.

While endeavouring to ascertain to what species of *Cæsalpinia* the name araroba was applied in Bahia, Professor Oliver pointed out to me that there was a note upon araroba in Martius's 'Flora Brasiliensis.'† In that work it is mentioned as the vernacular name for two species of *Centrolobium*; the two species are *Centrolobium robustum*, which yields the well-known zebra wood, and *C. tomentosum*. Of the wood of the latter he gives no description, but his account of zebra wood is interesting and, if araroba be derived from that tree, would account in some measure for the variation in colour seen in the lumps of araroba. The following is an abridged translation of it.

"In primeval forests it is a tall tree with a very thick trunk, the wood of which varies wonderfully in the hardness, thickness, and colour of the fibre, according to the circumstances attending its growth. An old trunk cut vertically shows at the same time many colours, in layers of different thickness, and without any distinct lines of separation. The inner layers are not always the darkest, but the light and dark hues alternate in various ways. In younger trees the colour of the wood is more frequently of a red tint or tinged with rose, hence the name, which means red wood. This colour is not permanent, but turns to a brown, or deep red, when exposed to the air, so that tablets cut out of the wood in course of time usually show dark bands or spots, on which account it has received the name of zebra wood. The wood does not, however, always show these red and ultimately darkened layers, but is sometimes found of a pale yellow or flesh colour, especially in sandy districts and in open sunny places."

The above description of the wood seems to correspond with the characters mentioned as belonging to araroba, and to indicate that that drug is obtained from the tree which bears its name.

Dr. Bomfim, professor of botany at Bahia, states,* however, that the name araroba or arariba is applied to a number of trees by the natives, and that the trees to which the name of araroba is applied by Martius do not yield that drug. The tree which yields it he believes to be one as yet undescribed by botanists. He has, however, only seen the leaves and a portion of the wood. The botanical source of the drug, therefore, seems to be at present unknown. Lately, however, Dr. J. L. Paterson, of Edinburgh, has brought home and deposited in the Royal Botanical Gardens, at Edinburgh, two cuttings of the plant. We may therefore hope, ere long, to have some definite information upon this point.†

With regard to the identity of this drug with Goa powder, the evidence given by Dr. Lima in the *Medical Times and Gazette* evidently points to their geographical source being probably identical, as their physiological action certainly is. One difficulty, however, still remains, and that is the very different colour of Goa powder and araroba. With a view of solving this difficulty I examined the specimen presented to the Pharmaceutical Society eleven years ago by Mr. Kemp. I found it to be of a chocolate brown colour, as then described.‡ Dr. Frazer, however, speaks of it in the year 1874 as a fine yellowish powder; a specimen lately presented to the museum by Mr. Postans, and which came from Treacher and Co., of Bombay, is of a dull ochre, or pale brown colour, and another specimen which I have received is of an umber-brown. The difference in colour cannot therefore be any objection to the identity of araroba with Goa powder. Since Professor Attfield had discovered that araroba, or chrysarobine as it has been lately named, contained a large percentage of chrysophanic acid, it occurred to me that a rough but ready test of identity would be to ascertain if this body were present in Goa powder. I therefore digested separately a few grains of each specimen in liquid ammonia, alcohol, ether, benzol, chloroform and strong sulphuric acid, in all of which chrysophanic acid is said to be soluble. In all the specimens the colours of the solutions were similar with the respective solvents; thus the ammonia gave a deep reddish purple solution, and chloroform and benzol deep-brown solutions, both in the araroba and in all the specimens of Goa powder. I therefore think that a more accurate and careful examination by those who have the time and opportunity will

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, April 7, 1875.

† Papilionaceæ, vol. xv., part 1, p. 264.

* *Medical Times and Gazette*, March 6, 1875, p. 250.

† Since this paper was written, I have received, through the courtesy of Mr. J. Sadler, a leaf from one of these slips, and I am thus enabled to say that the leaf is not that of a *Centrolobium*, but appears to be that of a species of *Cæsalpinia*, nearly allied to *C. Sappan*.

‡ *Pharmaceutical Journal* [2], vol. v, p. 345. This colour does not appear to have become darker since it was deposited in the museum, and any change which has taken place must have occurred before that date.

prove that these two drugs are absolutely identical. I would also suggest that the substance to which they owe their physiological action is worthy of trial in the pure state. It is a principle widely distributed in nature, being known to occur also in three species of rhubarb, several species of dock, in senna, and in the common yellow lichen, *Parmelia parietina*. It is worthy of note, also, that in the time of Gerarde, dock-root was used in the form of ointment and decoction, as an external application for various skin diseases, and is still so used by herbalists in country districts, and I have been informed, with considerable success. With regard to the best method of applying araroba and Goa powder, I have been favoured with the following information by Mr. Postans. When applied as in India by making it into a cream with lemon-juice, vinegar, or water, it strongly discolours the skin, and even the hair, and is apt to cause considerable swelling and inflammation. This method of using it has also the disadvantage of allowing the powder to become scattered about as soon as the vinegar, etc., is dried up. In one case which came under his notice the Goa powder having been applied to the head, some of the powder found its way into the eyes and caused dangerous inflammation. He therefore recommends it to be made into a paste with juniper tar oil, olive oil, or lard. In Bombay it is commonly sold as a tincture and as an ointment. The cost of the drug obtained from Bombay was £3 12*s*. per lb.

I may add that I mixed some alcoholic tincture of Goa powder with glycerine and applied it to the back of my hand, but did not find that it left any stain.

[*The discussion on this paper is printed at p.* 816].

NOTES ON THE PHARMACY OF ATROPINE.*

BY W. WILLMOTT.

So largely is the therapeutic or surgical value of atropine dependent on the care devoted to its preparation, that, as a remedy requiring absolute purity, it has called for closer attention on my part than otherwise I should have considered needful. Indeed, I may say that, as Dispenser to one of the large London Hospitals, I have been specially appealed to on the subject. If these "Notes" should appear to partake to some slight extent of a medical character, I can only plead that it is no pretension on my part, but simply a necessity in carrying out an inquiry which is strictly pharmaceutical in its object and result.

I need scarcely say that atropine, or atropia, is obtained from the root of the Atropa belladonna by a rather complicated process. Briefly, however, it amounts to this:—A strong spirit tincture is prepared from the root, lime is then added, and afterwards diluted sulphuric acid in slight excess. This is followed by the addition of potash after evaporation of the spirit, and the atropia thus set free is dissolved out by chloroform, decolourized with animal charcoal, and finally crystallized from an alcoholic solution. This process will be recognized as that of the British Pharmacopœia, which, in fact, is simply a modification of Mein's improved method,—*i.e.*, improved as compared with that originally devised by Brandes, the discoverer of atropine, in 1819. The objection to Brandes' process lay in the employment of caustic potash, which, being heated with atropia, was found to decompose it evolving ammonia. In December, 1854, a paper was read at a meeting of this Society by Mr. W. T. Luxton, M.R.C.S., on "An Easy Method of Preparing Atropine," in which the author suggested the substitution of ammonia for potash in precipitating the alkaloid. The suggestion, however, was not sufficiently practicable, and consequently failed to receive support.

Atropine had been for some years in use in Germany, great advances having been made in the study of its preparation and medicinal effect; but it was not until the year 1844 that it received the attention of ophthalmic surgeons in this country. At that date, Mr. White Cooper drew attention to atropine as a new and superior agent in place of belladonna (chiefly the extract) then in use. This was followed by a communication from Mr. J. Lloyd Bullock, suggesting that inasmuch as Mr. Cooper's solution involved the use of spirit of wine, thus constituting a *primâ facie* objection, the *salts* of atropine, which were neutral and soluble in distilled water, should receive a trial as being in all probability preferable to the dissolved alkaloid both in use and effect. This suggestion was accepted unreservedly. The sulphate, which is very soluble without extraneous aid, is now almost universally employed, where applicable, in varying strengths, from 1 to 4 grains to the fluid ounce.

I cannot pass from these introductory remarks without reference to certain information for which I am indebted to the kindness of Mr. Williams, who, in a conversation on the subject entered fully into the merits of the question, giving me also the results of his extensive experience of this important substance. "The Germans say of us," remarked Mr. Williams, "that we make belladonnin and not atropine, and we say the same of them. There is," he continued, "no doubt of there being an atropine in the market containing an acridity which gives rise to pain. That atropine should cause pain when applied to the eye is not a new thing; it frequently does so. Medical men say that some atropines give rise to pain and irritation, whilst in the same cases other atropines are well borne. In practice, the process of the Pharmacopœia is rarely, if ever, strictly adhered to. Atropine requires great care in preparation, or it would, no doubt, contain free sulphuric acid. Different makers produce different results as to the quality. No impurity would be found in atropine if properly prepared. There are only the two alkaloids, atropine and belladonnin." These are valuable hints, and have direct reference to the facts herein duly set forth.

It has been stated of atropine that it frequently causes pain when applied to the eye in the familiar form of "drops." Our main inquiry, therefore, will be,—To what is this due? For, truth to say, important as the question may be, it is not definitely known how or in what manner this peculiarity is brought about.* It is for this reason that I find myself engaged in an inquiry which is certainly new to the pharmacist, but which has been urged upon me by the consideration that at his door the blame may be laid, and that therefore he is bound in all doubtful cases to demonstrate as far as possible the integrity of the substances produced by chemical aid for the prescriber's use.

In ophthalmic practice atropine is used to dilate

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, April 7, 1875.

* Some few instances have been traced to idiosyncrasy or intolerance of the remedy in any form; but other instances more frequently occur to which this explanation clearly does not apply.

the pupil for purposes of diagnosis, and for the prevention or removal of adhesions. It is also said to be sedative in its action; and for these and other reasons we find it freely prescribed. Now, it will be readily understood that as most hospitals and infirmaries have a special department for the treatment of diseases of the eye, in that department atropia is an all-important substance; and when we remember that it is the organ of vision with which we are dealing, the force and truth of this proposition can hardly be overstated; so that clearly nothing short of an absolutely pure sulphate should be used in all the collyria, discs, or drops prescribed to contain it.

It was about three years ago, at King's College Hospital, that the cases became frequent in which pain and irritation were set up by the use of the ordinary liquor atropiæ sulphatis of the British Pharmacopœia. I was not only called to the consulting room to observe these cases, but the surgeon was good enough, at my request, personally to visit our department and himself examine the solution we were then using. As no explanation was at all apparent, I commenced taking notes with a view to discover how far this unusual frequency of a distinctive peculiarity was due to the atropine—perhaps on these occasions too readily accepted as the cause.

I had been informed that at the hospital in Moorfields such cases as I have described were unknown, and accordingly I hastened thither to learn the secret of this success. My surprise was indeed great when I found that a committee had been appointed for the following week to consider the question of the atropine in use there, the quality of which had not been found satisfactory. In the reports of this hospital (vi., 119) attention is called by Mr. George Lawson to the precise effects here referred to, showing clearly that they are not confined to one institution; and although he believes that when the sulphate acts thus as an irritant it is due to some idiosyncrasy on the part of the patient, yet amongst medical men generally the alkaloid itself is not held acquitted of blame. Three suggestions have been offered as possible sources of the mischief residing in the atropine, viz.: 1. Impurity; 2. Acidity; 3. Change of condition by long keeping; and to each of these I will now briefly direct attention.

1. *Impurity.*

In suspecting impurity as a source of mischief in atropine, we are reminded that the specific action of any given remedy is an all-important consideration. We inquire, therefore, of the ophthalmologist if we ought to expect pain from the use of atropine, as we do, for instance, from the application of nitrate of silver, and he replies,—"No, there should be almost immediate dilatation of the pupil, but no pain." What more natural, then, in these exceptional cases, than to fix upon impurity as the cause? But here the question arises,—Given an impure atropine, and what is the probable impurity therein contained? To this apparently simple question I found it no easy matter to obtain an answer, whilst my efforts to meet with an impure atropine for purposes of comparison failed in every way.* In truth, so far as my experience extends there is no such substance to be procured, and I am inclined to look upon such a possibility in the ordinary course of dealing with chemists of repute as very questionable, though Mr. Williams, as we have seen, has hinted differently. I have used atropines from many, if not all sources, and have found all the specimens equally pure and good.* During my use of even the cheapest that could be obtained, no complaint reached me of any ill effect from its application in the ordinary way. Nevertheless, surgeons adhere to the hypothesis that when irritative action is set up it probably arises from some impurity or change in the solution used. Hence, in our own case, we are not unfrequently confronted with memoranda from the prescriber to the following effect:—

"Please to see that the drops are pure, as some patients complain of their hurting."

"The drops hurt. Query impure."

"Drops to be very pure."

Whenever an intimation of this kind comes under my notice I invariably address myself to the patient with the foregone conclusion that upon him or her the solution of the problem will be found to rest. On this head the following case will be instructive:—

"*J. D. Aged* 27. *Dimness of sight.*

"Jan. 8. Ordered atropine drops; strength two grains to the fluid ounce.

"Jan. 11. Repeat drops ("purissima")—

"Memorandum on letter [prescription]. 'The last drops irritated considerably.'

"NOTE.—Patient is a plumber by trade, and states that the vapour from the hot grease employed in his work will of itself cause smarting and pain in the eye. Uses a camel hair pencil for dropping the solution—the 'same that he used last summer when attending Charing Cross Hospital for a similar complaint.' Keeps the bottle containing the drops on kitchen shelf."

Here I think it will be admitted that we have sufficient cause for the irritation, without blaming the remedy prescribed. This is but one example of many such cases that might be given; and it is more than probable that in the majority of instances of an approximative character, careful investigation would show similar results.†

"*C. G. Aged* 22. *Cataract.*

"April 4. ℞. Atrop. Sulph. PUR. gr. iv.

"Aq. ℥i.

"Ft. Guttæ. 'Please see that they are VERY pure.'

"'To be admitted on Sunday evening.'

"April 9th. Patient admitted. Reordered drops.

"No complaint of the atropine given on the 4th. May 2nd. No complaint."

Here, then, we have a case where great purity was required, and in which the *German* sulphate (the kind dispensed) was found to be completely satisfactory.‡

* The B. P. test—"leaves no ash when burnt with free access of air,"—points to mineral matter as the chief impurity to be looked for in this alkaloid.

* "Impure atropia is not crystalline, is more or less coloured, and has an unpleasant odour."—*Pereira's Elements*, 1872. "Atropia.—The characteristic odour is best developed by placing the alkaloid upon a few crystals of CrO_3, and applying gentle heat until green Cr_2O_3 begins to form."—*Year-Book of Pharmacy*, 1874.

† As atropine drops are seldom properly used by patients, and certainly, in their hands, very carelessly kept, it is perhaps to be regretted that this remedy cannot be applied by the practitioner himself, in the consulting room or surgery of the hospital.

‡ I believe I am correct in stating that, on account of the heavy duty levied on rectified spirit, the great bulk of the atropine used in this country is imported from Germany, and converted into sulphate by manufacturing chemists, as occasion may require. I have reason to believe that very little of the alkaloid is really manufactured in the metropolitan laboratories.

"*M. L. Aged* 50. *Iritis.*

"March 7. Ordered atropine drops, 4 grains to the ounce.

"March 11. Repeat. Memorandum on letter: 'Please see as to the drops; the last hurt the eyes.'

"NOTE.—Drops neutral and bright. The smarting soon subsides, and patient does not think the eye is worse in consequence. To come again on Monday.

"18th. Eye improving. Drops still hurt, but not so much. Doctor says the smarting will get less as the eye gets better.

"25th. Patient reports that there is now no pain or smarting in applying the drops. Repeat. No further complaint."

The atropine used in this case was obtained from one of the most eminent chemists' firms in London, whose name is a sufficient guarantee for the unexceptionable purity of all their preparations. We have, therefore, in this instance, an illustration of the circumstance that what was unquestionably pure atropine will sometimes produce pain and smarting, thus rendering an appreciation of the real cause in any given case a matter, it may be, of some difficulty even to the most experienced practitioner.*

2. *Acidity.*

We now come to the question of acidity, and herein is another supposed explanation of the peculiarity under consideration. "A more serious difficulty arises," says Mr. Brudenell Carter in "Contributions to Ophthalmic Therapeutics" (*Practitioner*, July, 1869, p. 27), "when the atropine acts as a local irritant. It does so in some degree not very unfrequently, where its use has been long continued; and the explanation is, I believe, that the solution when given into the custody of patients often loses its neutrality, or undergoes other changes, from keeping, and from exposure to sunlight." The observation that the solution often loses its neutrality when given into the custody of patients is perfectly true, but that this is an explanation of the "serious difficulty" referred to does not accord with the result of my inquiries so far as I have been able to carry them. I find that much of the solution sent out from the hospital in a perfectly neutral condition is returned a week afterwards distinctly acid to test-paper, whilst the remaining portion of the same solution retains its neutrality as completely as when first supplied to the patient. I frankly confess that this little mystery I have never been able satisfactorily to solve. I have tried by every fair means to produce this acidity, but have always failed. A solution of 4 grains to the ounce has been evaporated very slowly in the sunlight for weeks; then redissolved and again evaporated; again dissolved and again exposed as before, and yet no trace of acidity could be discovered when tested with litmus. A cork has been cut into pieces and shaken with the atropine occasionally for months with exposure to air and light, and still no distinctive reaction has been shown. Doubtless, by and by, I shall be on the right track of discovery, but in the meanwhile it is unimportant, since the presence of this acid in the solution is really not the cause of any irritative effect it may possess. To test this I ventured, in a given number of instances, to add free acid to a point which gave a distinct reaction on blue litmus. It was a bold experiment, I admit, and I awaited the result with some anxiety, and with many forebodings of the numberless complaints to be encountered. But to my great astonishment, not a single memorandum reached me in any one instance. Selecting those cases where atropine had been previously used without complaint I carefully made my notes, and on reference to them at this date find them run as follows:—

"*E. H. Aged* 28.

"Jan. 29th.—Has been using atropine since the 1st. Attends every Monday. Solution neutral. Repeat and acidify with the $\frac{1}{25}$th of a drop of acid. sulph. dil. to each fluid drachm of the solution.

"Feb. 5th.—No complaint. Repeat drops *sine* acid."

"*J. R. Aged* 40. *Iritis.*

"Jan. 31st.—Has been using atropine since the 20th. Solution neutral. Repeat and add to each fluid drachm gtt. $\frac{1}{25}$ acid. sulph. dil.

"Feb. 5th.—No complaint. Repeat drops *sine* acid."

"*M. A. S. Aged* 48.

"Jan. 29th.—Has been using atropine since June 15th, 1871. Attends once a fortnight. Give drops made strongly acid to test-paper.

"Feb. 12th.—No complaint; no smarting. Repeat drops omitting the acid."

And so on throughout the whole number selected for trial. Similar results present themselves where the acid is not added but is engendered, as I have hinted, from some unknown or unexplained cause.

"*J. K. Double cataract.*

"May 4th.—Ordered liq. atropiæ sulph., P.B. (Neutral when given to patient).

"May 15th.—Drops strongly acid. No complaint of smarting. Patient going on well. Repeat, taking care to give neutral solution.

"May 29th.—Drops again very acid, but no irritation or pain from their use. Mother of the patient states that she lives over stables, and keeps the drops on a shelf over a water-tank. Uses a fresh quill twice a week, and places it in hot water before using. To keep the drops in another place.

"June 12th.—The same acid condition of the solution is again apparent, but still no complaint of smarting or pain. Finds no difference in effect when the drops are first used as received from the hospital, and when they are last used. The acidity does not affect the eye prejudicially, or cause smarting in any degree."

To the foregoing I will add, by way of support to my "Notes," the following authoritative testimony. The *Lancet*, May 2nd, 1868, commenting on the hospital reports already referred to, says:—"The irritative effects occasionally witnessed from the use of a solution of sulphate of atropia have been generally ascribed to the presence of some free acid in the solution, but Mr. Lawson doubts the truth of this explanation and very fairly points out that salts containing much more free acid, as, *e. g.*, the sulphates of zinc and alumina, are used daily in ophthalmic practice without irritant effect." Thus it is clear that inasmuch as this peculiar change in the solution, viz., acidity, under the patient's own keeping is of constant and continuous occurrence, the inference that it is the cause of the mischief complained of in a certain few cases receives no support from those prominent facts which investigation so clearly reveals.

3. *Change of condition by long keeping.*

Little need be said to show that a solution of pure sulphate of atropia will keep for an indefinite period without change. Some in my possession prepared nearly five years ago is now quite good in every

* "In some individuals, even in weak doses, atropine excites irritation."—*Med. Times and Gazette*, April 25, 1868.

respect; and I have in three separate bottles solutions of different atropines showing no change, though prepared so long ago as the 24th of February, 1872.

The following case, will, I think, be sufficiently conclusive on this point:—

"*J. P.* (*Iritis*).

"April 17th. Atropine drops previously used repeated. Memorandum from surgeon:—'These drops smart again.'

"April 24th. Repeat drops. Memorandum from surgeon:—'Guttæ Atropiæ same as last, which did *not* smart.'"

I have only to say that here the solution which gave rise to the smarting was freshly prepared, whilst that which "did *not* smart" was taken from a small quantity which had been set aside many months previously on account of its terrible delinquency, or supposed delinquency, on several important occasions. This latter solution was subsequently used again and again with the usual specific effect. I think, therefore, that we must seek for another cause to account for the occurrence of the peculiar phenomenon in question; always reserving those instances where intolerance of the remedy, or idiosyncrasy, is the acknowledged and unquestioned explanation. What, then, is the probable source of this mischief? I have no hesitation in expressing an opinion that in the majority of instances it arises from the presence of particles of solid matter (dust and dirt) which find their way into the solution, and from thence into the eye itself. We all know the disastrous effect of dust when brought into contact with the eye even in a state of health. How much more likely, then, to cause pain and inconvenience when that delicate structure is disorganized to however small an extent.* Amongst my "Notes" I have two or three illustrations of this, and they will be the last I shall need to give.

"*E. S.*, *aged* 14. (*In patient*).

"June 26th. Eye drops sent down from the Ward with the following memorandum written on prescription:—'To be exchanged for atropine that does not irritate.'

"NOTE.—Examined solution and found it neutral, but full of dust. Passed it through filtering paper and returned it to the ward.

"July 5th. Bottle sent down for further supply of atropine. Solution neutral. No complaint. Nurse reports no irritation, and all well."

"March 13th. Memorandum received from the resident accoucheur:—'The child B. having complained of great smarting in the eye after the introduction of the atropine, the solution is considered impure. A fresh one should be made.'

"NOTE.—Examined solution and found it charged with particles of dust, but unexceptionable in all other respects. Passed it through filtering paper and returned it to the ward, with instructions that a new and clean quill should be used.

"March 18th. Resident accoucheur reports that the child has not since complained of pain. Previously the drops caused much smarting and irritation.

Here, then, we are presented with facts which seem clearly to bear out the explanation I have ventured to suggest. I do not say, nor does my paper purpose to show or prove, that dust and dirt are *necessarily* at fault in every case of irritation which may occur through the use of atropine; but certainly my first care would be, under such circumstances, to examine the solution, with a view to the detection of the presence of any of these irritative agents.* That impurity, acidity, or an acrid condition of the alkaloid may each and all produce mischievous effects on the eye (though my experience furnishes no *proof* of such) can scarcely be doubted.† It concerns us intimately, therefore, in dispensing this remedy, to see that these undesirable accompaniments are not present therein. And when we add to the possibility of mischief arising from its use, the undoubted fact that atropia has a special importance in ophthalmic surgery, and at the same time bear in mind the anxious and possibly disastrous character of any affection which may attack the organ of sight, we shall consider no attention too great that can be bestowed upon the preparation and storage of this highly organized substance, the absolute integrity of which, as, in the case unreservedly of all our medicaments, it is incumbent upon us, not only faithfully to advocate, but strictly to observe and maintain.

[*The discussion on this paper is printed at p.* 818].

* "The intrusion of foreign matters may excite other effects than those of mere inflammation . . . . a detached eye-lash between the lids gives rise to much irritation, and sometimes a most obstinate chronic ophthalmia is found to depend entirely on a minute light-coloured one becoming inverted." —*Practical Treatise on Ophthalmic Medicine.* By E. O. Hocken, M.D. 1844.

* The insidious character of dust, as strikingly shown by Professor Tyndall in his well-known lecture on "Dust and Disease," is unquestionable. It may find an intrusion at any time, and will often elude the most careful vigilance.

† Mr. Wells, in his valuable 'Treatise on Diseases of the Eye' (foot-note, p. 100), refers to instances in which pure solution of atropia has produced great irritation and pain, but says:—"This is, however, a very exceptional occurrence, and bears not the least analogy to those cases in which the irritation is caused by the impurity of the atropine."

ERGOT AND ITS LIQUID EXTRACT.‡

BY A. W. GERRARD,

Teacher of Pharmacy at University College Hospital.

In bringing this subject forward, the prime objects I have in view are to point out some defects in the official process for preparing the liquid extract of ergot, and to give a method for making it which my experience has taught me will yield a superior preparation.

I will preface my remarks with a brief statement of our present knowledge as to the chemical properties and composition of ergot itself, for I consider this knowledge places one in a better position to judge or decide upon the treatment the drug should undergo for a proper extraction of its active constituents.

Standard works of chemistry and materia medica afford but brief information concerning this drug. Flückiger and Hanbury, however, in their 'Pharmacographia' have brought in coalition the researches of various investigators upon it up to the present time; this excellent work, therefore, contains the fullest information with reference to ergot of any book with which I am acquainted. Following are some of the more important extracts therefrom.

"According to Wenzell, ergot of rye contains two alkaloids combined with ergotic acid, soluble in water, which he designates ecboline and ergotine; ecboline possesses in a high degree the special medicinal properties of ergot; ergotine has, however, but little action; ergot also contains a sugar termed mycose, lactic acid, albumen, and red colouring matter.

"According to Wiggers this drug contains 30 per

‡ Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, on Wednesday, April 7, 1875.

cent. of saponifiable oil, with small portions of acetic and butyric acids combined with glycerine; the oil is also accompanied by small quantities of cholesterin and resin."

Flückiger and Hanbury state that the crystals which abound in the kept extract are acid phosphate of soda and ammonia, with a small portion of sulphate; my investigation of these crystals proves them to be acid phosphate of potash, with a trace of ammonia.

When to ergot or its liquid extract a caustic alkali is added and a gentle heat applied, a mixed ammoniacal odour is evolved characteristic of trimethylamine, which ammoniacal base it is pronounced to be; this effect is probably due to decomposition of albumen, of which ergot contains a considerable quantity.

It is thus seen that in ergot of rye we have a substance to deal with of a naturally delicate and chemically intricate character, rapidly undergoing change and losing its activity on exposure to atmospheric influences; its proper preservation is therefore a matter of paramount importance, dryness and close packing I have found most essential to this end. On the receipt of a parcel, which should be as fresh as possible, let it be examined as to its dryness, and if dry bottled immediately, fixing a piece of lime, tied in muslin, to the interior of the stopper. By adopting this expedient I have found the ergot at the expiration of a year to yield an extract equally active as that prepared from the fresh sample.

I will now ask attention to some remarks upon the liquid extract of ergot of the British Pharmacopœia.

It is made by removing the oil from one pound of ergot by one pint of ether, or a sufficiency, macerating it in 3 pints of water for twelve hours at a temperature of 160° F., then pressing and straining, and evaporating to 9 fluid ounces; when cold add 8 fluid ounces of rectified spirit, set aside to coagulate albumen, then filter. The product should measure 16 fluid ounces.

I will now report upon each division of this process step by step, and introduce suggestions which I have found to be improvements.

Removal of the oil by ether has been pointed out by Umney and others as a wasteful and unnecessary proceeding. My experience agrees with them, for it has been found that the resultant extracts prepared with or without ether extraction differ not in their therapeutic effects, neither as pharmaceutical preparations.

The second step in the process is maceration of the ergot in 3 pints of water for twelve hours, at a temperature of 160° F. I find after the ergot has been in contact with the water at this temperature for a few hours it swells, and the mass assumes a semi-colloid condition, so that pressure and straining, the next part of the process, is absolutely impracticable.

These difficulties suggested to me the use of cold water as a solvent, and I find it perfectly successful, using 6 instead of 3 pints, and proceeding thus: macerate the ergot in 4 pints of cold distilled water for twenty-four hours, then transfer to a muslin strainer, when the fluid ceases to pass pour upon the ergot the remaining 2 pints of water, allow this to pass, then press the marc. By this method a more thorough exhaustion of the ergot is ensured than by the B.P. process, and the annoying property of partial gelatinization avoided.

During the summer months, at the temperature of 160°F., the mass speedily undergoes fermentation. If this takes place the resultant extract is very acid and has an unpleasant odour. This objectionable property I consider to be an additional argument in favour of cold extraction.

The next and last step in the process is the evaporation of the strained fluid to 9 fluid ounces, allowing it to cool, then adding 8 fluid ounces of rectified spirit and set aside to allow albumen to coagulate, then filter. The product, we are officially informed, should measure 16 fluid ounces: my experience proves that it does not measure this amount. Upon adding the 8 ozs. of rectified spirit to the 9 ozs. of extractive, condensation of volume takes place, it measuring 16½ ozs., being less by half an ounce than the original bulk. The albumen has now to be separated officially by filtration, which I find cannot be done; decantation and straining through tow answers best. When this is performed the ultimate product measures 14½ instead of 16 fluid ounces. This result was almost invariable on several occasions.

My process then, of which the preceding remarks contain the details, consists simply of macerating 1 pound of ergot in 4 pints of distilled water for twenty-four hours, transferring to a muslin strainer, adding 2 pints more of water, allowing this to pass, then pressing the marc, evaporate the fluid to 10 ozs., then add 8 ozs. of rectified spirit, and when the albumen has coagulated, decant the clear portion and strain the remainder through tow. The product should be made to measure 16 fluid ounces.

A specimen of extract prepared by this process I have placed upon the table. There is also a bottle containing the crystalline separation of the acid phosphate of potassium which occurred in four days. The extract has a sp. gr. of 1·013, and is a preparation which I feel confident must be acknowledged superior to that of the B. P.

A point in the preparation to which I am desirous of referring is the large quantity of spirit it contains; this I consider unnecessary and even detrimental to the product, for the following reason, it causes the separation and crystallization of large quantities of phosphates, especially when made by the process I have described. Whether these phosphates are an item of its activity I am unable to state, but I am inclined to consider them as such.

According to Wenzell, to whose investigations I have previously referred, the substance to which ergot owes its principal activity, viz., ecboline, is soluble in water; this, therefore, is an additional reason for reducing the quantity of spirit. I will recommend, therefore, the addition of one-fourth instead of one half its volume of rectified spirit; thus prepared it maintains its therapeutic effects equally with the other.

From a consideration of the continental and trans-atlantic formulæ I am of opinion that our British liquid extract maintains a superiority; that this may at some future period be replaced by a better is a reasonable desire. I have been lately engaged in the preparation of an ammoniated extract, the addition of ammonia being said to give ergot increased activity. Results that have been obtained from its use are promising; further therapeutic data are, however, required; when these are forthcoming I trust to be able to give you a report upon it.

These remarks principally consist of my own experience in the pharmacy of ergot; it is a drug to which we cannot devote too much care and attention, for it is often the thread upon whose strength the life of mother and offspring depends.

[*The discussion on this paper is printed at p.* 819].

The Pharmaceutical Journal.

SATURDAY, APRIL 10, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

EXAMINATION FALLACIES.

THE establishment of an examination test as a necessary preliminary to entering upon the business of a chemist and druggist is so recent in this country that it is not surprising to find a certain vague feeling of discontent manifesting itself among some of those who have to undergo the ordeal of examination. If, however, the nature of the examination be considered, it will be found that, in almost all cases, such a feeling can only be regarded as indicative of deficiency in the acquirements which are universally recognized as being indispensable not only for all who carry on the business of the pharmacist in its higher branches, but, likewise, even for those who deal in drugs. Of such a nature are the complaints that from time to time appear as to the hardships occasioned by having to pass an examination. The recent alterations that have been adopted in the examinations have afforded an opportunity for putting forward the grievances that have been supposed to exist in regard to this matter. But, however much we may, in a general way, sympathize with those individuals who, after having spent some years in the business as apprentices or assistants, nevertheless find themselves unable to cope successfully with the examination that is the test of their fitness for commencing business on their own account, we cannot call to mind anything that has been adduced which tends in the least either to shake confidence in the propriety of an examination test, or to disturb the conviction that those who cannot satisfy the requirements of this test should be precluded from carrying on the business of the pharmacist.

The practice of all other countries is either in conformity with the view that has been stated or is in course of adapting itself to the same principle. Moreover the system is not only desirable as regards the interests and safety of the public, but it is also desirable from the pharmacist's point of view that properly qualified men should not be exposed to competition with persons who are wanting in the scientific knowledge and practical skill essential to the calling. However this matter be regarded, therefore, it would seem to be the first duty of those who have the interest of pharmacy at heart to uphold the examination system and jealously to maintain a high standard of qualification.

We have been led to mention this subject by a most remarkable incident that has taken place at the late Council meeting. We refer to the presentation of a memorial addressed to the Council of the Society by the Pharmaceutical Chemists and Chemists and Druggists of Glasgow and the West of Scotland. This memorial is printed in full at page 814, and therefore we need only mention here that the memorialists state they are firmly of opinion that some of the regulations laid down for conducting the examinations of the Pharmaceutical Society are inimical to the future progress of pharmacy in their part of the kingdom, and that these regulations have done much to estrange young men from becoming apprentices or students of the business.

Exception is also taken in this memorial to the mode of appointing Examiners, especially in Scotland, as having been unfair to the great body of qualified pharmaceutical chemists throughout the country, and detrimental in some respects to the interests of candidates for examination.

These allegations are of so grave a nature that it is remarkable they are not supported by some statement of facts illustrative of the supposed defects and evils which have led to the presentation of this memorial. This, however, is wanting, and even Mr. FRAZER, who at the Council meeting expressed himself as being prepared to support the memorial, confined himself to stating as his reason for doing so that in the West of Scotland there is a great difficulty in obtaining assistants. It was to this circumstance also that he mainly attributed the existence of a strong feeling on the subject of examinations in that part of Scotland.

Certainly it seems a somewhat remarkable fact, considering the gravity of the subject dealt with in this memorial and the strong feeling Mr. FRAZER believes there is respecting it, that no more than seven or eight persons should have been induced to attend the meeting at which the memorial was adopted and directed to be sent to the Council of the Pharmaceutical Society. Still more remarkable is it, considering the existence of a Branch of the Pharmaceutical Society in Scotland and in such immediate proximity to Glasgow, that action should have been taken independently by the Council of the Glasgow Chemists and Druggists' Association. The speech of Mr. MACKAY after the presentation of the memorial seems to point to the absence of any ground for such reticence, especially in regard to the complaint as to the appointment of Examiners.

To enter upon any criticism of the measures proposed by the memorial as a remedy for the evils that are assumed to exist in the conduct of the examination would be superfluous until there were some tangible evidence that the alleged evils have any real existence, and until that is attempted nothing need be added to what was said by several members of Council. There is, however, one contingency suggested by Mr. MACKAY's remarks—we trust not a probable one—which it would be well to consider in connection with the Examiners and the important duty that has to be performed by them. We refer to the difficulty experienced in making up the Examination Board and the reluctance there is to give up the time and bestow the labour which are required in conducting the Society's examinations.

It may also be useful to the Pharmaceutical Chemists and Chemists and Druggists of the West of Scotland if an inquiry were made with the view of tracing to its true source the difficulty said to be experienced there in obtaining apprentices and assistants. We are disposed to believe that in this way it would be possible to disclose some more reasonable ground for disinclination to enter the business of pharmacy than the alleged defective nature of the examination test of fitness for that business. We have no doubt such an inquiry would serve to convince the authors of this memorial that they are labouring under very erroneous views, and that by the opinions they have expressed, they have contributed to the support of an unwholesome, though at present to some extent natural, aversion to the test of the examination room, thus in fact, acting inconsistently with the best interests of pharmacy which they claim to have at heart.

A PUBLIC ANALYST'S WARNING.

In a recent report, Dr. J. Campbell Brown, the Public Analyst for Liverpool, states that it has come to his knowledge, in a private manner, that some of the citric acid, tartaric acid, and other drugs consumed in that borough contain lead, not purposely added, but derived from the vessels in which the substances are prepared or stored. Dr. Brown states that being unable to give any official warning to dealers on the subject he has taken the opportunity of presenting this Report to make the fact known, in order that druggists and others who vend such substances may be on their guard and avoid the penalties to which under the Pharmacy Act they would be liable for the sale of such impure drugs.

INCORPORATION OF THE ROYAL VETERINARY COLLEGE.

We learn with pleasure that Her Majesty has been pleased to grant a Charter of Incorporation to the Royal Veterinary College. Among the powers bestowed by it upon the College is one of creating scholarships, and of awarding medals, prizes, and certificates to the students. To this is added the power of appointing former students to be "Licentiates," or those who have practised with particular distinction in their profession, "Fellows" of the College; also to bestow the higher honour of "Honorary Associate" on distinguished persons, native or foreign, who have contributed in an especial manner to elevate veterinary science.

In reference to the report in the *Pall Mall Gazette* and other papers of the trial of Alfred Thomas Heap, for murder, and describing him as a chemist, we have to state that no such appears on the Register.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 7, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Frazer, Greenish, Hampson, Mackay, Owen, Radley, Rimmington, Robbins, Sandford, Savage, Schacht, Shaw, and Williams.

The minutes of the previous meeting were read and confirmed.

The Late Mr. Daniel Hanbury.

The President said: Gentlemen,—Before commencing the business of the day, I feel it my duty to call your attention to the great loss Mr. and Mrs. Hanbury and family have sustained in the death of their eldest son, the late Daniel Hanbury, and I am sure that you will all join me in a letter of condolence and sympathy to them in their bereavement. It is not only the family of Hanbury that have sustained a great loss, but we also, and all connected with pharmacy and medicine, for Mr. Hanbury was not only a pharmacist but also a great authority on materia medica, as his work in connection with Professor Flückiger will testify. As I am sure that every one has read the interesting memoir published in the Society's Journal of April 3rd, I will not say more than ask your concurrence, together with that of the Board of Examiners, in a letter of condolence to Mr. Hanbury, our late much esteemed Member of Council and Treasurer, Mrs. Hanbury and family, on the great loss of their persevering, industrious, and talented son, the late Daniel Hanbury.

The Vice-President, in seconding the proposition, said: I feel with all of you that the loss of Mr. Daniel Hanbury is, indeed, not only a loss to us and to English society, but to European society; in truth, Mr. Hanbury's reputation was not confined even to Europe. We not only from time to time had great pleasure in meeting him, sitting under his influence, and receiving information from him, but we also rejoiced to see the position which one of our most highly educated members had attained.

Mr. Sandford, as an old member of the Council, could not allow the motion to pass quite in silence. He had known Mr. Hanbury as long as any gentleman in the room, and had seen very much of him in the early days of the Society, particularly when working with Mr. Bell in the conduct of the Journal, where his assistance was most valuable, and was highly appreciated by Mr. Bell. He also knew how Mr. Hanbury had worked in connection with the evening meetings and on the Board of Examiners; in fact, in every sense of the word Mr. Hanbury was an honour to the Society. He might, perhaps, be excused for a passing allusion also to the active part which Mr. Hanbury took in the institution of the British Pharmaceutical Conference, a most important off-shoot from the Society, and he felt that they could not do too much honour to the name of a gentleman to whom they were so deeply indebted.

Mr. Schacht said it was unnecessary to add a single word to what had been said, but his connection with the Pharmaceutical Conference might justify him in adding his small testimony to the general expression of the sense of the great loss which had been sustained. It was also a personal gratification to do so, inasmuch as he had been a fellow student with Mr. Hanbury in the first year of the School of Pharmacy. He would only say further that he had felt much pleasure in seeing the degree in which he had been surpassed by Mr. Hanbury, and especially in his attainment of the somewhat rare honour for a pharmacist of the title of F.R.S.

Mr. Williams, having known Mr. Hanbury for a very long period, had no hesitation in saying that they had now lost the most eminent man, not only in English but European pharmacy. The great work which Mr. Hanbury had happily lived to complete in conjunction with Professor Flückiger was his best and greatest memorial, and he believed he was justified in saying that it showed more of Mr. Hanbury's work than of his coadjutor's. A great deal of time and much of his private fortune had been expended in collecting materials for it, and he believed its publication would greatly tend to advance the science of pharmacy.

The resolution was carried unanimously.

Nominations for Council and Auditors.

The Secretary reported that there had been 23 nominations to fill the 14 vacant seats on the Council, and the following 17 nominees had signified their willingness to accept office if elected:—

Andrews, Frederick, 23, Leinster Terrace, Hyde Park, W
Atherton, John Henry, Long Row, Nottingham.
Baynes, James, 24, Waterworks Street, Hull.
Betty, Samuel Chapman, 6, Park Street, Camden Town, N.W.
Bottle, Alexander, 7, St. Martin's Terrace, Dover.
Brown, William Scott, 113, Market Street, Manchester.
Clark, Walter Beales, 15, Belvoir Street, Leicester.
Cracknell, Charles, 217, Edgware Road, W.
Frazer, Daniel, 113, Buchanan Street, Glasgow.
Greenish, Thomas, 20, New Street, Dorset Square, N.W.
Hampson, Robert, 205, St. John Street Road, E.C.
Hanbury, Cornelius, Plough Court, Lombard Street, E.C.
Mackay, John, 119, George Street, Edinburgh.
Richardson, John George Frederick, 10, Friar's Lane, Leicester.
Rimmington, Felix Marsh, 6, Ivegate, Bradford, Yorks.
Robbins, John, 372, Oxford Street, W.
Savage, William Dawson, 4, Park Road East, Brighton.

The following six nominees declined to accept office if elected:—

Davenport, John Thistlewood, 33, Great Russell Street, W.C.
Hills, Walter, 338, Oxford Street, W.
Morson, Thomas, 124, Southampton Row, W.C.
Radley, William Valentine, 74, Market Place, Sheffield.
Stoddart, William Walter, 9, North Street, Bristol.
Urwick, William Walker, 60, St. George's Road, Pimlico, S.W.

The Secretary also reported that the following five members had been nominated for election as Auditors, and had declared their willingness to accept office if elected:—

Barron, Frederick, 2, Bush Lane, Cannon Street, E.C.
Hodgkinson, William, 127, Aldersgate Street, E.C.
Horner, Edward, 20, Bucklersbury, E.C.
Squire, William, 5, Coleman Street, E.C.
Stacey, Samuel Lloyd, 300, Holborn, W.C.

The following being duly registered as Pharmaceutical Chemists were respectively granted a Diploma stamped with the seal of the Society:—

Brown, William Braithwaite.
Draper, James William.
Dutchman, Walter.
Hillier, Henry.
Radford, John Storer.
Riley, Charles Reynolds.
Tocher, John.
Twemlow, Francis Ernest.

Elections.

Members.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected Members of the Society:—

Aylesbury, William Thomas ...Weymouth.
Brown, William Braithwaite ...Preston.
Dutchman, Walter ....London.
Hillier, Henry ....London.
Radford, John Storer ....London.
Riley, Charles Reynolds ....London.
Twemlow, Francis Ernest ......London.

Chemists and Druggists.

The following registered Chemists and Druggists were elected Members of the Society:—

Clark, Willoughby ....Ilfracombe.
Drawbridge, Joseph George ...Liverpool.
Griffiths, Thomas ....Welshpool.
Hatfield, George Berney ....London.
Ormandy, John Stanley ....Barrow-in-Furness.
Stone, Frederick William ......Exeter.
Thomas, Caleb Jones ....Ystal-y-fera.

Associates in Business.

The following having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society:—

Minor.

Barlow, Frederick..................Birmingham.
Beesley, Thomas, jun. ....Salisbury.
George, Edward Robert ....Aylsham.
Gordelier, John Thomas ....Sittingbourne.
Harrison, John ....Dewsbury.
Kellett, Richard Edward.........Wigan.
Kirby, Frederick ....Northampton.
Mathews, Henry ....London.
Moore, Thomas Cooper ....Sunderland.
Morton, Henry ....London.
Murdoch, John McGill............Glasgow.
Platt, Jakeh Wright...............Shaw.
Purse, Alfred Dodds...............Sunderland.
Rhodes, Samuel......................Oldham.
Sherriff, George.....................Paignton.
White, Robert ....Sunderland.

Modified.

Buchanan, Dugald ....Irvine.
Parry, William ....Liverpool.
Tupholme, Edward Harland ...London.
Wearing, John ....St. Just.
Wilcox, William ....Lincoln.

Associates.

The following having passed their respective examinations and tendered their subscription for the current year, were elected "Associates" of the Society:—

Minor.

Franciosi, Eugène Auguste de...London.
Fraser, Andrew.....................Aberdeen.
Green, George ....Thetford.
Hemingway, Edward ....London.
Wylie, David Neil ....Edinburgh.

Modified.

Bunker, James ....Easton, Portland.
Haywood, Charles ....Liverpool.
Hughes, Thomas ....Denbigh.
Nix, John Beard ....Billericay
Pape, Tom..............................York.
Pill, Edward ....Helston
Richards, Alfred .... Hull.
Rogers, George Edward ....Birmingham.
Rossiter, William Henry ....London.

Apprentices.

The following having passed the Preliminary Examination and tendered their subscription for the current year were elected "Apprentices or Students" of the Society:—

Bird, William, Jun. ....Monkwearmouth
Carvell, John Maclean............London.
Dawson, John William ....Alford.

Dimmock, Frederick Augustus London.
Dingle, James Hender............Penzance.
Dove, George.........................Sherburn.
Fletcher, Thomas Henry ....Weston.
Foggitt, Thomas Jackson.. ......Thirsk.
Ground, Thomas ....Birmingham.
Hepworth, Frederick James ...Saltburn-by-the-Sea.
Hetherington, Thomas............Penrith.
Howard, Wilkins Rigg...........Burnley.
Hunter, William Sisson ....London.
Lawson, William Cooper.........Glasgow.
Newth, Francis Henry............Southampton.
Portway, John Bernard ....Bury St. Edmunds.
Radley, William Gibson ....Newton Abbot.
Redman, Joseph ....Rochester.
Reece, Thomas ... .Llandilo.
Roberts, George ....Dalston.
Snell, Charles Henry ....York.
Taylor, John ....Bolton.
Taylor, Samuel Mumford ......Notting Hill.
Welch, Charles ....Gosport.
Williams, Hugh ....London.

Several individuals were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The following names were restored to the Register of Chemists and Druggists:—

William Wilcox ....22, Guildhall Street, Lincoln.
William Lane Clarke...2, Nankin Road, Shanghai, China.

Honorary Members.

The Secretary drew attention to the fact that there were at present forty-seven names on the list of Honorary and Corresponding Members, fifty being the limit, and that it would be necessary to nominate now any person whom it was wished to elect at the next meeting of the Council.

Mr. Greenish begged leave to nominate Professor Dragendorff, of Dorpat University, and Professor Von Trapp, of St. Petersburg.

Reports of Professors.

Award of Bronze Medals.

The report of Professor Redwood on the first course of lectures on Chemistry and Pharmacy of the present session was read. It stated that there had been a marked improvement in the number of students, and in the attention paid and progress made. This was evidenced by the fact that fifteen students had competed for the bronze medal, the only prize offered, all the answers being satisfactory, five highly so. The numbers were 92, 88, 83, 72, and 70 per cent. respectively. The envelope bearing the motto of the successful competitor was then opened by the President, and found to contain the name of

Mr. Henry Ellis, of 11, Lower Phillimore Place, Kensington, to whom the bronze medal was voted accordingly.

Professor Bentley's report also spoke very satisfactorily of the good conduct, diligence, and progress of the students. There had been sixteen candidates for the bronze medal, the number of marks ranging from 80 to 35 per cent. On opening the envelope bearing the motto to which the highest number of marks had been awarded, it was found to contain the name of

Mr. Alfred Wright, of 16, Little Alie Street, Goodman's Fields, to whom the medal was ordered to be given.

Mr. Williams suggested that the professors should be requested in future to furnish in their reports the number of students attending the classes. This was agreed to.

Mr. Greenish said he should be glad to see an improvement in the mode of conducting the examination for these sessional prizes; viz., that they should be undertaken by some one independent of the professors who had delivered the lectures.

Mr. Williams said this question had been mooted on previous occasions, but had not been received with favour by the professors. He thought it better, therefore, not to press the matter at present.

Finance.

The report of this Committee was received and adopted, and sundry accounts ordered to be paid. A balance sheet had been prepared and printed, and sent to every member of the Council.

Mr. Williams said the Society had been put to some expense in printing this balance sheet, and he should like to know of what use it was. If it were simply to be laid on the table and nothing said about it, it was a pity such an expense should be incurred. He should be glad to hear, therefore, anything which was to be said about it.

Mr. Hampson thought the expense would only be a few shillings, and though he admired the Treasurer's economical tendency, he thought the balance sheet contained very valuable information.

Mr. Mackay also thought the document a very useful one, and if no remarks were made upon it now, there might be on a future occasion. The only item which he was at all inclined to take exception to was the valuation of the Society's property in Scotland, which he considered much understated at £150.

Mr. Betty said that the very absence of questions and remarks showed the value of the balance sheet, and that it afforded all the information which could be desired.

Mr. Baynes asked how it was that while a certain percentage was written off several items for depreciation, nothing was written off the value of the lease.

The President said the lease was worth more instead of less, owing to the rise in the value of household property in the neighbourhood.

Benevolent Fund.

The Secretary having reported the result of further inquiries and the receipt of three letters respecting the widow of a chemist for whose benefit £10 had been placed in his hands two months ago, he was now authorized to place the money in the hands of a member of the Society residing in the applicant's neighbourhood, to be used as far as possible for the benefit of her two children.

The report of the Committee was read containing the following recommendations:—

£10 to the orphan daughter of a former member, making the eighth grant.

£10 to the widow of a pharmaceutical chemist.

£10 to a former member unable from ill health to earn anything by his own exertions.

£10 to the widow of a former member residing in Manchester.

The above recommendations were adopted, and a resolution was also passed authorizing the payment of the yearly allowance to annuitants.

Mrs. Moss, one of the annuitants, having died since last quarter day, the payment for the present quarter was ordered to be made for the benefit of her children.

Library, Museum, and Laboratory.

It appeared from the report of this Committee, that the average attendance in the Library had been for the past month, during the day, 20·875; in the evening, 8·45. In the conversation rooms, the average attendance had been 6·3. The circulation of books had been, in town, 158; in the country, 61, to 36 places.

The curator had reported that the attendance in the Museum had been on the average, in the day, 20; evening, 2. The average attendance during the past month showed an increase of 7 in the daytime, and a decrease of

1 in the evening. The curator had lent some specimens to the Sheffield Association for exhibition at a *soirée*, having previously obtained authority to do so; these specimens had been returned in good condition. Some duplicate specimens had been presented to the Sheffield Association and also to the Edinburgh Museum.

The following books were recommended to be purchased for the Library:—

'Traité pratique de la Détermination des Drogues simples,' by Professor Planchon.

'Das Chinin,' by Professor Binz.

Professor Attfield had reported that 85 students had attended his class since the commencement of the session, 60 being now at work.

The report and recommendations were received and adopted.

House.

The report of this Committee stated the results of the inquiries which had been made with reference to precautions against accident by fire upon the Society's premises. The subject was again referred to the Committee for further consideration and action.

Law and Parliamentary.

This Committee reported that it had met four times during the past month to consider the proposed amendments in the Adulteration of Food and Drugs Bill, and that a deputation had attended on two occasions at the Local Government Office, where they expressed their views to Mr. Clare Sewell Read.

Mr. Sandford said he had drawn up a memorandum showing what the deputation had explained to Mr. Clare Read as to the amendments which the Council thought desirable, and those to which objection was taken by it. A copy of this memorandum had been given to Mr. Clare Read. Mr. Sandford then proceeded to read through the memorandum, and said he believed the Government intended to insist on the retention of the word "knowingly," and the exception in clause 5 of additions not injurious to health, for the purpose of improving the appearance of the article. The penalty of £50 for the first offence, where the article was so adulterated as to be injurious to health, and imprisonment without the option of a fine, the proposed punishment for subsequent offences, had been pointed out to the Government as being unduly severe in the case of chemists and druggists who kept a large number of articles in stock, and differ considerably from dealers in articles of food; but it was considered that the retention of the word "knowingly" would meet any objection on that score. Amendments requiring an analysis to be made within a certain limited time after the article was purchased, that proceedings should be taken within twenty-one days, and that no summons should be returnable in less than seven days after the date of service were desirable. He was opposed to the amendment of Dr. Lyon Playfair, which would forbid the appointment of any person as analyst who was engaged in dealing in any of the articles likely to come within the operation of the Act, it being necessary that for the purposes of the Bill analysts should possess knowledge of the ordinary condition in which drugs could only be imported into this country.

Mr. Savage said the Council was much indebted to Mr. Sandford and the deputation for the way in which they had brought forward the claims of the trade, but he thought the Council should go still further and present a memorial to the Government, expressing what its feelings were. He knew some gentlemen were of opinion that the heavy penalty of £50 should be retained on account of the word "knowingly" being introduced, but for his part he believed the effect would be just the opposite to that intended, because the law would be evaded instead of being enforced. He would suggest, therefore, that a memorial should be presented to this effect:—

"That the Council of the Pharmaceutical Society is so strongly impressed with the importance of having a practical working Act of Parliament in connection with the adulteration of drugs, that notwithstanding it has already by deputation expressed its opinion of certain sections of the Act, it would urge by this memorial a further protest against the clause, which would in effect for a first offence impose a penalty of £50, and on every subsequent conviction leave no alternative but imprisonment."

He thought a maximum penalty of £20 for the first offence, with the alternative on repeated convictions of a fine of £40 or £50, or imprisonment for six months, at the option of the magistrate, would be much better. He would also suggest, in addition to the memorial, that they should further urge on the Government the important subject of appointing analysts as heretofore from amongst those practically acquainted with the subject, irrespective of their occupation.

Mr. Hampson thought it very desirable to have such a memorial, but suggested that a committee should be appointed to draw it up. He agreed with the two main points mentioned by Mr. Savage, but thought the wording might be improved.

Mr. Radley asked whether the Bill would affect compound medicines common in pharmacy, such as the "morning tonics" and "pick-me-ups," etc.

Mr. Sandford said an opinion had been expressed that these would come under the exception of any compound medicine supplied in accordance with the demand of the purchaser.

Mr. Schacht said the more this matter was discussed the more painfully it became evident that the idea of incorporating drugs and food together in one Bill was most unfortunate. They as druggists were endeavouring to fence themselves as much as possible from the infliction of penalties on account of the extreme delicacy of many of the operations which they had to perform, but in doing so they had to some extent to weaken the effect of the Bill in the public interest as affecting the dealers in food to which these delicate processes did not apply. The consequence was that their efforts to make this Bill a good bill for themselves would tend to make it a bad bill for the public, simply because it included too much. He wished to ask if any of those gentlemen who had been in communication with the Government had laid before it the desirability of separating drugs from food, and if it was absolutely imperative that they must sink or swim with sellers of provisions.

Mr. Owen said Mr. Lumley had stated distinctly that it was now too late to draw such a distinction.

Mr. Schacht said the more the matter was discussed the more difficulties multiplied, but he thought it would even now be well to throw a little more light on this subject, when perhaps those who had charge of the Bill might be induced to reconsider their position. He was quite satisfied that no six men at that table could agree upon exactly what they wanted; in fact, they could not define, for instance, what was injurious to health, and therefore the decision of these points was left sometimes to the option of magistrates and sometimes to juries. He hoped, therefore, they would not identify themselves so much with the Bill as would be involved by memorializing the Government.

Mr. Frazer agreed to a considerable extent with what had fallen from Mr. Schacht, and without reference to what had already been done he thought they should pause before adopting Mr. Savage's proposals. The heavy penalties imposed were intended to prohibit adulteration absolutely, and he should not like that Society, considering what it had done for the improvement of pharmacy, to in any way countenance a Bill which would protect the fraudulent dealer as against the public. With regard to the appointment of practical pharmacists as analysts, he sympathized a great deal with Dr. Playfair's amendment, because while perfectly conscious of the thorough honesty of the gentlemen appointed there was always a liability for the judgment to be warped by private interest, as had been shown, in fact, by the manufacturers on the Parliamentary Committee. His own opinion was there was not so much evil in the existing Act itself as in its administration.

Mr. Owen said Mr. Frazer's remarks induced him to support the memorial in order that the Council might to some extent leave its mark on the Act of Parliament. He suggested that whatever memorial were decided upon, it should be sent round to each member of Council in the form of a circular, so that he might bring it before the notice of any Members of Parliament with whom he was acquainted and thus, perhaps, exert more influence than by a memorial simply.

Mr. Robbins agreed with Mr. Schacht that if possible they ought now to make some attempt to separate food and drugs in any legislation to prevent adulteration, because what was applicable to food was not applicable to drugs. A chemist had an immense number of articles to keep in stock, and with many of them he could not possibly be acquainted before he received them, particularly as a large number were being constantly introduced. As far as he remembered, there had been very few cases indeed of chemists who had been prosecuted for fraudulent adulteration; the cases had been mostly those of sweet spirit of nitre, citrate of magnesia, milk of sulphur, and matters of that kind, in which it was impossible to say there had been any fraudulent intention. He though this ought to be brought before the Government; but they, as a Council, ought not to mix themselves up with the Bill.

Mr. Shaw had understood Mr. Sandford to say that the Government intended to retain the word "knowingly" in the new Bill, but there was a very strong feeling throughout the country with regard to this point, as evidenced both in the press and the comments of magistrates. Very recently one had stated that if it were retained there would be no more prosecutions. With regard to the working of the present Act, an analyst had taken upon himself lately to warn chemists and druggists with regard to the fact that citric acid and tartaric acid were frequently impregnated with lead. If they were to be prosecuted for such things, they must either have a guarantee from the seller, or test every article they sold, which would be simply impossible. At the same time he remembered not long ago acetate of lead was used in the preparation of candles, and thus there would be lead poisoning in the atmosphere.

Mr. Savage then moved a resolution to the effect that the preparation of a memorial in opposition to the objectionable clauses in the Adulteration of Food and Drugs Bill, having especial reference to the excess of penalties and the proposed amendment of Dr. Lyon Playfair, be remitted to a committee, consisting of the President, Vice-President, with Messrs. Sandford and Greenish.

Mr. Hampson, in seconding the motion, said he sympathized with Mr. Schacht and Mr. Frazer to a considerable extent, but they must make the best of circumstances, and the only way they could prevent an objectionable Bill passing was to use whatever power they had to improve it, and he thought a memorial might have some weight with the Government.

Mr. Betty said the question divided itself into two parts, first, should a memorial be sent at all, and in the second place, what should be contained in it. He suggested they should decide whether or not to memorialize the Government, and afterwards the matter of such memorial.

Mr. Williams thought it was all one question, because they could hardly decide whether they should send a memorial unless they knew what was to be put into it. He hardly thought it consistent after what had occurred at the interviews they had held with members of the Government to send a memorial with regard to the amount or the nature of the penalties. His own opinion was that they were excessive, and would check the operation of the Act, but he did not think the Council ought to commit itself to an opinion, one way or the other, upon the point.

Mr. Atherton understood that the Government intended to adhere to its former resolution allowing the appointment of pharmaceutical chemists as analysts, or anyone else who had suitable knowledge, and, that being the case, it seemed almost impertinent to recur to the subject again in a memorial.

Mr. Mackay thought they should first decide whether any memorial should be presented.

Mr. Schacht thought there would be a difficulty in the course suggested by Mr. Betty. His own opinion, which he should be glad if his colleagues concurred in, was set forth in the following sentence:—"That this Council having regard to the extreme difficulty of reconciling discrepancies of facts that apply to the falsification of articles of food and drugs is distinctly of opinion that legislation on the two subjects should be separate." If they held such views he did not think it would be worth while to memorialize the Government unless they did it in the way which they had been told it was now too late to adopt. He himself was not frightened at that argument, because he thought it was always well to speak the truth even at the last moment.

Mr. Mackay suggested that they might be guided by the result of Mr. Sandford's interview with Mr. Sclater-Booth on the following morning.

Mr. Savage said he should be quite willing, if Mr. Sandford would undertake to see Mr. Sclater-Booth, to let the sending of the memorial depend upon that gentleman's opinion whether it would strengthen his hands to do so.

Mr. Sandford said he should be happy to call on Mr. Sclater-Booth the next morning.

Mr. Hampson saw nothing incompatible in the two proposals. Appointing a committee need not clash with anything Mr. Sandford had to say as a private individual to Mr. Sclater-Booth.

The President then read the resolution as proposed to be put, referring only to the question of the £50 penalties, etc.

Mr. Betty said they were running counter to the opinion of the Government on this point, whose hands they would weaken whilst proposing to assist them in passing the Bill. The amount of penalty and the word "knowingly" must stand or fall together, but if it were understood that the memorial was only to be sent if Mr. Sclater-Booth approved of this course being taken he would support it.

It being understood that this should be done, and the names of Mr. Williams and Mr. Hampson being added to the Committee, the resolution was passed by a majority of 12 to 5.

> "That if a Select Committee, consisting of the President, the Vice-President, the Treasurer, Messrs. Greenish, Hampson, and Sandford, deem it desirable, a Memorial be presented to the Government praying that the penalties named in the Sale of Food and Drugs Bill be reduced, and that an alternative of fine or imprisonment be allowed in a repetition of offences."

The report of the Parliamentary Committee was then received and adopted.

The Conversazione in May.

The Committee appointed to make arrangements for the ensuing Conversazione reported that they had obtained the sanction of the authorities to the use of the South Kensington Museum on the 19th of May next, and detailed the steps they had already taken in the matter.

Report of Examinations.

ENGLAND AND WALES.

March 17th, 1875.

	Candidates. Examined.	Passed.	Failed.
Major	8	7	1
Minor	21	10	11

April 2nd, 1875.

Modified	26	14	12
Total	55	31	24

The following Certificates were received in lieu of the Preliminary Examination :—

College of Preceptors	4
University of Cambridge	3
Society of Apothecaries	1
Total	8

SCOTLAND.

March 30th, 1875.

	Candidates. Examined.	Passed.	Failed.
Major	2	1	1
Minor	12	8	4
„ Mar. 31st	6	3	3
	—18	—11	— 7
Modified	1	0	— 1
Total	21	12	9

The Preliminary Examination.

The following table was presented :—

Preliminary Examination for the Past Year, showing the Number of Candidates at each Centre.

Centre.	Dates of Examination. 1874 July.	1874 Oct.	1875 Jan.	1875 April	Total Number of Candidates for the Year.
ENGLAND AND WALES.					
Aberystwith	3	...	1	3	7
Barnstaple	...	1	...	1	2
Berwick-on-Tweed	2	1	...	...	3
Birmingham	22	9	14	11	56
Boston	4	2	6	5	17
Brighton	1	4	3	2	10
Bristol	5	6	6	11	28
Cambridge	7	5	4	2	18
Canterbury	3	2	2	2	9
Cardiff	7	1	2	1	11
Cardigan	5	...	...	1	6
Carlisle	3	...	2	1	6
Carmarthen	5	8	3	4	20
Carnarvon	2	3	2	2	9
Cheltenham	2	3	1	5	11
Chester	5	4	3	4	16
Colchester	2	...	1	...	3
Darlington	7	7	4	2	20
Doncaster	1	2	1	1	5
Dorchester	...	...	...	...	...
Exeter	3	2	1	...	6
Guernsey	...	1	1	...	2
Hereford	...	...	...	...	...
Hull	12	8	3	5	28
Jersey	...	...	...	...	...
Leamington	2	4	2	2	10
Leeds	14	8	7	7	36
Leicester	4	6	4	1	15
Lincoln	5	3	...	3	11
Liverpool	16	10	5	7	38
London	58	49	23	33	163
Lynn	1	1	...	...	2
Macclesfield	3	1	...	...	4
Manchester	22	21	8	14	65
Newcastle-on-Tyne	6	4	5	5	20
Northampton	4	2	4	2	12
Norwich	7	1	3	6	17
Nottingham	11	6	6	3	26
Oxford	1	1	1	2	5
Peterborough	4	1	...	2	7
Plymouth	7	3	4	1	15
Portsmouth	2	5	2	3	12
Preston	7	4	2	4	17
Reading	2	...	1	1	4
Salisbury	...	2	...	2	4
Scarborough	2	1	1	2	6
Sheffield	6	2	6	3	17
Shrewsbury	3	3	...	2	8
Southampton	1	...	1	...	2
Stafford	6	3	...	...	9
Swansea	6	4	...	4	14
Taunton	2	...	1	1	4
Truro	2	...	1	4	7
Worcester	5	4	...	4	13
York	2	4	3	7	16
SCOTLAND.					
Aberdeen	10	5	9	10	34
Dumfries	5	...	...	2	7
Dundee	3	7	2	1	13
Edinburgh	11	7	9	10	37
Glasgow	11	2	1	9	23
Inverness	2	...	1	1	4
Perth	1	...	...	1	2
	355	243	172	222	992

Mr. Schacht said it was to be remembered that last year a Committee was appointed to consider the whole matter of Preliminary examinations, when it was ultimately decided to reduce the number of centres. It was then understood that the superintendents for the examinations should be appointed for one year only, at the expiration of which time the subject was to be again brought forward. The result of the year's experience was now in the hands of the Council, from which it appeared that there were three centres at which no candidates had presented themselves, and several others where there had been two, three, or four only. The question then arose whether it was worth while to continue these places as centres or not. Of course it did not follow because in one year there had been few candidates that therefore they should be discontinued, but it was an open question whether the saving effected by omitting them would be sufficient to justify them in putting the individuals who would have presented themselves at those places to the trouble and expense of travelling to the next nearest centre. The utmost saving which could be expected by omitting those he had referred to would be from £30 to £35, and in some cases the candidates would have a considerable distance to travel, and perhaps be obliged to spend a night from home. He would therefore propose that the superintendents should be reappointed for all the towns on the list, with the exception of Dorchester, Hereford, Macclesfield, and Perth.

Mr. Savage thought some intimation should have been given before the names of these places were removed from the list, and that at least another year's trial should have been given.

Mr. Atherton was of the same opinion. It was hardly fair to discard a town after only one year's experience.

Mr. Mackay also thought it better to try the matter further before making any change.

Several other members having expressed themselves to the same effect, Mr. Schacht said he was very glad to find the opinion was so strong against the suggestion he had made, because he should be very happy to see the examinations continued at the whole of these places.

The Secretary suggested that it would be desirable, where possible, that the superintendence of the Preliminary examinations should be placed in the hands of the local secretaries, and, therefore, he thought it would be well to appoint the superintendents only for the next examination, making a fresh appointment in August, when the new list of local secretaries would be complete.

This suggestion was adopted, and the resolution passed unanimously—

> "That the superintendents and deputy-superintendents of the written examinations be re-appointed until August 1st next."

Preliminary Examination.

Mr. Atherton now brought forward the proposition which he moved at the last meeting, namely—

> "That the questions for the Preliminary Examinations after the present year, be prepared and reported on by the College of Preceptors."

He said this proposition had already been pretty well canvassed, and would not require much more to be said respecting it. It was rather curious, however, considering that it had been partially discussed, and reported, as showing how little interest was taken in the matter that not a single allusion had been made to it in correspondence in the Journal. He might say, however, that he had no intention whatever to sever the connection of the Council with the Preliminary examinations, but wished the Council should, as it always had done, make the examinations more or less stringent as circumstances might demand. In asking the College of Preceptors to conduct these examinations he thought they would not only be conferring a boon upon the examiners, but would be raising themselves and adding dignity to the Society by selecting persons specially qualified to conduct such an examination as the Preliminary. The same course was adopted by the College of Physicians and the Veterinary College, and communication having been opened with the College of Preceptors, it was ascertained that it was willing to undertake the task at about the same cost as was now incurred, the only difference, therefore, would be that the questions would be set and reported upon by the College of Preceptors, but the questions would be sent out by the Secretary of the Pharmaceutical Society, to whom the answers would be returned as at present.

Mr. Greenish seconded the motion.

Mr. Mackay regretted that he was not present at the last meeting, when this matter was discussed, but he had conversed with the Board of Examiners of Scotland on the matter, and he found that it was quite willing to act in accordance with the London Board, whose opinion on this matter it supposed would be sought by the Council. He thought there would be no difficulty in the matter from the explanation which had been given, because, though it was not a nice thing for any Board of Examiners to allow the reins to slip out of its hands, if it now clearly understood that the whole power would still be left in the hands of the Council, or the Board, that the appointment now proposed would only be made annually, and that the College of Preceptors would not be under the impression that it was to frame questions irrespective altogether of the opinions of the Council or the Board, he saw no objection to the proposal. He should be very sorry if the College set questions too severe for the purposes they had in view, because that would be a serious dead weight against young men entering the business and they had already had practical experience of the difficulty, which was constantly becoming greater, of getting young men into the business. His experience in Scotland had been that many young men, finding they were bound to possess a certain amount of classical knowledge, thought they might as well go further to one of the universities, and so fit themselves to commence medical studies. The College of Preceptors was a body unknown in Scotland, but he understood it was an authorized body of high character acting with a single eye to the advancement of education, and he should therefore be prepared to support the motion.

Mr. Savage suggested the addition of the words, "If such course be in accordance with the wishes of the respective Boards of Examiners."

Mr. Williams said they might postpone the question until the opinion of the Board of Examiners had been ascertained, but the Council must decide the question.

Some further conversation ensued on the question whether or not the College of Preceptors would be guided in the character of the examination by the wishes of the Council, and

The Secretary stated that he had been distinctly informed that it would do so.

The resolution was put and carried by a majority of 15 to 2.

Memorial from Glasgow.

The Secretary read the following memorial:—

"Unto the Honourable the Council of the Pharmaceutical Society of Great Britain.

"The Memorial of Pharmaceutical Chemists and Members of the Pharmaceutical Society and others engaged in the business of chemists and druggists in the city of Glasgow and surrounding towns,

"Showeth:—

"That your memorialists are members actively engaged in the trade or profession for which your honourable Council is appointed to legislate, and have the best interests of pharmacy at heart; being firmly of opinion that some of the regulations laid down for conducting the examinations of the Society are inimical to the future progress of our calling in this portion of the kingdom, and have in the past done much to estrange young men from becoming apprentices or students of the business, and, moreover, the mode of appointing Examiners, in Scotland especially, has been unfair to the great body of qualified pharmaceutical chemists throughout the country, and detrimental, in some respects, to the interests of the young men who have presented themselves, from time to time, for examination; and, further, are of opinion that the time has arrived when the provision made or contemplated in the Pharmacy Act of 1852 should be carried into effect, wherein it is enacted that:—

"'It shall devolve or be lawful for the Council of the Society, and they are hereby required, to appoint such fit and proper persons in *Scotland* to meet in *Edinburgh* or *Glasgow*, or such other place or places as the Council may think desirable, and to conduct all such examinations as are provided for and contemplated by this Act,' etc.

"Your memorialists therefore humbly pray your honourable Council shall take immediate steps to carry into effect the following suggestions, viz.:—

> "1st. That candidates presenting themselves for examination should have at least two opportunities given them to pass their respective examinations for one fee, as is the rule in other examining bodies in Scotland; that in case of failure in one or more subjects no fee be returned, but that they should receive due credit for the subjects in which they have passed, provided they succeed in more than one subject; and that, on presenting themselves a second time, they only be examined in the subject or subjects in which they have failed; that this rule apply to *all* examinations conducted by and for the Society.
>
> "2nd. That the Board of Examiners be balloted for from year to year, as in the election of members of Council, that is to say, a proportion should retire by rotation annually, and while being eligible for re-appointment, care should be taken that they be

chosen from a wider area than hitherto, and more from the general body of the qualified members of the Society in Scotland.

"3rd. That advantage be taken of the 9th Section of the Pharmacy Act 1852, referred to above, and that the Scottish Board conduct Examinations in Glasgow, at least *twice* a year, to save time, travelling expenses, and cost of living to the various candidates in the West of Scotland.

"And your memorialists will ever pray.

"Signed (in name and on behalf of the Pharmaceutical Chemists and Chemists and Druggists engaged in Glasgow and the West of Scotland in public meeting assembled, and approved by the Council of the Glasgow Chemists and Druggists' Association.)

"(Signed) JOHN CURRIE, Chairman,
" JAMES M. FAIRLIE, Secretary.

"*Anderson's University,* 204, *George Street, Glasgow.*
"30*th March,* 1875."

Mr. FRAZER said he hardly knew what was the proper course to take with reference to such a document, but he knew there was a very strong feeling on the subject in the West of Scotland, arising in a great part from the difficulty of getting assistants, and he was prepared to support the memorial if he knew the proper form of doing so.

Mr. WILLIAMS said there were three points in the memorial. One was the appointment of Examiners by ballot, which was obviously illegal. Another was the removing of the examinations from Edinburgh to Glasgow, which they had power to do; but when they considered that it required a laboratory and a considerable number of appliances in the way of specimens and other things, it would be seen that the expense would be a great deal more than that of bringing students from Glasgow to Edinburgh. The third point was as to the fees, on which his opinion was exactly the contrary to that put forward, because he believed they would have before long to increase the fees. He was quite of opinion that the examinations were not paying the Society, yet they would have to look to them as a source of revenue.

Mr. FRAZER, in answer to a question, said there were seven or eight persons present at the meeting at which the memorial was adopted.

Mr. BETTY moved that the petition lie on the table.

Mr. HAMPSON proposed that the discussion be adjourned until the next meeting of the Council.

Mr. MACKAY said he should unfortunately not be present probably at the next meeting.

The VICE-PRESIDENT thought they had better discuss the matter at once, or refer it to the Board of Examiners in Scotland for its opinion. One part of the proposition was evidently illegal, and with regard to having two examinations for one fee, no portion being returned, he thought if they altered the fees at all it would have to be in the opposite direction to that contemplated by the memorialists.

Mr. FRAZER said he did not want the matter to be shelved or to merely end in talk, but he should like to know what was the proper form in which to bring it before the Council.

Mr. SCHACHT thought the petition of any seven gentlemen well worthy of attention; but it would hardly be of sufficient importance to be discussed by the Council, especially as the questions were not now raised for the first time.

Mr. BETTY said the memorial impugned the honour of the Board of Examiners in Scotland, and, therefore, he thought the gentlemen so assailed ought to have the earliest opportunity of defending themselves; it was for that reason he had thought Mr. Mackay should have an opportunity of speaking at once upon the subject.

Mr. MACKAY said he rose with feelings of positive pain and regret on hearing this memorial from Glasgow, because had the Board in Edinburgh had the least idea of any such feeling existing in the minds of their Glasgow brethren, or that they were holding meetings for the purpose of producing such a memorial, a deputation from the Edinburgh Board would gladly have gone to wait upon them and very probably the memorial would never have been presented. But seeing it had been presented, he was bound to say there were some statements contained in it which could scarcely be supported. The causes of failure in the examinations had been thoroughly canvassed by the London Board, by the Edinburgh Board, and by the Council, and a deputation had come from Edinburgh to London, with the result of which visit they were acquainted. It was therefore unnecessary to revive that question in this memorial. As to the fees in case of failure he had nothing to say, except this, that the Edinburgh Board was of opinion that the fees were not paying the cost of examination, and that it would become necessary to increase their resources, which could only be done in one of two ways, either by raising the fees, which he was rather opposed to, or by making an unsuccessful candidate pay more than one guinea when he failed. With regard to the constitution of the Board it had been already stated that the method of election suggested was positively illegal. Their friends in Glasgow seemed to have incorrect ideas as to the constitution of the examining Board. Some two years ago, it was endeavoured to secure a fuller representation from Glasgow on the Board in Scotland, but the attempt signally failed. He could give the names of several gentlemen to whom personal application was made, but who refused to serve. In fact, if the whole of the present members were to resign, he did not believe it would be possible to persuade eight other competent men to fill their places. If, however, their Glasgow friends would send the names of qualified gentlemen from the West of Scotland, the members in Edinburgh would be very pleased to put them forward for election by the Council, in December next. With regard to the examinations being peripatetic, at the time when the provision to that effect was made it was believed that the examinations would be so simple in character that the examiners could take a little parcel of specimens, put it into their portmanteaus, go to any part of the country and conduct the examinations. He need not say, however, that the examinations were now of such a character and required so much manipulation and apparatus that a complete laboratory was required, and therefore he thought it a great pity, when they had just obtained a local habitation and needful appliances in Edinburgh, that their Glasgow friends should ask them to move all this machinery in order to conduct the examinations in Glasgow. If it were the fact that candidates for examination were principally young men from Glasgow and the West of Scotland, there might be more foundation for such a request, but on going through the lists he believed it would be found that the bulk of them came from all parts of Scotland and the North of England. If they once began to multiply centres it was impossible to know where to stop, and therefore he thought the only proper course was to confine the examinations to the parent Society in London and the North British Branch in Edinburgh.

Mr. FRAZER then said he would give notice of motion that at the next Council Meeting he would move that the matter be referred to the Law and Parliamentary Committee.

PETITION FROM STAMFORD.

The SECRETARY read a petition which had been received from Stamford, signed by six or seven persons, complaining that the Pharmacy Act of 1868 was not properly enforced, and stating that many persons not duly qualified were in the habit of selling the poisons mentioned in Schedule A to the Act.

Mr. Radley suggested that the same course might be adopted in this case as was done some time ago with regard to Sheffield, the Secretary writing to say that if particulars were forwarded of any breach of the Act he would bring it before the Council, and steps should be taken if necessary.

Mr. Hampson said this was a very good suggestion, or the petition might be referred to the Parliamentary Committee. He thought they ought not to be too inert in matters of this kind.

Mr. Betty said the petition betrayed such an utter want of information as to the working of the Pharmacy Act, and the powers of the Council under it, that he thought they need not seriously discuss it. The receipt might be acknowledged, and, of course, if any information were received of large quantities of poisons being illegally sold proceedings would be taken accordingly.

Mr. Schacht gave notice that at the next meeting he should propose an addition to the standing orders; that members of Council having the intention to introduce any motion of which notice had not been previously given should announce the same at the commencement of the day's proceedings. He did not mean to prevent any matter being brought forward which arose out of the business of the day, but if any gentleman came to the meeting prepared to move a particular resolution it was hardly fair that it should be left to the chance of coming on near the conclusion of the proceedings, when some of the members might have left, so that the subject could not be properly discussed.

PHARMACEUTICAL MEETING.

Wednesday, April 7th, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed. The following donations to the Library and Museum were announced, and the thanks of the Society were awarded to the donors:—

Library:—'Transactions and Proceedings of the Botanical Society of Edinburgh,' vol. xi., part 3, and vol. xii., part 1, from the Society; Thomson's 'Conspectus of the Pharmacopœias of London, Edinburgh, and Dublin' (eleventh edition), Phillips's 'Translation of the London Pharmacopœia,' 1824 (second edition), and the 'Pharmacopœia Londinensis,' 1824, from Mr. R. C. Buckley; 'Chemical Examination of Alcoholic Liquors,' and 'Outlines of Proximate Organic Analysis,' from the author, Professor A. B. Prescott, M.D.; 'Ueber das Harz des Lärchenschwamms, von E. Masing,' from Dr. Dragendorff; 'The Durham University Calendar, 1875,' from the University.

Museum:—Fine specimen of Glacial Phosphoric Acid, from Mr. Morson; specimen of Goa Powder, from Mr. Postans; specimen of Guarana Seeds and Araroba, from Dr. Symes; Portrait of the Officers of the School of Pharmacy Students' Association, from the Committee; specimen of Witch Hazel Bark, from Mr. P. Squire.

Herbarium:—Specimens of *Daphne Laureola*, from Mr. G. C. Druce; specimen of *Ornithogalum nutans*, from Mr. T. W. Nettleship.

The President announced that Dr. A. W. Hofmann, of Berlin, who had come to this country for the purpose of delivering the Faraday lecture before the Chemical Society, had done the Pharmaceutical Society the honour of attending that evening for the purpose of bringing before it the specimens of substances which had been discovered or studied by Liebig. There were among the specimens many bodies interesting to pharmacists.

Dr. Hofmann, on coming forward, was greeted with loud and long continued cheering. He said that he thanked the meeting for the kind reception which they had accorded to him. He regarded it as due simply to the exertions which, at one time, it was his good fortune to make for the cause of chemical and—let him say—pharmaceutical education in this country. The two branches went hand in hand. There was before them a splendid collection of substances which had been discovered and examined by Liebig; but he must be excused from attempting a description of them, for he should not know where to commence or where to finish. In the summer of last year he received an invitation from the Council of the Chemical Society to deliver the Faraday lecture this year. It happened that that invitation was received almost on the same day of the month on which, a year previously, Liebig, his glorious master, had died. He immediately accepted the invitation requesting the council that they would allow him to select, as the subject of his lecture, the life-work of Liebig in chemistry, experimental and philosophic. He received by return of post a letter from the Foreign Secretary of the Chemical Society stating that the council heartily acquiesced in the proposal. Of course, he had from that moment to devote a large amount of his time to the preparatory readings for the lecture, and, as a matter of course, it soon became known among his pupils that he was, with all his might, exerting himself to do justice to the memory of his distinguished master. With that enthusiasm which was so characteristic of youth, some of the students associated in order to support him on that occasion, and they worked for months in order to enable him to submit to the chemists of England what was, probably, a more perfect and complete collection of the substances discovered and studied by Liebig than ever was—at all events simultaneously—under the eyes of Liebig himself. In speaking to a chemical fraternity, he needed not to dwell upon the time and energy which had been bestowed upon preparing these specimens, of which there were, perhaps, more than a hundred in number. He would, however, call attention to the beauty of some of the crystals and to the care bestowed by his young friends upon the classification of the substances. There was a peculiarity in that classification, for it would be found that some of the labels were white and some were blue. The white labels were applied to the substances which Liebig himself discovered, and the blue labels to those substances which had been discovered by others, but which he examined, and the composition and formulæ of which were established by his researches. It was quite out of the question to enter into the details of the collection upon that occasion; but the Society would feel interested in looking at it from two points of view. One was that they had the glorious result of a single life before them represented by what he might call an encyclopœdic display of his work; and the second point was that it showed the enthusiasm with which young chemists of our day most willingly gave up a very considerable part of their time for the sole purpose of exhibiting the labours of their grand countryman in the most conspicuous light to the chemists and pharmaceutists of this country.

The President said he was sure that he was speaking the sentiments of all present in saying that they were delighted and charmed, both by the presence of Dr. Hofmann, and by what he had shown them. There was no doubt that some day or other they would have quite as many valuable products which Dr. Hofmann himself had found; for there was no harder worker than Dr. Hofmann, to him work was a pleasure. His work was one of thought and investigation, undertaken with a desire to improve, as far as possible, everything connected, not only with chemistry, but with all that related to social life. Dr. Hofmann had shown himself to be ready on all occasions to do all that he possibly could do to ameliorate the conditions of society. He (the President) was sure that they must heartily welcome and thank him upon this occasion.

Identity of Goa Powder and Araroba.

A paper on this subject was read by Mr. E. M. Holmes. It is printed at p. 801, and gave rise to the following discussion:—

Mr. Plowman said that on the previous day Mr. Holmes had placed in his hand three samples of powder, which he had submitted to chemical examination; but in consequence of want of time the examination had been imperfect. One was a sample of Goa powder which had been presented to the Museum by Mr. Postans; the second, a sample of Goa powder which had been in the Museum for eleven years; and the third was a specimen of araroba. As Professor Attfield had found that chrysophanic acid was a chief constituent of araroba, he (Mr. Plowman) sought for that body. He exhausted each specimen with benzol, and from the Goa powder presented by Mr. Postans, he obtained 87 per cent. of soluble matter. From the Goa powder which had been in the Museum eleven years, he got 70 per cent. of soluble matter; and from araroba he got 84 per cent. The fact of the araroba powder giving less soluble matter than the Goa powder presented by Mr. Postans might be due to the fact that there was some woody matter mixed with it. The benzol solution upon evaporation deposited tufted crystals, which when examined gave the characteristic reactions of chrysophanic acid. The deposit, from the Goa powder which had been in the Museum eleven years, was somewhat crystalline; but the crystals were not definitely tufted as in the other case. The fact of the percentage of soluble matter being so much lower was, probably, due to the chrysophanic acid having become changed by keeping. From the results which he had obtained, he had no doubt that the araroba and the Goa powder presented by Mr. Postans were identical; and the probability was that the Goa powder presented eleven years ago was also identical, but that some change had taken place through keeping. The colours differed considerably, and, probably, the crystalline quality had been affected.

Professor BENTLEY said that he well recollected the discussion on Goa powder in that room eleven years ago. It showed how little they knew of the interest with which a substance then presented to the Society might be viewed many years after. He remembered that in that discussion the subject was thought by some present to be scarcely worthy of the notice of the Society. Goa powder had now, however, become an important remedy in skin diseases, and was peculiarly valuable in some intractable forms of skin disease which prevailed in India and China, though not so much in this country. It was, therefore, of importance to ascertain whether Goa powder and araroba were one and the same substance. The investigations seemed to show that they were identical. Probably they would not be able to tell the exact origin of araroba until the cuttings of the plant yielding it, which were now in the Botanical Gardens at Edinburgh, were sufficiently grown to be identified by botanists; but if the substance was derived from the plant it was supposed, or an allied species, the change of colour noticed in the paper was what they would expect, for many of the woods of those plants were used as dye woods. Thus, South American species of *Cæsalpinia* yielded, at least, three dye woods, namely, peach wood, Brazil wood, and Braziletto wood. Chemists knew that various tints, such as rose and yellow and red, could be obtained from these different woods, and even each particular wood would undergo a change of colour according to age and exposure. One species of *Centrolobium*, which was allied to the *Cæsalpinia*, also yielded an orange wood. This species was a native of the northern parts of South America. The orange wood upon keeping would become brown. Doubtless everyone who kept these woods knew that they would alter their colour very much from exposure. He, therefore, agreed with the statement in the paper that any slight difference of colour was a matter of no importance as to the identity of Goa powder and araroba. Mr. Holmes had stated in his paper that *Centrolobium robustum* was probably the plant which yielded the araroba powder. He had now told them that the leaves of the plant which he had since received showed its origin more probably to be a species of *Cæsalpinia*. He (Professor Bentley) believed the latter to be correct. Mr. Holmes spoke of *Centrolobium robustum* as yielding "the well-known zebra wood." He (the speaker) was not quite sure upon what authority that statement was made; but, probably, upon the authority of Martius, from whom an extract was given in the paper. The more recent investigations, however, of Schomburgh, showed that zebra wood was derived from *Omphalobium Lamberti*, a tree which grew in Guiana, and belonged to a totally different natural order, namely, the *Connaraceæ*, although some had supposed it to be derived from *Guettarda speciosa*, a cinchonaceous plant. He knew of no reliable evidence that the zebra wood of commerce was derived from *Centrolobium robustum*. He thought that the investigations of Mr. Holmes and others clearly showed that the two substances, Goa powder and araroba, were identical, and that the origin of them both was some leguminous plant. Probably it would be found from a species of *Cæsalpinia* or some nearly allied genus; for, as already noticed the woods of these trees varied very much in colour, and could be made to take a variety of tints by the action of reagents, and even by the action of the air and light. With regard to the action of dock, of course it was well known that dock-root had been used from the earliest period in cutaneous affections. There was a fashion in medicine, as in everything else, and perhaps some of the younger members of the Society would see the day when some of the old remedies were brought into use again. Chrysophanic acid was found in some docks, and if it were found to be the active principle of Goa powder, docks might come into use again. Dock was used in the time of Linnæus, and it was still used largely in Sweden in scurvy and in many cutaneous disorders. It was formerly sold in the herb shops of this country as *radix et herba britannica*. Dr. Garrod, some years ago, particularly called the attention of the profession to the use of some docks in skin diseases. It would be a very curious incident in reference to a subject which was thought of very little importance eleven years ago, if the active principle of Goa powder and the active principle of dock should prove to be the same.

Professor ATTFIELD said that the casks of araroba to which Mr. Holmes had referred in his paper, and which were exposed for sale in the London market last year, were, he believed, purchased by Mr. Kemp, of Bombay, who sent over to this country the Goa powder about which there had been lately some discussion. With regard to the identity of Goa powder with araroba powder or chrysarobine, he had examined several specimens which had been sent to him at different times under different names. He examined a sample which, eleven years ago, was sent by Mr. Kemp to one of the most eminent pharmacologists which this country had ever seen, and whose absence they must all regret. He referred to Mr. Hanbury. He had also examined a specimen which was presented to him four or five years ago as "genuine Goa powder;" and he had also witnessed the experiments made by Mr. Holmes on three or four specimens, the nature of which had been detailed in the paper. He had not the slightest hesitation in saying that the specimen which was given him four or five years ago as "genuine Goa powder" was spurious, and was simply what was known in England as cudbear. It was this specimen which he alluded to at the March Pharmaceutical Meeting as being entirely distinct from araroba powder. He had also no hesitation in saying that the specimens he had examined since, the sample which was sent to this country eleven years ago by Mr. Kemp, and the samples which had now been brought to the attention of the Society, were all identical, whether known as Goa powder, araroba powder, arariba powder, or chrysarobine. With regard to the varying colour of the substances, it was possibly, if not probably, due to the conjoined action of the oxygen of the air and traces of ammoniacal gas in the atmosphere. Samples of chrysarobine kept in his laboratory underwent change of colour far more rapidly than samples kept in his own house, and he need not remind the meeting that the atmospheres of those two places would probably differ somewhat as regarded the percentage of ammoniacal compounds which they contained. He cordially agreed with what had fallen from Professor Bentley, with regard to the importance of paying attention even to what might appear to be the most trifling or uninteresting substances brought before them from the colonies or from foreign countries. Dr. Hofmann had reminded them of the indebtedness of chemistry to pharmacy. The substance before them was extremely rich in chrysophanic acid, a compound which had not been exhaustively investigated. Here then was another instance of pharmacists presenting to chemists one more substance, the chief component of which would probably form the subject of many researches.

Mr. Moss said that it might be worth while to mention, in passing, that the parcel of araroba referred to by Mr. Holmes and Professor Attfield was by no means the first which had appeared in the London drug market. On the contrary, araroba had been received into this country for many years, but the imports had found their way almost entirely into the hands of one firm, which had again exported the whole, he believed, to the East Indies. If this were so, the fact, taken in connection with the many recent notices of araroba, would go far to remove the mystery in which the origin of Goa powder has been long enshrouded.

Mr. Postans, after alluding to Professor Attfield's research on chrysarobine, said that about a year ago, having, at the request of a customer, to procure some Goa powder, he obtained a supply from Bombay, and took the opportunity, with the concurrence of some medical friends, of testing its powers as a remedy for ringworm, on the forehead of his own little girl. Following directions received he moistened the part with water, and rubbed over it some powder. This treatment repeated for three or four days effected a cure. But particles of the powder were apt to get into the eyes, causing irritation. Subsequently, therefore, when the ringworm appeared on the scalp he used a paste of Goa powder with oil. The operation of washing, however, distributed the colouring matter of the powder over the girl's hair, converting it from auburn to ugly purplish-brown. Similar effects were afterwards described in a paper by Mr. Gaskoin. It would appear, therefore, that while a pomade or ointment, or oily mixture, was the appropriate vehicle for Goa powder, care must be used both in applying and removing tho preparation.

A paper entitled :—

"Notes on the Pharmacy of Atropine,"

was read by Mr. W. Willmott. It is printed at p. 802, and gave rise to the following discussion :—

Mr. Linford said, with regard to the statement that a solution of atropine might keep perfectly well in the laboratory and yet become perfectly acid during use, it had occurred to him that it was not improbable that the acid was derived from the secretions of the patient's eyes. And not only might the solution become acid, but dust and other solid matters might be conveyed to it during use ; for patients were in the habit of applying the solution with a camel's hair brush, and putting the brush into the bottle. He had seen atropine in use in a patient's house, and in that case the bottle was kept on the mantelpiece and the brush was kept in a tray by the side of it.

Mr. Williams said that he was hardly able to give an opinion as to the presence of dust in the solution of atropine ; but he knew, or believed he knew, that certain atropines, or so-called atropines, irritated the eye when applied, while others seemed not to possess the same property. There had been a controversy between German chemists and English chemists on the point. German chemists had said that English chemists used belladonine and not atropine ; and English chemists retorted that the German chemists had sent us belladonine, and that English chemists made atropine. It would be a very interesting subject of investigation whether belladonine or atropine was the irritating substance, if the irritation was due to either of them. The paper tended to prove that mechanical agency rather than chemical constitution was the cause of the irritation.

Dr. Hofmann said that he scarcely knew that he was in a position to throw any light upon this interesting and important question; but being called upon to offer a few remarks, he would direct their attention to the fact that there was a sample of atropine among the specimens which he had exhibited on the table; being one of the substances examined by Liebig at an early date, soon after he had elaborated his method of analysing substances and constructed his five-bulb apparatus. He (Dr. Hofmann) had not paid special attention to the subject of atropine, for there being so large a domain to be explored, each man had to select a special field on which to work, though at the same time he must endeavour as far as possible to remain familiar with what his neighbours were doing on the right and on the left. As far as his (Dr. Hofmann's) impression went, the chemical investigation of atropine had by no means been carried to such a point that it could be said to be complete. He thought that it was very important that atropine and a considerable number of other "*ines*" should be much more minutely examined. It was his belief, however, that chemists were at the present moment deeply impressed with the necessity of returning to the examination of the bodies presented to them by nature rather than of those obtained by the artificial processes of metamorphosis, and he was sure that the investigation of the former would still yield rich harvests of most valuable and frequently quite unexpected results. He might be allowed to allude to the recent examination of vanilline, a substance which occurred in the vanilla plant. Vanilla had been repeatedly examined. It had been examined by himself, by Carles, in France, and by two young German chemists, of the names of Tiemann and Haarmann, working in the Berlin laboratory. When the composition of vanilline had been established beyond doubt by a multiplicity of experimental researches such as had never been applied to atropine and the great majority of the alkaloids, suggestions were repeatedly thrown out as to modes of producing vanilline artificially, and they all knew that last year it was actually produced artificially from a crystalline substance having a very close analogy to it, and which was found in the juice of the fir tree. Here they had the starting point of a new chemical industry. The crystalline body obtainable from the juce of the fir tree, and which was called coniferine, could be procured in any quantity, and Messrs. Tiemann and Haarmann had collected not less than 100 kilog. of it in the course of a single summer. Coniferine, by a simple process of oxidation was converted into vanilline, and although some difficulty still existed on carrying out this oxidation upon an industrial scale, he had no doubt that artificial vaniline would soon compete with the natural product in the market. This instance showed the enormous advantages which might be obtained from a more minute and accurate examination of the bodies with which nature presented us. They must not, of course, expect every day to light upon such a vein as was opened up by the investigation of coniferine ; but he had no hesitation in stating his belief that every well-conducted examination of vegetable substances would amply repay the time and labour bestowed upon it. He might be allowed to remind the members of the Pharmaceutical Society that during the last few years he had been frequently engaged in the examination of essential oils which occurred in plants, and that nearly all of them he had found to be substances having great interest. There was, for instance, that class of bodies which chemists designated by the name of nitriles, artificially obtained by the withdrawal of water from amides. He had investigated nearly a dozen of the essential oils of plants and he had found that they were all nitriles of acids with which chemists were long acquainted. Thus the essential oil of *Tropæolum majus* and of *Lepidium sativum*, was found to be the nitrile of toluic or phenyl-acetic acid.

The oil of *Nasturtium officinale*, the nitrile of hydro-cinnamic or phenyl-propionic acid. Or he might remind them that the oil of *Cochlearia officinalis* had proved to be the mustard oil of the secondary butyl-alcohol. These results were decidedly of a nature to induce chemists to take up again the study of substances produced under the influence of plant-life. There was, indeed, an unmistakable tendency in that direction, and thus it would be seen, that chemistry, which owed its very origin to pharmacy, was now, after having almost forgotten this early association, returning in a measure to the source and fountain-head, accepting as it did most gratefully the endless variety of subjects, which the researches in pharmacy and the natural sciences allied with it, were daily presenting for inquiry.

Ergot and its Liquid Extract.

A paper on this subject was read by Mr. A. W. Gerrard. It is printed at p. 805, and gave rise to the following discussion:—

Mr. Hampson said that he had used a similar process to that described by the reader of the paper; namely, the use of cold water without the previous use of ether, and the product was very satisfactory.

Mr. Linford said that many years ago he made a cold water extract of ergot upon the same principles as had been stated that night; but with regard to the quantity of alcohol used, he had a perfect recollection that 25 per cent. of alcohol in the solution did not prevent so much fermentation in the preparation as to make it rather strongly acid in a few months. These experiments were conducted for Mr. Bullock with whom he (Mr. Linford) was living at that time—more than twenty years ago. It was a very great advantage when they made a cold water extract of ergot and had evaporated it, to add the alcohol before the extract was cold, because the albumen was separated much more easily, and the extract was easily filtered through paper while still warm. If the evaporated solution was allowed to become cold before the alcohol was added it was almost impossible to filter it through paper.

The President announced that the present meeting was the last of the session. He hoped that gentlemen would devote the recess to investigation and the preparation of papers for the next session. He again expressed the thanks of the society to Dr. Hofmann for his kindness in coming to the meeting that evening.

EXAMINATIONS IN EDINBURGH.

March 30th and 31st, 1875.

Present: Messrs. Ainslie, Buchanan, Gilmour, Kemp, Kinninmont, Noble, Tait, and Young.

MAJOR EXAMINATION.

Two candidates were examined. *One* failed. The following passed and was declared qualified to be registered as a Pharmaceutical Chemist:

Tocher, John........................Aberdeen.

MINOR EXAMINATION.

Eighteen candidates were examined. *Seven* failed.

The following *eleven* passed and were declared qualified to be registered as Chemists and Druggists:—

Sawyer, Henry......................Carlisle.
Equal. { Chadwick, George Nicholas ...Dewsbury.
Equal. { Walton, Edward Bridges.........London.
Kellett, Richard Edward.........Wigan.
Allan, Alexander ....Aberdeen.
Equal. { Joures, Robert ....Edinburgh.
Equal. { Lett, Arthur Joseph ....Manchester.
Williams, William ....London.
Panton, William Alexander ...London.
Peacock, John Rutherford ......Glasgow.
Edward, John Hutchison ......Edinburgh.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

One candidate was examined, but failed to pass.

EXAMINATION IN LONDON.

April 2nd, 1875.

Present: Messrs. Allchin, Barnes, Bottle, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Taylor, and Umney.

MODIFIED EXAMINATION.

Twenty-six candidates were examined. *Twelve* failed. The following *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Boutall, George Squire...........Ramsgate.
Bunker, James ....Easton, Portland.
Hall, Frederic John ....Leamington.
Haywood, Charles.................Liverpool.
Jones, David........................Uphill.
Knight, John Edward............London.
Manthorp, Frederick William...Colchester.
Nix, John Beard ....Billericay.
Pape, Tom..........................York.
Pill, Edwin ....Helston.
Smith, John Sykes ....London.
Smith, Robert George ....Liverpool.
Wearing, John ....St. Just.
Webster, Thomas..................Beaumaris.

PRELIMINARY EXAMINATION.

The undermentioned was received in lieu of the Society's Examination:—

Certificate of the University of Cambridge.

Foggitt, Thomas Jackson ......Thirsk.

MEETING OF THE NORTH BRITISH BRANCH.

The fifth meeting of the present session was held in the Society's Rooms, 119, George Street, on Friday evening, 26th ult., at half past eight o'clock. Mr. W. Gilmour, President, in the chair. Before the business of the evening commenced the President made allusion to the loss which the cause of pharmacy generally, and the Pharmaceutical Society in particular, had sustained by the sudden and unexpected death of Mr. Daniel Hanbury.

Mr. Blanshard laid on the table a sample of Rangoon wood oil, fifteen casks of which had been offered to his firm for the purpose of making balsam of copaiba. Of course, not being manufacturers of such an article, the offer was politely declined. In all its characteristics it appeared to be an impure Gurjun oil. The sample was presented to the Museum.

A paper entitled "Notes on Aloes, with Special Reference to the Action of Changed Aloin and Resin of Aloes," was read by William Craig, M.D., F.R.S.E., and Lecturer on Materia Medica.

Before proceeding to deliver the lecture Dr. Craig asked permission to address a few words to pharmaceutical students regarding the order of their academic studies. He said the great aim of the student was not merely to get good from the class he attends, but to get the greatest possible amount of good from that class. This can only be obtained by attending the classes in a certain rotation. There were three classes which the Pharmaceutical Society recommend their students to attend—botany, chemistry, and materia medica. It would be well for pharmaceutical students to be conversant with all of these subjects, and they ought to be studied in the order stated above. It is not desirable that any two of these classes should be taken simultaneously, and they may all be attended separately in the space of fifteen months. Botany naturally came first, a class that was only taught in summer; and he might say that the students in Edinburgh have opportunities of acquiring a knowledge of botany superior to those possessed by any other students in the kingdom. He would also call the attention of the students to a prize which is given for the best herbarium, as a prize which ought to be gained by a student of the *North* British Branch of the Pharmaceutical Society. He believed he was correct in stating that no teacher of botany in the kingdom had done so much for practical botany as Professor Balfour. A keen enthusiast in his favourite science, he had succeeded in infusing enthusiasm into many of his pupils, and by his weekly excursions into the surrounding country he afforded the means of collecting a fine herbarium. Within a radius of 20 miles around Edinburgh, upwards of 1000 species of phanerogamous plants and ferns may be collected, and were collected a few years ago by Dr. Isaac B. Balfour. Having attended botany in the summer, the student should attend chemistry the following winter. Materia medica should be taken in the summer after chemistry. It is this class more than any other which united the members of the medical profession to members of the Pharmaceutical Society. As he had the honour last summer of lecturing on materia medica to several students of pharmacy, he thought it his duty to take this opportunity of advising the students regarding the order of their academic studies, and he was confident that if they adopted the order which he had indicated, they would find that it had not been accepted without considerable advantage.

Dr. Craig's paper was illustrated by numerous tables, coloured drawings, and diagrams, and he had also on the table a specimen of Socotra Aloe plant, sections of the leaves of which showed abundant exudation of the juice.

After some remarks on the watery extract of aloes by Mr. Ainslie and others, a vote of thanks was very cordially awarded to Dr. Craig for his interesting paper.

Dr. Craig's paper will be printed in an early number.

Mr. John Mackay then read a paper on the Solid and Liquid Japanese Oil of Peppermint. We are compelled by want of space to defer the printing of this paper also.

The specimens submitted to the meeting were handed to the Museum.

Mr. Blanshard moved a vote of thanks to Mr. Mackay, which was carried unanimously.

Parliamentary and Law Proceedings.

Pharmacy Bill for Ireland.

The following is the draft of a Bill proposed by the Chemists and Druggists' Society of Ireland, to institute a Pharmaceutical Society in Ireland, and to regulate the Sale of Poisons.

Whereas a great deficiency exists throughout Ireland of establishments and shops for the sale of medicines and compounding of prescriptions, and great inconveniences thereby arise to the public in many parts of the country, it is expedient that a Pharmaceutical Society should be instituted for Ireland, and that the licentiates of said society, registered under this Bill, may keep open shop for the dispensing and compounding of prescriptions of duly qualified medical practitioners; also that a register should be kept of chemists and druggists who sell poisons.

And whereas, it is expedient and necessary that such persons should possess a competent practical knowledge of their business, and to that end, that from and after the day herein named, all persons should, before commencing such business, be duly examined as to their qualifications and practical knowledge, and that registers should be kept, as herein provided.

Be it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the lords spiritual and temporal, and commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1. From and after   One thousand eight hundred and seventy-   , it shall be unlawful for any person, other than a duly qualified pharmaceutical chemist or licentiate of the Apothecaries' Hall, to keep open shop for dispensing or compounding medical prescriptions in Ireland, and registered under this Bill.

2. Pharmaceutical chemists within the meaning of this Bill shall consist of all persons who shall be duly examined and licensed in pharmacy, and registered as pharmaceutical chemists or pharmacists under the provisions of this Bill.

3. Chemists and druggists within the meaning of this Bill, shall consist of persons who have kept open shop for the sale of drugs and poisons before the passing of this Bill, and of those who shall be duly registered under this Bill as hereinafter specified.

4. It is hereby enacted that a Pharmaceutical Society shall be instituted, to be called the "Pharmaceutical Society of Ireland;" and authority is hereby given for the formation of such society; and in order to the formation of same, in the first place, twenty-four fit and proper persons be and are hereby named to form the first council (one-third of whom retire by rotation each year, but may be eligible for re-election), with power to make certain by-laws and appoint examiners, and lay down a scheme of examinations, subject to the approval of the Lord Lieutenant, it shall be lawful for every person who has been duly licensed and registered as a pharmaceutical chemist by this Bill, and also for every duly qualified apothecary, upon payment of an annual subscription of one guinea each to the treasurer appointed under this Bill, to become a member of said society, and to have a voice and vote in all general meetings of the society; and the Council of the Pharmaceutical Society are hereby authorized and required, within one year after the passing of this Bill, to convene a meeting of all members of the society, to be held in Dublin, at such place as may be agreed on, by written or printed summonses, to be issued ten days previous to the day agreed upon for holding such meeting; and it shall be lawful for the members in assembly at such meetings to appoint a president, vice-president, council, and secretary, for conducting the business of the society; and like meetings of the society shall be holden annually. And it shall be lawful for said council to arrange at any time with the Council of the Pharmaceutical Society of Great Britain for a reciprocity of privileges and practice between the legally registered pharmaceutical chemists, and chemists and druggists, respectively, throughout the United Kingdom.

The following are the persons named to form the first Council:—Sir Dominick Corrigan, Bart.; Dr. Rawdon MacNamara; Dr. Aquilla Smith; Dr. William Frazer; Dr. Charles H. Leet, L.A.; Thomas Collins, L.A.; Henry N. Draper, C. and D.; Charles R. C. Tichborne, Professor of Chemistry; Edward M. Hodgson, C. and D., President; William Hayes, C. and D., Secretary; John Goodwin, C. and D., Treasurer; William Allen, C. and D.; J. T. Holmes, C. and D.; Stanley Oldham, C. and D.; Robert Simpson, C. and D.; Charles Johnston, C. and D.; Patrick Bermingham, C. and D., Dublin; Thomas R. Lester, C. and D., Cork; John Laird, C. and D., Limerick; Henry Bell, C. and D., Waterford; A. E. Doran, C. and D., Bray; Thomas G. Peel, C. and D., Armagh; W. R. Hamilton, C. and D., Newry; Samuel J. Conolly, C. and D., Athy.

5. All such persons as shall have been so appointed to conduct examinations under this Bill shall be, and the same are hereby declared to be, fit and proper persons to conduct all such examinations as are provided for or contemplated by this Bill, and shall respectively have full power and authority, and are hereby authorized and required to examine all persons who shall present themselves for examination under the provisions of this Bill in their knowledge of the Latin and English languages, in arithmetic, in botany, materia medica, in pharmaceutical and general chemistry, in practical pharmacy, in the British Pharmacopœia, and such other subjects, as may from time to time be determined by any by-law of the General Council of the Pharmaceutical Society of Ireland. Provided always that such examinations shall not include the theory and practice of medicine, surgery, or midwifery, or any branch of medicine or surgery; provided,

nevertheless, that in case of rejection, a rejected candidate may present himself for re-examination after six months.

6. The Council of the Pharmaceutical Society of Ireland shall have power to appoint and dismiss at any time a registrar, and such clerks and other officers as may be requisite for carrying out the purposes of this Bill, and also to pay suitable salaries to the said registrar, treasurer, clerks, and officers.

7. For every examination and registration, and for every certificate of same, such reasonable fees or charges shall be paid as shall from time to time be fixed and determined by any by-law to be made by the Council of the Pharmaceutical Society, provided always, such fees or charges shall at no time exceed the fees laid down respectively in each case in Schedule (A) to this Bill annexed, and such fees shall be paid to the treasurer, and shall by him be applied as the said Council of the Pharmaceutical Society shall direct in furtherance of the provisions of this Bill.

8. The registrar to be appointed under or by virtue of this Bill shall from time to time make out and maintain a complete register of all persons certified as pharmaceutical chemists by the examiners appointed under this Bill, also a separate register of all persons certified in like manner as chemists and drugists, and also as apprentices, students, or assistants, respectively, and shall keep a proper index of the registers, and such other registers and books as may be necessary for giving effect to the by-laws which shall from time to time be made in conformity with the provisions of this Bill. But no name shall be entered in the register, except of persons authorized by this Bill to be registered, nor unless the registrar be satisfied by the proper evidence that the person claiming is entitled to be registered; and any appeal from the decision of the registrar may be decided by the Council of the Pharmaceutical Society; and any entry which shall be proved to the satisfaction of such Council to have been fraudulently or incorrectly made, may be erased from, or amended in, the register, by order in writing of such Council.

9. It shall be the further duty of the registrar to make and keep correct registers, in accordance with the provisions of this Bill, of all persons who shall be entitled to be registered under this Bill, and to erase the names of all registered persons who shall have died, and from time to time to make the necessary alterations in the addresses of the persons registered under this Bill. To enable the registrar duly to fulfil the duties imposed upon him, it shall be lawful for the registrar to write a letter to any registered person, addressed to him according to his address on the register, to inquire whether he has ceased to carry on business, or has changed his residence, such letter to be forwarded by post as a registered letter, according to the Post Office regulations for the time being; and if no answer shall be returned to such letter within six months from the sending of the letter, a second of similar purport shall be sent in like manner, and if no answer be given thereto within three months from date thereof, it shall be lawful to erase the name of such person from the register, provided always, that the same may be restored by direction of the Council of the Pharmaceutical Society, should they think fit to make an order to that effect.

10. The registrar shall, in the month of January, in every year, cause to be printed, published, and sold a correct register of the names of all pharmaceutical chemists, and a correct register of all persons registered as students, apprentices, and assistants, also a correct register of all persons registered as chemists and druggists, and in such registers respectively, the names shall be in alphabetical order, according to the surnames, with the respective residences, in the form set forth in Schedule (B) to this Bill, and such printed registers shall be called "The Registers of Pharmaceutical Chemists, and of Pharmaceutical Students, Apprentices, and Assistants, and of Chemists and Druggists for Ireland," and a printed copy of such registers for the time being, purporting to be so printed and published, as aforesaid, or any certificate under the hand of the said registrar, and countersigned by the President or two members of the Pharmaceutical Society, shall be evidence in all courts, and before all justices of the peace, and others, that the persons therein specified are registered according to the provisions of this Bill, and the absence of the name of any person from such printed register shall be evidence, until the contrary shall be made to appear, that such person is not to be registered according to the provisions of this Bill.

11. Any registrar who shall wilfully make, or cause to be made, any falsification in any matter relating to the said registers, and any person who shall wilfully procure, or attempt to procure, himself to be registered under this Bill, by making or producing, or causing to be made or produced, any false or fraudulent representation or declaration, either verbally or in writing, and any person aiding or assisting him therein, shall be deemed guilty of a misdemeanor, punishable by fine or imprisonment, and shall, on conviction thereof, be sentenced to be fined or imprisoned for any term not exceeding twelve months, and not exceeding 20*l*.

12. Every registrar of deaths in Ireland, on receiving notice of the death of any pharmaceutical chemist, or pharmaceutical student, apprentice, or assistant, or of any chemist and druggist, shall forthwith transmit by post to the registrar under this Bill a certificate, under his own hand, of such death, with the particulars of the time and place of death; and on receipt of such certificate, the said registrar under this Bill shall erase the name of such deceased pharmaceutical chemist, or student, apprentice, or assistant, or chemist and druggist, as the case may be, from the register, and shall transmit to the said registrar of deaths the cost of such certificate and transmission, and may charge the cost thereof as an expense of his office.

13. From and after the
one thousand eight hundred and seventy- , any person who not being a duly registered chemist and druggist, or pharmaceutical chemist, shall keep an open shop or wareroom for the retailing or dispensing of poisons, as set forth in the Poisons Act of 1870, "to regulate the sale of poisons in Ireland," or which may be hereafter added according to the provisions of said Act, provided that the exceptions therein specified, with respect to the duly qualified apothecary, shall also apply to the pharmaceutical chemist registered under this Bill; or any person who, not being a duly registered pharmaceutical chemist, shall keep an open shop or wareroom for the dispensing or compounding medical prescriptions, or who shall take, use, or exhibit the name or title of pharmaceutical chemist, or pharmaceutist, or pharmacist, or dispensing chemist, or chemist and druggist in Ireland, or make use of any sign or title, implying that he is registered as a pharmaceutical chemist, or as a chemist and druggist under this Bill, or who shall compound or dispense any prescription of any duly qualified medical practitioner containing any medicines of the British Pharmacopœia, except according to the formularies of the said Pharmacopœia, each and every person so offending shall for every such offence be liable, on summary conviction before one or more justices of the peace, to pay a penalty not exceeding ten pounds, and when recovered, such penalties shall be applied to the purposes of this Bill; but nothing in this Bill contained shall extend to, or interfere with, the business of any legally qualified apothecary, or the lawful business of any veterinary surgeon.

14. Upon the decease of any pharmaceutical chemist or chemist and druggist actually in business at the time of his death, it shall be lawful for any executor, administrator, or trustee of the estate of such pharmaceutical chemist, or chemist and druggist, to continue such business, provided such business shall be *bonâ fide* conducted by a pharmaceutical chemist, or chemist and druggist, as the case may be, registered under this Bill.

15. It shall, nevertheless, be lawful, anything to the contrary notwithstanding, for the examiners appointed under this Bill to admit to examination any chemist and druggist being twenty-one years of age, who shall have been continuously at the business as such in Ireland for a term of five years immediately preceding the passing of this Bill, and who shall, within twelve months after it has passed into law, make application in writing for examination to the registrar under this Bill, accompanied with a certificate according to Schedule (C) to this Bill; and every such chemist and druggist who shall have satisfied the examiners as to his knowledge, skill, and competency to carry on and conduct the business of a pharmaceutical chemist or pharmacist, shall receive the certificate of pharmacy from the said examiners, and shall be entitled to be placed on the register of pharmaceutical chemists of Ireland; and the persons so certified shall pay the same fees as other pharmaceutical chemists under this Bill; provided always that in case of rejection the rejected candidate may be re-examined after six months.

16. Any person who has been at business as a chemist and druggist in Ireland before the passing of this Bill shall be entitled to be registered in the list of chemists and druggists of Ireland under this Bill, on producing a certificate according to Schedule (C) of this Bill; but any person who has not been so engaged before the passing of this Bill, shall produce a certificate of being twenty-one years of age, and shall pass a modified examination to be determined on by the Council of the Pharmaceutical Society, in order to entitle him to have his name inserted in the registered list of chemists and druggists of Ireland, for the purposes of this Bill; but registration in this list shall in nowise qualify or empower to compound medical prescriptions.

17. At all general meetings of the Society, it shall be lawful for the Society to make all such by-laws and rules for the advancement of pharmacy and for the good government of the Society as the members present shall in their wisdom, and by a majority of votes, determine, provided always, that said by-laws and rules shall be consonant with, and not contrary to, any of the provisions of this Bill, subject to the approval of the Lord Lieutenant.

18. It is hereby enacted that the exemption of pharmaceutical chemists from service on all juries and inquests, under the Juries Act, 1862, be applicable to the pharmaceutical chemist duly registered under this Bill.

19. This Act may be cited as the Pharmacy Act, Ireland, 187 .

SCHEDULE A.

Scale of Fees for Certificates.

Chemists and Druggists	1 guinea.
Apprentices and Students	2 guineas.
Assistants	3 guineas.
Pharmaceutical Chemists	5 guineas.
The Fee for Registration	5 shillings.

SCHEDULE B.

Name.	Residence.	Date of Registration.
A. B.	Grafton Street, Dublin.	January 10th, 187 .
C. D.	Patrick Street, Cork.	March 4th, 187 .
E. F.	Corn Market, Belfast.	June 15th, 187 .

SCHEDULE C.

Certificate to be signed by a *duly qualified Medical Practitioner* or *Magistrate* respecting a person who was at the business for five years as a Chemist and Druggist, in Ireland, prior to the passing of the Pharmacy Act, Ireland, or was in business as such at the date of the passing of said Act, as the case may require.

To the Registrar appointed under the Pharmacy Act, Ireland, 187 .

I, residing at in the county of hereby certify that I am a duly qualified Medical Practitioner (or Magistrate), and that to my knowledge , residing at , the county of , has been engaged in the business of Chemist and Druggist (for five years continuously) prior to the passing of the Pharmacy Act, Ireland, or at date of the passing of the said Act.

(Signed)

This day of 187

EXAMINATION PAPERS.

At Bow Street Police Court, on Monday, April 5, Samuel Cowap, aged 21, described as a chemist's assistant, residing at 42, Castle Street East, Oxford Street, was charged before Mr. Flowers with inciting one George Austin to steal an examination paper of the Pharmaceutical Society from his employers, Messrs. Stevens and Richardson, printers, of 5, Great Queen Street, Lincoln's Inn Fields. Mr. Douglas Straight, instructed by Messrs. Flux and Co., solicitors to the Pharmaceutical Society, appeared for the prosecution.

In opening the case Mr. Douglas Straight said that the charge against the prisoner was one of inciting Mr. George Austin, who is in the employ of Messrs. Stevens and Richardson, to steal a copy of the examination paper which had been prepared for the Preliminary examination of the Pharmaceutical Society that was to take place that day. As his worship was perhaps aware, all persons who wish to be employed in making up prescriptions are now wisely required to pass certain examinations to prove their efficiency, and it was to obtain a paper of the questions that would be put in the Preliminary examination that the prisoner, acting possibly under the instructions of some third party, committed the offence with which he is charged. In the year 1871 a similar case was brought to that court by the Apothecaries' Company, and sent for trial, the prisoner in that case being afterwards convicted and sentenced to twelve months' imprisonment with hard labour. In the present case, on Thursday last, Mr. Austin, in the employment of Messrs. Stevens and Richardson, who print the examination papers for the Pharmaceutical Society, received a message that a person wished to see him. What took place at that interview Mr. Austin would be called to prove in detail, but what it amounted to was this. The prisoner said: I have a fellow reading with me. He is very backward. I must pass him, and if you can let me have a copy of the paper I will give you half a sovereign. Mr. Austin thought it was very desirable to bring this style of person—who could perhaps place the same temptation in the way of others less able to resist it than himself—to justice, and, therefore, he arranged to take a copy of the examination paper required to some spot, on Saturday, where it could be handed over to the prisoner. This, Mr. Straight said, was his case, and he did not very well see, if these facts were proven, what answer there could be to the charge. Mr. Straight then called

Mr. George Austin, who said: I am employed by Messrs. Stevens and Richardson, of Great Queen Street. They are the printers for the Pharmaceutical Society, and among other things they print the *Pharmaceutical Journal*. They also print the examination papers for the Society. When these papers are printed they are in the custody of Mr. Richardson, one of the partners. To obtain a copy I should have to break open a lock. On Thursday last I was engaged on the *Pharmaceutical Journal*. It was between eight and nine, I think, in the evening. A lad, named Bladon, came up to me and made a communication, in consequence of which I went downstairs. There was no one at the door, but the prisoner was standing opposite under a public-house lamp. On seeing me he crossed over and spoke to me. He asked if I was engaged on the *Pharmaceutical Journal.* I said I was. He then said: Do your employers print the examination papers? I said: Yes. He asked: Can you let me have one? I said: No, I can't. Not knowing what to do, I said: They have not gone to press. He then told me that he was not a spy; that he had not come to spy out, or words to that effect. It had struck me that he was sent by the Pharmaceutical Society to see if I was trustworthy. The prisoner continued: Well, to tell the truth, I will give you half a sovereign if you can get me one of those examination papers. I have a young friend reading with me who is very deficient and can't pass this examination unless I can get one of these papers. I then said to him: Well, you know the risk I run in this matter (I had then made up my mind to let my employers know all that took place). He said: I do, but you can trust me. If you are true to me you will have nothing to fear from me, or words to that effect. I then asked him whether he could make an appointment. I asked if Saturday would do. He assented, and then the spot was fixed, whether by him or by me I don't remember. It was at the corner of the Tottenham Court Road where the omnibuses stop. I don't know which corner. This being settled the prisoner asked me to have a glass, but I refused. We then parted. I then returned to my employment. On the following morning I saw my employer, Mr. Richardson, at eight o'clock, who sent me with a letter to Mr. Richard Bremridge, assistant secretary to the Pharmaceutical Society. I received some instructions from Mr. Bremridge. On the Saturday at one o'clock I again saw Mr. Bremridge, and with him Sergeant Butcher. At four o'clock on this Saturday afternoon, that is the 3rd of April, I went to the corner of Tottenham Court Road, with the examination paper (produced in court). I met the prisoner who said: Are you alone? I said: Yes, but are you alone? for you know the risk I run. He said: Oh, you have nothing to fear. We then went into a public-house where I said to him: Is this for yourself? He said: It is. I asked him: Why did you tell me it was for some one else? He did not answer that but said: I am very well up, but am not confident of passing without the papers, or something to that effect. He made me understand that without those papers he could not pass. He said that the greatest difficulty was in the translation of Cæsar. I said to him: You are not selling me? and he again replied: No; you have nothing to fear. I then asked him whether he could bring me other business, and he then said: I know other students who would be glad to deal with you, but not for this examination. The examination, for which the paper I had given him, was to take place to-day (Monday). I opened the paper and said: That's what you want. Is it not? He said: That's it. He then handed me the half sovereign and I gave him the paper. Detective Butcher, who was at hand, immediately took him into custody.

Mr. Straight said that upon this evidence he should ask for a remand, as it was of great importance to find out, if possible, whether the prisoner had simply obtained the paper for himself, or whether he had acted under the instructions of some other person.

Mr. Flowers remanded the case till to-day (Saturday) at two o'clock.

The prisoner was admitted to bail; himself in £40, and two sureties in £20, or one in £40.

Fatal Explosion whilst Preparing Oxygen Gas.

An inquest on the body of Mr. James S. Marsden, whose death had been occasioned by an explosion which took place in his residence, Tritonville Road, on the 18th March last, was resumed in the schoolhouse, Irishtown, by Dr. Davys, on Saturday, April 3rd.

Mr. J. Rynd, instructed by Mr. J. C. Rynd, appeared for the next of kin of the deceased.

Dr. Boyd, instructed by Mr. George Belas, appeared on behalf of the Apothecaries' Hall of Ireland.

The Coroner, addressing the jury, told them that since they met last Mrs. Marsden, the widow of the deceased, had sufficiently recovered from the injuries which she had sustained by the explosion to be able to attend and give evidence. He wished to ask whether it was admitted by the Apothecaries' Hall that the material from which Mr. Marsden attempted to make gas was procured there.

Dr. Boyd: Most certainly not. The Apothecaries' Hall was served with a notice to attend here, and in deference to that I appear.

Mrs. Maria Anne Marsden, the widow of the deceased, was then sworn. Her hands were bound up in linen. She deposed as follows: Mr. James Marsden was in perfect bodily and mental health on Thursday, the 18th of March; we had our tea early, and then he proceeded to prepare the gas for a magic lantern exhibition in the kitchen; he opened two packages and ground some black and white materials together with a bottle, and then put a small portion of the mixture into a retort; the retort, I think, was made of iron; I was about to remark that the fire was bad, when the explosion took place; the retort had only been a second on the fire; we were both rendered insensible by the effects of the explosion; my husband was aged forty, and was the principal support of our family.

By Mr. Rynd: He was assistant messenger in the Bankruptcy Court.

Miss Charlotte Elizabeth Creighton examined: I live at No. 2, Tritonville Road, the house opposite Mr. Marsden's; I was in his kitchen on the evening of the occurrence; when I came over I found him preparing to make the gas; he took the ingredients out of white papers which he threw into a corner of the grate.

By Mr. Rynd: On one of the packages the words "oxide of manganese" were badly written (paper produced); I positively swear that this is the paper of the package to which I refer.

To the Coroner: The explosion was just like the sound of a cannon, such as is heard when there is artillery practice.

Mr. Edward Clegg examined: I am an apprentice of Simpson and Co., Henry Street; I have been there over two years; I gave a parcel to my brother in our house on the 17th March last; I believe it to contain black oxide of manganese and chlorate of potash—three pounds of the latter and a pound and a half of the former—in separate parcels; I had obtained them at the Apothecaries' Hall myself; Mr. Marsden had asked me to get them there; I did not actually see either of the substances; they were supplied to me there by Mr. Jesson, who, I believe, is a qualified person; the names of the substances were written on each parcel (the witness identified the paper previously produced as that which contained the manganese); the parcels never left my possession until I gave them to my brother; I brought the names of the substances written on a slip of paper to the Apothecaries' Hall, and gave it to Mr. Jesson, saying I was going to dinner, and would call back for the parcels, which I did.

To a Juror: Mr. Marsden himself came to me at Simpson's and asked me to buy the ingredients at the Apothecaries' Hall, as I would get them cheaper there than elsewhere; I wrote down the names immediately; I made no mistake.

To the Coroner: I had not to undergo any examination before I was apprenticed.

Mr. John Robinson examined: I reside at 39, Lower Sackville Street; I am a photographer and certified chemist. I knew Mr. Marsden; he was accustomed to the making of oxygen gas, both professionally and as an amateur, and I considered him competent and intelligent. On the Saturday after the explosion I went to Mr. Marsden's kitchen, having been asked by the family to examine it. I found plenty of the material which was intended to go into the retort, and other material which resulted from the explosion. I believe what caused the explosion to have been the substitution of black antimony for manganese.

A Juror: Did any portion of the mixture remain in the room?

Witness: No; the explosion would have consumed all. [The paper already identified was submitted to the witness.] I consider the discoloration on this paper to have been caused by black antimony.

Mr. George Porte, head master of the Erasmus Smith's school, at No. 43, Great Brunswick Street, deposed: The deceased was my assistant for a great number of years; he was also in the habit, during thirteen years, of making oxygen gas for me, and I considered him perfectly competent to do so. The discoloration on the paper produced is decidedly that of black antimony; the result of the fusion of manganese and the chlorate of potash is a black residuum, while the material left after the explosion of antimony and chlorate of potash would be white. I don't believe it possible that so much of the mixture in question as has been stated (4½ lbs.) could have been put into the crucible, because the latter—which I gave to Mr. Marsden—would not have held it, and also, because if such a quantity had been exploded, there would not have been two stones of the house left together.

Surgeon J. P. Doyle, M.D., of Irishtown, deposed that immediately after the occurrence Mr. Marsden was brought to his house which was not far off. He was able to walk there, but died shortly afterwards from blood-poisoning.

The jury, after a very brief deliberation, found the following verdict:—"That the deceased, James Marsden, aged 40 years, came by his death on the 20th of March, in consequence of injuries accidentally received on the 18th of March from manufacturing oxygen gas, and that the explosion was caused by sulphuret of antimony having been supplied from the Apothecaries' Hall in mistake for manganese.——*Freeman's Journal.*

The Sale of Vermin Killers.—Attempted Suicide.

was charged before Mr. Moreton with having attempted
At Wolverhampton, on Monday last, Samuel Harvey,
to commit suicide.

Police-sergeant Evans said he was called into the prisoner's house on Saturday night, when he found the prisoner vomiting. He fetched Mr. Love, the police surgeon.

Stephen Sibthorpe, assistant to Messrs. Reade, chemists and druggists, Victoria Street, said the prisoner came to Messrs. Reade's shop on Saturday, and purchased a packet of Battle's vermin powder. He knew the face of the prisoner, who said he had frequently purchased the same powder for killing vermin. The defendant signed his name on being supplied, but gave no address. In reply to the Bench, witness said he was aware that the powder contained either strychnine or arsenic.

Mr. Barber said that it was not sufficient for a person to sign his name; he must also give his address, and if unknown to the chemist, he must be introduced by some one whom the chemist did know. This was provided by the last Pharmacy Act, which also set forth that all compounds containing poisonous ingredients mentioned in the schedule of the Act must be labelled "poison" on being sold.

The witness said he did not know positively that Battle's vermin powder contained strychnine. It was simply a supposition.

Mr. Barber: But strychnine is one of the twenty things mentioned in the schedule of the Act.

Witness: But the packet does not say it is strychnine.

Mr. Moreton: The meaning of the Act is so clear that if you repeat sales again like this you will get into trouble.

Witness: We shan't repeat it again.

Captain Segrave said he must ask for a summons against the witness for selling the powder without taking proper precautions.

Mr. Moreton: You had better leave that matter alone for the present.

Mr. J. H. Love said he was called to see the prisoner on Saturday evening. He was vomiting, and was also in a profuse perspiration, and complained of great pains. Witness considered that he had taken something containing strychnine, as he was suffering from tetanic spasms. Battle's vermin powder contained strychnine. The mixture varied from one to three grains of strychnine, of which half a grain would be sufficient to kill a person.

The prisoner's wife, on being called, stated that her husband had been drinking heavily of late, through which he had lost his situation.

A fellow-workman of the prisoner was bound over for the prisoner's good behaviour for the next six months.—*Midland Counties Evening Express.*

The Sale of Methylated Spirit.

On Thursday, at the Southwark Police Court, Mr. Charles Downs, surgeon, 13, White Street, Borough, was summoned by the Excise for selling methylated spirits without a licence.—Thomas Winslow, an officer of the Excise, said that on the 5th of February he went to the defendant's surgery and asked for half a pint of methylated spirits. The assistant served him and took the money.—The Defendant said that his was an open surgery, and he only kept a small quantity for use. He never sold any at any time. When the Excise officer came for the spirit his assistant, who had only been three weeks in his service, let him have all he had, which was very little beyond a quartern, as he was not aware of the law.—A long discussion took place as to the liability of Mr. Downs for the act of his assistant, and Mr. Powell cited several cases from the Law Reports to support the complaint, and added that if otherwise they would have great difficulty in enforcing the revenue laws.—Mr. Benson said it had not been shown to his satisfaction that defendant knowingly sold the spirit, therefore he dismissed the summons.

Messrs. Hardy and Simpson, chemists, Great Dover Street, Borough, were summoned for a like offence.—Thomas Winslow said that on the same day Mr. Hardy served him with half a pint of methylated spirits. He was not licensed to sell it.—The Defendants having pleaded guilty, Mr. Benson fined them in the mitigated penalty of £12 10s.

Ignoramus.—The ordinary tests for strychnia as described in works on chemistry; for instance, Attfield's 'Manual.'

"*Nitrogen*" and "*A Chemist and Druggist*" are referred to the rule respecting anonymous communications.

S. Tabor.—Your letter and enclosure have been handed to the advertisement agents, Messrs. Churchill.

"*Juvenis.*"—You will find instructions for the drying and preserving of plants in the *Pharmaceutical Journal,* for March 21, 1874, p. 754.

W. J. B. will find recipes for "Brilliantine," in vol. i. of the present series of this Journal, p. 437.

C. Lowe and Co.—The receipt of your letter was acknowledged in the Journal for March 20.

R. E. J.—By referring to the report in this number of the Journal, you will perceive that your letter has been written under some misapprehension as to the facts of the case.

In consequence of the length to which the official reports extend we are compelled to postpone the publication of several communications.

Communications, Letters, etc., have been received from Dr. Craig, Professor Flückiger, Messrs. J. Abraham, A. W. Shakespeare, Holmes, W. Gunn, E. de T. Collins, J. J. Jenkins, "Palt," "Vinegar," W. B. C., W. W. W.

SOLID AND LIQUID JAPANESE OIL OF PEPPERMINT.*

BY JOHN MACKAY.

Early in the present session some remarks were made at one of the evening meetings in London by Mr. Moss, F.C.S., on Japanese oil of peppermint.

The subject appeared to me to be of considerable interest, and I made efforts to obtain specimens of both liquid and solid oils. These are now on the table, and have been kindly supplied by the same parties (Cyriax and Farries) who gave them to Mr. Moss. As I am permitted to dispose of them in any way I think fit, it gives me much pleasure to hand them over to our museum.

Let me now place before you the principal facts known about these oils—chiefly derived from the paper already referred to and other sources.

1. The oils appear to have come over from Japan in cylindrical tin canisters, and up to the present time the quantities received in this country have not been intended for sale, being small, and sent more for curiosity and for specimens.

2. The solid portion, though called crystallized oil of peppermint, appears to be simply a deposit from the original liquid oil, probably at a low temperature.

3. About thirteen years ago a memoir on crystallized oil of peppermint was presented to the London Chemical Society by Oppenheim. This chemist speaks of the article as coming over here in considerable quantity, adulterated to the extent of 10 or 20 per cent. with sulphate of magnesium. In this statement, however, there seems to be some error, because after many inquiries, no traces can be found of this article being known as an article of commerce, while it was equally unknown to chemists. In regard to adulteration there is no resemblance between the two substances,—I mean the one referred to by Oppenheim and that now under notice—because though the crystals do resemble in appearance the so-called adulterating substance, there is not the slightest trace of its presence, a chemical examination indicating, that the deposition is as pure as the oil from which it has been thrown down.

4. Dr. Attfield refers to peppermint camphor under the name of menthene, believing it to be the hydrocarbon found more or less in nearly all varieties of peppermint oil.

5. From the numerous experiments which have been made, such as the fusing and boiling point, solubility (though very sparing) in water, ether, alcohol, bisulphide of carbon, fatty and essential oils, etc., it appears that the substance now shown is in all respects identical with that submitted by Oppenheim in 1862 to the Chemical Society, but free from any adulterating ingredient.

6. Dumas, as well as Oppenheim, appears to have operated on peppermint camphor. The result of his examination corresponded with that of Oppenheim and Attfield. Dumas used the crystals obtained from some variety of American oil, and found the formula to be $C_{10}H_{20}O$, precisely the composition given by the other chemists, and further confirmed by Mr. Hanbury in his 'Pharmacographia.'

So much for the solid oil and its known history. Before remarking further on its solubility, or comparing it with the liquid, let me notice the use to which a similar, if not the identical preparation has been, and is, I understand, still put to in some foreign countries.

About five years ago, Dr. A. Wright communicated to the *Lancet* that when in China he became acquainted with the fact that the natives, when suffering from facial neuralgia, applied oil of peppermint to the seat of pain by means of a camel hair pencil, and with decided success.

In 1871, Mr. D. Hanbury stated in the *Pharmaceutical Journal* that oil of peppermint was distilled at Canton, though unacquainted with the plant used for its production.

Some months thereafter Professor Flückiger referred to a notice which had appeared in the *American Journal of Pharmacy* confirming the use by the Chinese of the oil in neuralgic cases, stating further, that the oil was much used for this purpose in San Francisco and elsewhere, the oil being put up in small ℥ss. bottles, and sold as "Chinese Medicine." For this small quantity one dollar was charged, and the label had printed on it "*Fook-chang-Yong*," with the name of the seller. Professor Flückiger believed the specimen he saw to be good American or English oil, although the dealers in San Francisco declared it to be imported direct from Canton, which of course it might have been. A few drops of this oil Professor Flückiger placed on a glass slide, and in a few hours it yielded crystals of camphor in all respects similar to those he had observed in the Japanese oil. So far, then, as we know, there is but little difference between these two foreign oils, Chinese and Japanese, although it is alleged that in California the former becomes solid in cold weather, while the American or English as a rule do not alter, although in some kinds of oil there may be separated, when subjected to cold, a portion of camphor. The following is what appears on this subject in the 'Pharmacographia' by Professor Flückiger and Mr. D. Hanbury:—

"When oil of peppermint is cooled to 4° C. it sometimes deposits colourless hexagonal crystals of peppermint camphor $C_{10}H_{18}+H_2O$, called also menthol. This camphor, the deposit of which in the oil we have not observed, boils at 210° C. and possesses the odour of the crude oil. The properties of menthol contained in oils of different origin is very variable. Pure crystallized menthol is sometimes found in commerce under the name of Chinese oil of peppermint."

There can, therefore, be very little doubt that menthol, a solid Chinese oil of peppermint, resembles in all its properties the solid portion of Japanese oil, obtained in all probability by submitting the oil to a low temperature, by which all the solid portion is obtained. Nor can it be doubted that chemically, this menthol closely resembles, nay is in all respects the same as the peppermint camphor obtained from our own or American oil, and that in fact, both may be named a monatomic alcohol, menthylic alcohol or hydrate of menthyl being as already stated represented by $C_{10}H_{18}+H_2O$.

In connection with the use of the oil of peppermint in neuralgic cases, I received the following note from Messrs. Frazer and Green, of Glasgow, which will tell its own tale. I may premise the note was written in consequence of receiving one of the circulars announcing that this paper was to be read.

* Read at a meeting of the North British Branch of the Pharmaceutical Society of Great Britain, March 26th, 1875.

113, Buchanan Street, Glasgow.
March 25th, 1875.

John Mackay, Esq.,

Dear Sir,—We had an order some weeks since for three bottles of medicine which we have now no doubt but that it is the Japanese liquid oil of peppermint. Our customer could give no name;—he gave us a small flat bottle with a label printed in Chinese looking characters, the bottle being enclosed in a small paper box. We tried London and could hear of nothing like it except at Messrs. Savory and Moore's, but theirs is the *solid* article. Our customer wishes the liquid. It is used for neuralgia—a drop being rubbed on the affected part. Our order is for three bottles. Can you help us in the matter?

Yours truly,
Frazer and Green.

The following are a few characteristics of the liquid Japanese oil:—

It is soluble in any quantity of ordinary spirit of wine, 56° O.P., and at ordinary temperatures.

The mixture I now submit contains one part of the oil in eight parts of rectified spirit. It dissolves very readily in any proportion and makes a clear solution, and that now shown will give some idea of its behaviour when employed for making the common essence. In comparison with this, I now place two others, one is made from good American, and the other from Mitcham oil of peppermint, and in exactly similar proportions. For strength, flavour, and aroma, the English is undoubtedly the best, then follows the Japanese, and lastly the American.

The liquid oil has the power of dissolving the solid or crystalline oil. With the aid of a gentle heat the proportions are one to four. Here is such a solution, and although no deposition of crystals has taken place in cooling, I have no doubt if submitted to cold, the crystals would be regained.

The solid oil is also capable of solution in ordinary spirit in the proportion of one to two, and without the aid of heat, simply by rubbing in a mortar. I submit such a solution, but it will not compare in point of flavour with the fluid oil. In order that they may be fairly tried I have added some spirit so as to make the strength one to eight as in the other solutions.

Of course one of the most important elements in connection with this subject is the cost of the oil as compared with others in the market. As I have already stated the small quantities as yet sent over are more for samples, and as something rare, than for sale. The firm already referred to have, however, written me that 70 lbs. weight of each kind are coming over soon, and they promise when this lot does arrive to give me notice stating the commercial value of solid and liquid. As their memorandum bears date of 13th March, we may expect ere long to know price and value.

I may further state, that in submitting the solid oil to heat it melts at a temperature of about 100° F. but on cooling it resolidifies. Of this you have a fair example in what I now show in the test tube.

Both the samples seem to me quite free from any adulteration whatever, and specially so from the turpentine smell, which many of the foreign oils of peppermint have. The solution of the solid oil, though pungent to the palate, is disagreeable and wanting in the aroma and flavour which all fine peppermint oil possesses in such a remarkable degree.

If moderate in price and supplied in sufficient quantities, I think it very likely that the liquid Japanese oil may come into demand for confectionery and other purposes, as the samples of liquid oil now submitted give fair promise of the Japanese becoming a competitor with any other English or American oil at present to be found in the market.

CHEMICAL EXAMINATION OF JABORANDI.*

(Pilocarpus pennatifolius ?)

BY M. BYASSON.

The author has been engaged in an investigation having for its object to determine the nature of the active principle of jaborandi, a portion of which drug had been intrusted to him by Dr. Coutinho, for the purpose. He reports the isolation of a small quantity of alkaloidal substance, which when injected into the veins of a dog caused an abundant flow of saliva.

The leaves under examination were first allowed to macerate in 90° alcohol, which treatment was continued during two months in consequence of the author's absence from home. The alcoholic liquor, which was of a green colour, was then separated from the leaves by filtration, and submitted to distillation. The addition of water to the distilled alcohol rendered it slightly turbid, indicating the presence of a little essential oil. A certain quantity of this oil was swallowed in suspension in the diluted alcohol without having any apparent effect. The taste was pungent and persistent. The residue from the distillation, allowed to stand, deposited a relatively considerable quantity of a green substance presenting all the characters of chlorophyll. After filtering, the liquid was of a reddish brown colour, had a slight aromatic odour, and after a time deposited a brown matter, which, taken up by alcohol and precipitated by water, presented all the characters of a resin; it was slightly acrid to the taste, and did not appear to have any medicinal action. A portion of the liquid was evaporated and milk of lime added, when the reddish-brown colour was immediately changed to a fine yellow.

Desiccation having been effected at a temperature not exceeding 60° C., the residue was exhausted with a great excess of chloroform. Distillation and evaporation of this liquid yielded a yellow brown glutinous, residue presenting no trace of crystallization and showing under the glass oleaginous particles. Treated with water acidulated with sulphuric acid it partly dissolved and formed a slightly brown acid and aromatic solution, which, when treated with ammonia in excess, threw down some glutinous flocks. Shaken with ether, and the ether evaporated, it yielded a viscous aromatic substance and some crystals of sulphate of ammonia.

This substance the author found to be soluble in absolute alcohol. It was precipitated by the general reagents for alkaloids, and particularly by the double iodide of mercury and potassium in acid solution. The yellowish white precipitate resembled in its characters the best defined alkaloids. The taste of this substance was acrid; with a bitter after-taste, and a small quantity which was tasted by the author was sufficient to provoke the commencement of salivation but without sweating.

To another portion of the original liquid lime was

* Abstract of a paper in the *Répertoire de Pharmacie*, March 25, 1875.

added and it was submitted to distillation. There was an abundant evolution of ammonia, and, to judge by the characteristic odour, of methylamine or an analogous base. The distilled liquor, agitated with ether, yielded a small quantity of oleaginous and viscous substance presenting all the characters of the foregoing. When the distilled liquor no longer gave any reaction of alkaloid, the residue was evaporated and dried, then treated as before with chloroform with the same result.

After treatment with chloroform, absolute alcohol removed a small quantity of resin similar to that which was deposited spontaneously by the distilled liquor. The residue, of a fine yellow colour, yielded nothing to ether. The greater portion of it dissolved in boiling water, the insoluble portion being formed almost entirely of excess of lime. The aqueous solution deposited upon cooling a small quantity of white matter which was converted by calcination into carbonate of lime. The author was not able to determine the nature of the dissolved substances, among which there was a considerable quantity of an organic acid.

The quantity of the alkaloidal substance obtained was too small to allow of a chemical examination of it; but M. Byasson concludes from his experiments that the active principle contained in jaborandi leaves is a liquid, viscous, aromatic alkaloid, having an acrid and bitter taste, and capable, like nicotine, of being carried over in distillation by the vapour of water in the presence of ammonia. The method by which it was obtained shows that it is soluble in chloroform, ether, absolute alcohol, ammoniacal water, and dilute acids; also that it is displaced by ammonia and that ether removes it from aqueous solution.

M. Byasson proposes to call this new alkaloid "jaborandine;" but, as this name has already been appropriated to the alkaloid obtained from a species of *Piper* referred to before (see p. 781), the anticipatory suggestion of Mr. Holmes that it should be called "pilocarpine" seems to be preferable.

THE PHARMACOPŒIA DOSES.

BY J. A. COPE.

The doses given in the British Pharmacopœia are intended to represent average doses, in ordinary cases, for adults, and the maximum dose given an average full dose. It should follow that the dose of a medicine and its preparations will correspond, providing those preparations depend on that medicine alone for their activity, and contain it in an equally active condition. But it will have been observed by all who are accustomed to use the Pharmacopœia, that the doses vary considerably. Sometimes the dose of a preparation will not represent more than half the dose of the medicine it contains, and yet depends entirely upon it for its value. Thus in tincture of ergot the maximum dose is one drachm, which is equivalent to about 13½ grains of ergot, but in powder or in the liquid extract the maximum dose equals 30 grains. In another case the dose of a preparation equals twice the dose of the medicine, as in tincture of foxglove, the maximum dose is 30 minims, which represents over 3 grains of the dried leaves, but under digitalis and its infusion the maximum dose equals only 1½ grains of leaves. Under aloes and its preparations the maximum dose varies from under 3 grains to 8 grains. The dose of extract of aloes is the same as that of aloes and yet it is about twice the strength. Under tincture the maximum dose represents less than 3 grains of aloes, wine 4½ grains, decoction 8 grains of extract. The maximum dose given for tincture of belladonna is 20 minims, equivalent to less than a grain of leaf; that of the extract is 1 grain, which is considered equal to 1 drachm of tincture, or three times the strength of the dried leaf. The maximum dose for tincture of nux vomica is 20 minims, equal to about 2 grains of powdered seeds; that of the extract is 2 grains, which is equivalent to half a drachm of the seeds. The maximum dose of castor in powder is 10 grains; that of the tincture represents only 2⅔ grains. The maximum dose given for chloroform is 10 minims, but that of the spirit represents only 3 minims, the tincture 6 minims, the water 5 minims. The maximum dose of conium leaves in powder is 8 grains; that of the extract, which is about four times the strength, is 6 grains. The maximum dose given for liquor calcis is 4 ounces, equivalent to about 2 grains of hydrate of lime; that of liq. calc. sacchar. is only 60 minims or less than 1 grain of hydrate of lime. The maximum dose given for rhubarb is 20 grains; that of the extract is 15 grains, and it is three times the strength. The maximum dose for tincture of henbane is 1 drachm, equivalent to about 7 grains of dried leaves; that of the extract, which is about three times the strength, is 10 grains.

The above is sufficient to show that the doses given in the P. B. do not accurately represent the therapeutical value of a preparation as compared with the medicine it is prepared from. This appears a defect in the work, likely to cause confusion and especially to pharmaceutical students who make it their text-book.

Derby.

NOTES ON ALOES WITH SPECIAL REFERENCE TO THE ACTION OF "CHANGED ALOIN" AND THE "RESIN OF ALOES."*

BY WILLIAM CRAIG, M.D., F.R.S.E., AND LECTURER ON MATERIA MEDICA.

Aloes has been used in medicine for upwards of two thousand years. It is mentioned by Pliny, the celebrated Latin historian, who lived in the first century of our era, and by Dioscorides, a Greek physician, who probably lived about the same time, and who wrote a celebrated work on materia medica. It is used as a medicine in every country where the healing art is practised. It is thus interesting both on account of its venerable antiquity, and of the universality of its employment.

Aloes, the "*aloe*" of the Pharmacopœia, is the inspissated juice of the leaves of various species of aloe.

In studying any substance of materia medica derived from the vegetable kingdom it is well to observe a certain method:—First, to ascertain the plant which yields the drug; second, the part of the plant which yields it; third, its nature and chemical composition; fourth, its preparations and doses; and, lastly, the actions and uses of the drug: in other words, its natural history, its chemistry, its pharmacy, and its therapeutics.

I am not going minutely into all of these subjects, but I will say a few words on each.

First, the plant which yields the aloes. It is the product of several species of the genus *Aloe*, plants belonging to the *Liliaceæ* of botanists. To the same order of plants belongs the *Urginea Scilla*, the plant which furnishes the well-known medicine squill.

There are two plants often confounded with the true aloë. There is, first, the aloes of Scripture, which must

* Read at a meeting of the North British Branch of the Pharmaceutical Society of Great Britain, March 26, 1875.

not be confounded with the medicinal plant of that name. The aloes of Scripture is got from the aquilaria, a tree belonging to a different order of plants, *Aquilariaceæ*. They are trees, and are dicotyledonous plants. They were famed chiefly for their fragrance, and hence "aloes, myrrh, and cassia."

Another plant often confounded with the true aloes is the *Agave americana*, American aloe. This belongs to the *Amaryllidaceæ*, the order which contains the snowdrop and narcissus. The plants of this order differ from the *Liliaceæ* in having the flower or perianth superior to the ovary, whereas in the *Liliaceæ* it is inferior; or to speak more botanically, in *Amaryllidaceæ* the ovary is inferior, whereas in *Liliaceæ* it is superior.

The agave is a well-known green-house plant, especially the variagated variety. Its foliage has considerable resemblance to that of the true aloe, but it is essentially a different plant. The flowering stem of the agave must not be confounded with the stem of the aloe. The agave has no stem or only a very short one. It has large fleshy leaves, and though said to flower in America when about eight years old, it is much longer in flowering in this country, and hence the opinion regarding it that it only flowers once in a hundred years. When it does flower it sends its flowering stalk from the centre of the leaves. This flowering-stalk grows with great rapidity, growing sometimes thirty feet in thirty or forty days. It is said that sometimes as many as 4,000 flowers are produced on one plant. After flowering the plant always dies, though its roots may send out young shoots. The plants are natives of America, but they are entirely wanting in Chili. The juice of this plant just before flowering is used in America for the manufacture of an intoxicating drink, etc., a very different effect from what is produced from the juice of the leaves of the true aloe.

The true aloe is a very different plant botanically. I have just mentioned that it belongs to the *Liliaceæ*. The aloes are succulent plants, with fleshy persistent leaves, usually prickly at the margin. Some are stemless, others have stems varying from a few inches to 50 or 60 feet, and, it is said, as much as 30 feet in circumference. We are told by Humboldt in his 'Views of Nature' that a plant of *Aloe dichotoma*, Linn., has been found in Africa, with a stem 4 feet in thickness, 20 feet high and a crown measuring 426 feet round. The flowers of the aloe are showy and generally yellow or reddish. The plant flowers freely and frequently, and does not die after flowering, and so is different in many respects from the agave. They are natives of Africa and the adjacent islands, and grow generally in arid sunny places, chiefly in southern and eastern Africa. They are however naturalized in the south of Europe, and in the East and West Indies. It is probable that from most plants of the genus *Aloe* aloes may be obtained, and certain it is that many species contribute to the supply of aloes. As it is no part of my present purpose to describe the varieties of aloes met with in commerce, so I shall not attempt to discuss the question what species yield medicinal aloes. I mean to confine my attention to the different kinds of aloes officinal in the B.P. Medicinal aloes is got from the leaves of the plants.

Aloes is defined in the B. P. as the inspissated juice of the leaves of the aloe. As seen in the shops it occurs in reddish-brown masses, breaks with a peculiar fracture, and has a taste and odour peculiar to itself. The juice is contained in peculiar cells within the leaves, and exudes spontaneously when the leaf is cut transversely.

Only two kinds of aloes are officinal in Britain, Barbadoes and Socotrine aloes. Besides these we meet with Hepatic aloes,—so called because of its resemblance or supposed resemblance to liver,—which comes to Europe by way of Bombay, and is generally supposed to be an inferior kind of Socotrine aloes. We have also Cape aloes from the Cape of Good Hope. Another kind lately introduced into European commerce is Natal aloes, also from South Africa.

I wish now to say a few words regarding the two sanctioned in the B. P.—First, *Aloe Barbadensis.*—This is the inspissated juice of the leaves of *Aloe vulgaris*, imported from Barbadoes. It is described in the B.P. thus:—"In yellowish-brown, or dark-brown opaque masses; breaks with a dull conchoidal fracture; has a bitter, nauseous taste, and a strong, disagreeable odour; and is usually imported in gourds."

The *Aloe vulgaris* has a short, woody cylindrical stem, and curved fleshy glaucous-green and slightly mottled lanceolate leaves, armed with hard distant reddish spines. The scape is *branched*, flowers are yellow. It grows in the East Indies, south of Europe, and in Barbadoes, and hence the name Barbadoes aloes. Some difference of opinion exists as to whether or not the aloe is indigenous to that island. It is perfectly naturalized, but was probably introduced from Africa. It is now regularly cultivated in Barbadoes. Nearly the whole of this island is under cultivation of some kind or other. In the work recently published by Flückiger and Hanbury there is an excellent account of the cultivation of Barbadoes aloes and of its mode of preparation. We are there told that the plants are set 6 inches apart, in rows which are 1 to $1\frac{1}{2}$ feet asunder. The plants are all dwarf, and all above one year old bear flowers. The leaves are 1 to 2 feet long. They are cut annually, but the plant lives for several years. The cutting takes place in March and April, and is performed in the heat of the day. The leaves are cut close to the plant and quickly placed in V-shaped vessels, and the juice allowed to exude spontaneously. In this way the best aloes is obtained. Sometimes the leaves are boiled, but then an inferior kind is produced, owing to impurities being extracted in the process.

Aloe Socotrina is described in the B. P. as the inspissated juice of one or more undetermined species of aloe produced chiefly in Socotra, and shipped to Europe by way of Bombay. This variety occurs in reddish-brown masses, opaque or translucent at the edges, breaks with an irregular, or smooth resinous fracture, has a bitter taste, and a strong but fragrant odour. This kind receives its name from the island of Socotra, at the mouth of the Arabian Gulf, off the east coast of Africa. It is probably produced in great part from the *Aloe Socotrina*, which grows in great abundance in the island.

The *Aloe Socotrina* differs from the *Aloe vulgaris* in having a stem $1\frac{1}{2}$ feet or more high, naked below, sometimes branched, leaves amplexicaul, curved in at the top, and marked with numerous small white marginal serratures. The raceme is *unbranched*. Flowers scarlet at the base, pale in the middle, and green at the point.

I shall now say a few words regarding the substance known in medicine as aloes. I have just stated that it is the inspissated juice of the leaves of certain species of aloe. It flows from the leaves in a liquid state, at first clear, but soon darkens by exposure to the air. In the heat of the sun it gradually concretes into the solid substance so familiar to us all. Aloes has been carefully analysed by several eminent chemists. The three most important constituents of aloes are:—

1. A volatile oil—which was first discovered by the Messrs. Smith of Edinburgh, and was by them exhibited at the Vienna Exhibition in 1873, which sample I was privileged to see some time ago. This oil exists in very small quantity in aloes—only about one ounce being obtained by the Messrs. Smith from the distillation of 400 lbs. of aloes. This oil is a pale yellow mobile liquid—sp. gr., 0·863, and boils at 266° or 271° C. To the presence of this oil is due the odour of aloes. This oil has a resemblance in taste and smell to oil of peppermint.

2. *Aloin.*—This is the most important constituent of aloes. It occurs in beautiful crystals which are supposed to be a hydride of the amorphous aloin.

This substance was discovered by the Messrs. Smith in 1851. The importance of this addition to our knowledge of the chemistry of aloes cannot be overstated, inasmuch as it has been clearly proved that this is the active principle of the drug. Aloin constitutes about twenty-five per cent. of aloes. Some chemists are of opinion that aloin from the various kinds of aloes is slightly different in regard to solubility, boiling point, and form of crystals, etc. The latest theory regarding aloin is so very ingenious that I cannot refrain from mentioning it,—namely "That the aloin got from the various kinds of aloes forms a homologous series in which the difference is CH_2. According to this theory—

The Aloin from Socotrine Aloes is $C_{15}H_{16}O_7$.
„ Natal „ $C_{16}H_{18}O_7$.
„ Barbadoes „ $C_{17}H_{20}O_7$.

This is so very beautiful that we wish it could be established. It requires, however, to be proved. Be that as it may, aloin is an oxidized hydrocarbon. It gives no ash when burned.

3. *Resin of Aloes.*—The substance which deposits from a decoction of aloes as it cools is usually denominated *resin of aloes.* This substance often contains a variable amount of aloin, owing to the extreme difficulty of entirely exhausting the aloes of aloin.

To obtain this resin in the purest possible state, the following plan was adopted by the Messrs. Smith. They took some resin prepared in the ordinary way, and which had been subjected to four additional washings, and dissolved it in rectified spirit, which dissolves the aloin as well as the resin, and to this was added boiling water, and the whole agitated so as to form a sort of emulsion. From this the resin separated in a very fine state, and I believe as free from aloin as any resin could well be.

Very absurd notions regarding this resin are held by Dr. Tilden and others as to its physiological action, of which I have some important communications to make this evening, and in almost all works on materia medica it is spoken of as a "modified aloin" as aloin oxidized or otherwise changed by exposure to the air. Chemically it is essentially different from *aloin*, and physiologically it bears no resemblance to it whatever; were it changed aloin it would produce no ash when burned—and, moreover we would expect it to have the physiological action of aloin, which changed aloin undoubtedly has, as I shall presently show.

The Messrs. Smith were kind enough to furnish me with the following particulars regarding experiments on this resin of aloes—I mean the *resin* prepared in the manner just described:—

Eight hundred and eighty-three grains of this *resin* were thoroughly dried; of this quantity 753 grains were found to be soluble in rectified spirit, and 130 grains were insoluble.

The *soluble resin* gave 1 per cent. of ash when burned. The insoluble resin gave 23 per cent. of ash. These experiments alone are sufficient to disprove the common assertion that the resin of aloes is modified aloin.

These are the *three* principal ingredients of aloes.

In regard to the preparations of aloes I shall not say much.

From Barbadoes aloes we have *seven* preparations, and from Socotrine aloes *eleven* preparations.

The dose of aloes is 2 to 6 grains, and it is best given in pill.

Aloes in small doses is a tonic. It assists digestion. It gives tones to muscular tissue, and is thought, and I believe correctly, to exert a special influence on the liver.

In larger doses, it is a purgative. It acts specially on the large intestine. It increases the intestinal secretion, and also the peristaltic motion of the bowels. It also stimulates the uterus, and hence is useful in certain sluggish states of that organ. The sulphate of iron and other substances increase its purgative action.

It is generally said to cause griping, but I believe not nearly so much as many suppose. In olden times the *resin* was looked upon as the cause of the griping. This, however, has been clearly disproved. When aloes gripes, it will probably be found that this untoward result is mainly due to some impurity in the drug.

Having thus briefly directed attention to the natural history, chemistry, pharmacy, and therapeutics of aloes, I wish to submit the results of some original researches into "changed aloin" and the "resin of aloes," and though from the very nature of the investigation I shall have much to do with figures, yet I shall endeavour so to deal with those figures that they shall not be altogether uninteresting to those whom I have the honour of addressing.

Although aloes has been used in medicine for more than 2000 years, it was not till 1851 that the Messrs. Smith of this city discovered in aloes a crystalline principle to which they gave the name *aloin*, on account of its being supposed by them to be the active principle of the drug. After this important discovery of aloin much difference of opinion existed regarding its physiological action. So late as 1870, we find Dr. Tilden, of London, maintaining that the purgative property of aloes is not due to aloin, that the active constituent of aloes is still unknown and that in all probability it is due to the resin of aloes. Even in the present day, there appear to be doubts in the minds of some regarding the activity of aloin, and in a recently published work on materia medica, a work emanating from the Edinburgh School of Medicine,* there is not one word regarding the action of aloin.

Notwithstanding these statements, it has been clearly demonstrated by various experimenters, and confirmed by clinical observation, that aloin is an active aperient and is sufficient to account for the purgative property of aloes.

It was no part of my intention in the following experiments to determine the action of aloin, but to investigate the properties of "changed aloin," and to determine the action of the "resin" of aloes.

In 1872, the Messrs. Smith, of this city, when preparing a specimen of *aloin* for the Vienna Exhibition, took four ounces of aloin and dissolved it in order to recrystallization, that they might obtain very pure crystals of aloin. From this solution two ounces of very beautiful crystals were obtained, and the residue was set aside for some months. To this, distilled water was added, and after eight months a dark coloured substance had formed, easily reduced to a fine powder, and to which they have given the name "changed aloin." It is undoubtedly aloin which has undergone some change by exposure to the air, probably a species of oxidation.

They were naturally anxious to ascertain if this substance possessed the activity of aloin. They applied to me to investigate this question, which I accordingly did, and found that this aloin which had undergone some chemical change still possessed its physiological action.

My experiments were performed on healthy young rabbits. I had prepared a cage in such a manner that I could easily measure the urine and weigh the fæces daily. The first six days I fed the rabbit daily, at a fixed hour, with ten ounces of carrot, and each day measured the urine and weighed the fæces. The next six days I injected daily one grain of this changed aloin under the skin of the rabbit. The experiments were made at a fixed hour, and were generally performed on the sides of the animal.

Table I.

First six days. No injection. Ten ounces of carrot daily:—

1st day.	Urine,	56	fluid drachms;	Fæces,	Nothing.
2nd day.	„	74	„	„	„
3rd day.	„	68	„	„	„
4th day.	„	53	„	„	„
5th day.	„	60	„	„	Traces.
6th day.	„	64	„	„	„
Average.	„	62·5	„	„	0

Second six days. One grain in solution of changed

* 'Materia Medica,' by Dr. Scoresby Jackson, 3rd Ed. (Dr. Macdonald), 1875.

aloin injected subcutaneously daily—and ten ounces of carrot each day as formerly :—

TABLE II.

1st day.	Urine,	48 fluid drachms ;	Fæces,	59 grains.
2nd day.	„	60 „	„	121 „
3rd day.	„	68 „	„	184 „
4th day.	„	60 „	„	38 „
5th day.	„	64 „	„	10 „
6th day.	„	64 „	„	8 „
Average.	„	60·7 „	„	70 „

On comparing carefully these two sets of experiments, we find some remarkable facts established. Ten ounces of carrot formed scarcely a sufficient diet for the animal, but this in no way invalidates the results, seeing that the same amount was given during the whole twelve days.

During the first six days, the urine varied from 53 fluid drachms to 74 fluid drachms, average, 62·5 fluid drachms daily. During the next six days with the same quantity of food and the injection of one grain of changed aloin daily, the amount of urine varied from 48 fluid drachms to 68 fluid drachms, average, 60·7 fluid drachms daily, being nearly the same as in the first six days.

With regard to the *fæces* the results were very different. During the first six days there were no fæces, or only traces on the fifth and sixth days. During the next six days, when one grain of changed aloin was injected subcutaneously daily, the fæces varied from 8 grains to 184 grains, average 70 grains daily. The first day after the injection there were 59 grains of fæces, the second day 121 grains, the third day 184 grains, and on the three following days they gradually diminished to 8 grains on the last day. There was a marked effect the very first day after the injection. The amount increased gradually for three days, and then diminished for the next three days. This fact is easily accounted for when we bear in mind that having once emptied the bowels by means of aloin, and the food not being increased, we could not expect the same amount of fæces from the purgative action of the drug. Nevertheless, the results were so marked, and followed so soon after the administration of the drug, that there is no resisting the conclusion that this "changed aloin" is a certain and an efficient aperient, and possesses the physiological action of aloin. Being anxious to observe its action on man, I had pills specially prepared with extract of gentian, and containing no ingredient except the "changed aloin" and gentian. These pills contained from 1 to 2 grains of this "changed aloin." I administered these pills to a number of individuals, and in very various circumstances, and invariably found them to act as an aperient, and in no case was there any griping. I gave it in several cases of habitual constipation, occurring in persons of a sedentary habit (1 or 2 grains daily), and found it answer remarkably well. I also administered it to pregnant females during the latter weeks of pregnancy, and succeeded in removing the constipation so common in females shortly before confinement. I also gave it on several occasions to females after delivery, and invariably found it a mild aperient, and in no case did any bad effect follow its administration. It will thus be observed that clinical observation fully corroborates the conclusion drawn from experiments on the lower animals that this *changed aloin* possessed the physiological action of the active principles of aloes.

These experiments and clinical observations are interesting and of considerable importance, inasmuch as they prove that aloin, which undoubtedly is the active principle of aloes, may, by exposure to the air, undergo considerable chemical change without losing its physiological action.

I come now to consider the action of the so-called "*resin of aloes*," a substance about which there is much diversity of opinion regarding its chemical composition, and whose physiological action has hitherto never been properly investigated. The resin of aloes generally contains a variable amount of aloin on account of the extreme difficulty of thoroughly exhausting the aloes of its aloin. This fact undoubtedly has led some observers to the conclusion that the resin of aloes possessed purgative properties. With the view of determining this important question, I made the following experiments. The resin of aloes was carefully prepared for me by the Messrs. Smith, of this city.

My experiments were performed on healthy young rabbits :—For six days I gave a rabbit daily 14 ounces of carrot, feeding it always at the same hour. The urine and fæces were carefully collected, and their amount duly ascertained.

The following table represents the results :—

TABLE III.

1st day.	Urine,	86 fluid drachms ;	Fæces,	209 grains.
2nd day.	„	82 „	„	167 „
3rd day.	„	73 „	„	3 „
4th day.	„	78 „	„	341 „
5th day.	„	82 „	„	0 „
6th day.	„	64 „	„	70 „
Average.	„	77·5 „	„	136·6 „

During the next six days I gave the rabbit daily, at the same hour, 14 ounces of carrot, and injected subcutaneously 1 grain of the "resin of aloes" in solution, with the following results :—

TABLE IV.

1st day.	Urine,	96 fluid drachms ;	Fæces,	6 grains.
2nd day.	„	60 „	„	83 „
3rd day.	„	76 „	„	213 „
4th day.	„	84 „	„	100 „
5th day.	„	60 „	„	290 „
6th day.	„	100 „	„	105 „
Average.	„	79·3 „	„	132·8 „

On comparing these two sets of results we find that the urine was slightly increased on the average, but not to such an extent as warrants the conclusion that the resin of aloes is diuretic. With regard to the fæces it will be observed that the amount varied very much on different days; from nothing to 341 grains during the six days when no injection was given, and from 6 grains to 290 grains during the time of the injection. Nevertheless, the daily average was nearly the same in both sets of experiments, being 136·6 grains when no injection was used, and 132·8 when 1 grain of the resin of aloes was injected daily. In this case the fæces were slightly diminished during the time of the injection, clearly proving that 1 grain of the resin of aloes failed to produce any purgative action.

I was anxious to ascertain if larger doses of the resin of aloes would produce any different results, and accordingly I injected subcutaneously 2 grains of the resin of aloes in solution, and fed the animal as before with 14 ounces of carrot daily.

The following are the results :—

TABLE V.

1st day,	Urine,	72 fluid drachms ;	Fæces,	202 grains.
2nd day.	„	80 „	„	16 „
3rd day.	„	76 „	„	200 „
4th day.	„	78 „	„	190 „
5th day.	„	72 „	„	771 „
6th day.	„	70 „	„	460 „
Average.	„	74·6 „	„	306·5 „

It will be seen at once that the urine remained much the same throughout the whole of these experiments, but not so with the fæces. During the six days that 2 grains of the resin of aloes were injected daily, the fæces varied from 16 grains to 771 grains—average 306·5 grains, whilst the average amounted to 136·6 grains when no injection was used, and to 132·8 grains when only 1 grain of resin of aloes was injected. On examining carefully the results of the last six days, it will be observed that the large daily average is due entirely to the large amount of fæces obtained on the fifth and sixth days; but on five of the six days was the daily average about the average when no injection was used, and when one grain was injected daily. There can be no doubt that this resin of aloes which I used in doses of two grains acted as a purgative, though in doses of one grain it failed to produce any purgative action. I may mention that I had pills prepared with extract of gentian, each pill containing 2 grains of the resin of aloes, and found that four of these pills or more produced three or four watery stools—again confirming by clinical observation what I had found as the result of experiments on the lower animals. On communicating the results of my experiments to the Messrs. Smith, they suggested that it was possible that the resin of aloes which they gave me might have contained a small quantity of aloin, and that the purgative effect obtained might be due to this aloin. The resin of aloes with which I was experimenting was very carefully prepared from a solution of aloes in boiling water and had received four additional washings. The Messrs. Smith informed me that resin of aloes prepared even with such care, might contain aloin owing to the extreme difficulty of entirely exhausting aloes of its active principles. They accordingly took a quantity of the resin of aloes prepared in the manner above described, and dissolved it in rectified spirit, to which solution they added boiling water and then agitated the mixture from which the resin of aloes afterwards separated in a fine state. The resin so prepared might be regarded as pure resin, and as free from aloin as any resin could be.

The following experiments were performed with this resin prepared in the manner just described, and were conducted in much the same way as I conducted the other experiments.

A healthy young rabbit, weighing two pounds and seven ounces, was fed daily on 14 ounces of carrot for six days, and the urine was carefully measured and the fæces weighed every day.

The following table represents the results obtained:—

Table VI.

1st day.	Urine,	56	fluid drachms;	Fæces,	4	grains.
2nd day.	„	76	„	„	30	„
3rd day.	„	88	„	„	2	„
4th day.	„	80	„	„	203	„
5th day.	„	64	„	„	67	„
6th day.	„	64	„	„	57	„
Average.	„	71·3	„	„	60·5	„

The next six days I injected daily two grains of resin of aloes subcutaneously. (The first two injections were with the first resin I used, the others with the new resin prepared with extra care.)

The following were the results:—

Table VII.

1st day.	Urine,	68	fluid drachms;	Fæces,	127	grains.
2nd day.	„	56	„	„	192	„
3rd day.	„	56	„	„	87	„
4th day.	„	64	„	„	30	„
5th day.	„	48	„	„	3	„
6th day.	„	66	„	„	232	„
Average.	„	59·6	„	„	111·8	„

On comparing these two sets of experiments it will be seen that the urine was slightly diminished, but the fæces were considerably increased. The average in the one case without any injection being 60·5 grains daily, whereas the average when two grains of the resin of aloes were injected amounted to 111·8 grains daily. It must be remembered that the first two injections were with the resin I formerly used, and which was decidedly purgative, and that the average for these two days was 159·5 grains daily. The daily average for the other four days was only 88 grains.

The next six days I fed the rabbit on 11 ounces of carrot daily, as it was found that 14 ounces were too much. No injection was given.

The following are the results:—

Table VIII.

1st day.	Urine,	36	fluid drachms;	Fæces,	2	grains.
2nd day.	„	76	„	„	81	„
3rd day.	„	64	„	„	198	„
4th day.	„	52	„	„	420	„
5th day.	„	56	„	„	0	„
6th day.	„	68	„	„	120	„
Average	„	54·6	„	„	136·8	„

The next six days I fed the rabbit also on 11 ounces of carrot daily, and injected each day 2 grains of the new resin of aloes which was so carefully prepared.

The following table contains the results:—

Table IX.

1st day.	Urine,	44	fluid drachms;	Fæces,	154	grains.
2nd day.	„	56	„	„	197	„
3rd day.	„	64	„	„	94	„
4th day.	„	80	„	„	50	„
5th day.	„	52	„	„	272	„
6th day.	„	60	„	„	108	„
Average.	„	59·3	„	„	145·8	„

On comparing these last two tables it will be observed that the urine is slightly increased, but only to a limited extent. The daily average of the fæces was increased by 9 grains, but this is so small an increase that we cannot draw from it any conclusion in regard to the purgative property of the resin of aloes. The largest amount of fæces obtained during one day when the injection was used was 272 grains. Whereas, on the other hand, 420 grains were obtained one day when no injection was used. The daily average increased gradually during each period of six days, without reference to the injection of the resin of aloes. The rabbit increased in weight from two pounds and seven ounces to two pounds and eleven and a half ounces. In twenty-four days it increased four and a half ounces in weight. On a careful comparison of the whole of these experiments with the resin of aloes it will be observed that no appreciable effect was produced even by the subcutaneous injection of two grains of this resin.

During the first six days when no injection was used, the daily average amount of fæces was 60·5 grains; during the second six days it was 111·8 grains with 2 grains of resin of aloes injected daily; during the third six days, with no injection, the daily average was 136·8 grains; and during the last six days, with 2 grains of resin of aloes injected daily, the average was 145·8 grains. There is but one conclusion to be drawn from these experiments, namely, that the resin of aloes is not purgative, and cannot be the active principle of the drug.

I had some of this resin made into pills with extract of gentian, each pill containing 2 grains of resin, and found that six such pills taken within one day failed to produce any effect whatever. I thus found that my clinical experience fully confirmed the conclusion arrived at from my experiments on the lower animals. Dr. Farre, of London, gave to patients doses of three grains of resin, and said that he found it almost inert, and that it seldom produced any evacuation. He, however, holds the rather doubtful conclusion that though it is inert when separated, it is probably active when combined. This conclusion is more than doubtful. In those cases where three grains produced evacuation, the activity was most likely due to the resin containing a small quantity of aloin. As previously stated, it is exceedingly difficult to exhaust the aloes entirely of its aloin; and in proportion as it contains any of this substance, so will it prove more or less active. But when the resin is prepared with the care that the last sample was with which I experimented, it will prove altogether inert. Similar results were obtained by Dr. Garrod, although it is evident from his experiments that the resin was not always free from aloin. He says the *extract* is far more active as a purgative than the resin, and admits that the resin often proved almost inert. I believe that had the resin with which he experimented been perfectly exhausted of aloin, it would have been always inert. Nevertheless the experiments of Dr. Farre and Dr. Garrod are exceedingly valuable and very interesting, and tend very much to show that the resin is an inert substance.

I think I have thus far established the point that the opinion of Dr. Tilden regarding the activity of the resin of aloes is altogether untenable. It is contradicted by the experience of the observers just named, and my experiments both on man and on the lower animals are conclusive on the point.

In speaking of the action of the resin of aloes, I must not omit to mention that to this resin is generally ascribed the griping property of aloes. My own opinion is that aloes does not gripe nearly so much as writers on materia medica would lead us to believe. When it does gripe, it is probably on account of some impurity in the drug, and certainly it cannot by any possibility be due to the resin. It was with the view of determining this question that the experiments of Dr. Farre and Dr. Garrod were performed, and they both came to the same conclusion that the resin was not the cause of the griping. My experience fully coincided with theirs. I gave it to a large number of patients and in very different circumstances, in doses varying from four to twelve grains, and in no single instance did it produce griping. It thus appears that the resin is not only inert, but is also a very harmless substance.

These experiments are also interesting as bearing on the chemical constitution of the resin of aloes. They are entirely at variance with the generally received opinion that this *resin* is "modified aloin." I have clearly demonstrated that "changed aloin," which very much resembles *resin* in appearance, is an active aperient, possessing all the activity of aloin itself, whereas the *true resin* is altogether inert.

The following may be regarded as conclusions fairly deducible from the foregoing experiments:—

1. Aloin may by exposure to the air undergo considerable chemical change without losing its physiological action as an active aperient.

2. That the *resin* of aloes, when thoroughly exhausted of aloin, possesses no purgative properties, and therefore cannot be the active principle of aloes.

3. That the resin of aloes is not the cause of the griping which sometimes follows the administration of the drug.

4. That aloin is an active aperient, and is in all likelihood *the active* principle of aloes.

When these experiments are viewed in connection with the researches of numerous experimenters in regard to the activity of aloin, we are forced to the conclusion that aloin is the only active principle contained in aloes, and is sufficient to account for all the purgative properties of that medicine. And that being the case, I cannot conclude without expressing a regret that in the Addendum to the British Pharmacopœia of 1867, published in 1874, no mention is made of aloin. It ought to find a place amongst the medicines recognized in the B.P. It possesses the following advantages over the crude drug:—

1. Being uniform in strength, its dose can be more accurately determined.

2. Its dose being only gr. ss. to gr. j., it can easily be introduced into tonic pills without making these pills too large.

3. By using the active principle we get rid of all impurities which are so apt to cause griping.

Its uniformity in strength, the smallness of its dose, and the certainty of its action should commend it to the favourable consideration of all medical practitioners.

The following pill I believe to be superior to the Pil. Ferri et Aloes of the B.P.

℞.	Aloin	gr. ss.
	Ferri Sulph. Exsic.	gr. jss.
	Extract. Nucis Vom.	gr. ss.
	Extract. Belladon.	gr. ss.

Fiat pil.
One or two pills daily.

This I have found an excellent pill for the constipation so common in females of a sedentary habit.

But I must now hasten to a close. You perceive that I have been endeavouring to solve some of the questions about which there was some difference of opinion regarding a drug known to medical men for more than 2000 years, and used in every country where the healing art is known. In my researches into the action of changed aloin and the *resin* of aloes, my sole object has been to ascertain the truth regarding them, and as I undertook these investigations at the recommendation of a distinguished pharmaceutical chemist of Edinburgh, and one whose researches into the chemistry of aloes are second to none in the kingdom (I refer to Mr. T. Smith, of T. and H. Smith of this city), and if the researches should prove of any value, and tend in any degree to add to our knowledge of the action of the constituents of aloes, I shall ever regard it as a high honour to me that the results of my experiments should have been first communicated to the North British Branch of the Pharmaceutical Society—a Society to which I take this opportunity of tendering my sincere thanks for their kindness to me as a Lecturer on Materia Medica in the Edinburgh School of Medicine.

CITRATE OF IRON AND BISMUTH.*

BY C. RICE.

Being requested some years ago to devise a liquid preparation containing bismuth and iron (at that time intended for use in some other complaints besides dyspepsia), I finally, after various trials, adopted the following formula, which I have followed ever since:—

Take of citrate of bismuth, ammonio-citrate of iron, each 320 grs.; water of ammonia, water, each a sufficient quantity.

With 4 oz. of water rub the citrate of bismuth into a smooth paste; gradually add water of ammonia until solution has taken place, being very careful not to have an excess of ammonia. Now add the ammonio-citrate of iron and some more water; dissolve, filter, and wash the filter with enough water to make the solution measure 1 pint.

This solution if intended to be long kept may be partly made up with glycerine, although I cannot speak from experience whether it is so well borne by the stomach. A more useful addition, however, is good sherry wine, of which there may be used 10 fluid oz. (or perhaps more), in place of so much water.

The above solution is prescribed under the name of liquor ferri et bismuthi citratis, and contains in 1 fluid drachm 2½ grains each of citrate of bismuth and ammonio-citrate of iron. The dose is from 1 to 2 fluid drachms, half an hour before meals, or, when required, after meals.

It is, of course, no true double salt, chemically speaking, but only a mixture of ammonio-citrate of bismuth and ammonio-citrate of iron; and although a true double salt containing those elements might perhaps be prepared I doubt whether it could have any better effects.

The solution may also be prepared of a concentrated state, and spread upon plates of glass to dry, yielding exceedingly handsome scales of a golden-brown colour, which must be protected from the light, and 5 grains of which are equal to 1 fluid drachm of the solution.

---

* From the *Druggists' Circular.*

The Pharmaceutical Journal.

SATURDAY, APRIL 17, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE GLASGOW MEMORIAL.

AT the special request of the PRESIDENT and SECRETARY of the Glasgow Chemists and Druggists' Association we call the attention of our readers to an explanatory note those gentlemen have forwarded for publication, which will be found at p. 843 of the present number of the Journal.

We must confess to being under some difficulty in complying with their desire that we should also make some further reference to this note, since we fail to perceive in it anything calculated very materially to modify the opinions we have already expressed.

In regard to the surprise we expressed at the small number attending the meeting at which the memorial was adopted and directed to be sent to the Council of the Pharmaceutical Society we may remark that we were guided by the statement of Mr. FRAZER at the Council meeting. It now appears that though this seems to have been the only meeting of which Mr. FRAZER was cognizant, the draft memorial had already been adopted at a previous meeting of the trade, numbering about sixty town and country members, and that many others who could not attend that meeting were in favour of of the memorial. While accepting this explanation as in some degree removing the ground for the impression we were at first led to form, we cannot but declare that the circumstance of there being so many who sympathize with the memorial seems to be an additional reason for regret. For the explanatory note furnishes nothing in the shape of fact or argument in support of the grave allegations of the memorial, and since we regard those allegations as being entirely fallacious, we can only deplore the fact of their being so much more generally entertained by the chemists and druggists of the West of Scotland than we had supposed to be the case.

As to the disclaimer of any intention on the part of the memorialists to cast any imputation on the Board of Examiners in Scotland, we gladly accept it, since it is unquestionably a matter of great importance, especially at the present moment, that nothing should be done to lessen in any degree the respect in which the Examining bodies of the Society should be held. But while giving the memorialists all credit for their good intentions, it is to the purport and effect of their complaints that attention must be directed in judging of such a document as the Glasgow memorial. In that respect we do not hesitate to say that the statements contained in the memorial do cast discredit on the system of Examination, inasmuch as it is represented as being in certain particulars inimical to the future progress of the trade, and as having estranged young men from becoming apprentices or students of the business.

Regarding the memorial merely from this point of view we thoroughly concur with Messrs. CURRIE and FAIRLIE in the hope that, as a result of the motion Mr. FRAZER has given notice of, the memorial will receive thorough consideration when it again comes before the Council. Whatever opinion may be entertained as to its merits, it is certainly desirable that the alleged evils attending the present system of examinations should be discussed and inquired into in such a manner as to dispose of them finally. The revival of this subject after the opportunities that have lately been afforded for communication and consultation between the Examining Boards of Scotland and England and the Council of the Society, and after the satisfactory conclusions we were disposed to believe had resulted from these measures, seems to show that there is still some unexplained cause of discontent. It would be well for the interest of all concerned if that could be discovered and remedied.

We are glad to find some evidence afforded by the letters of other correspondents on this subject that these opinions are not general in Scotland, and we are glad to find that the writer of one of the letters which we publish this week promises to follow up the subject. We are especially glad to learn that he will deal with the alleged scarcity of assistants, for it is this point which, so far as we can gather, seems to lie at the root of that vague dissatisfaction indicated by the Glasgow memorial as prevailing in the minds of some members of the trade in Scotland. Upon the principle that a disease may be successfully treated when its cause has been discovered, we hopefully look forward to the elucidation of the question why there is such reluctance to take up the career of a chemist and druggist in Scotland.

Having said thus much on the general aspects of the matter we shall abstain from any further comment on the memorial and its objects until such time as we may be in possession of a more adequate collection of facts. But at the same time we must take this opportunity of remarking that we cannot admit the justice of the objection raised by Mr. CURRIE and Mr. FAIRLIE to our having taken up the memorial in the editorial columns of the Journal.

THE SALE OF VERMIN POWDERS.

LATTERLY we have heard much less of poisoning with vermin killers containing such poisons as strychnine than used to be the case, and this may, we believe, be attributed to the fact that greater precautions have been taken in the sale of these preparations since they were placed upon the same footing as the poisons they contain. But it would seem that something further still remains to be done in order to protect vendors of these preparations from inconvenience in the event of accident or misuse.

In illustration of this we refer to the report, at p. 840, of the prosecution of a firm of chemists and druggists for having unlawfully sold a packet of Battle's vermin killer to a person not known to them. The evidence of the man who purchased the vermin killer and attempted to poison himself with it was to the effect that he had been drinking heavily all the previous week, and at the time he bought the poison he was so drunk that he did not know anything about it. The assistant who supplied him with the vermin killer, however, stated that the man appeared to him to be sober when he was in the shop. No great importance is, we believe, to be attached to this conflict of testimony, especially as the poison was sold on a Saturday evening, when there may have been a press of business in the shop. It is also quite possible that the man may have been drunk at the time without it being noticeable.

For the defence it was urged that the assistant knew the man as a frequent customer, and as being in the employ of a manufacturer in the town, and hence it was contended that there was no infringement of the Act relating to the Sale of Poisons. However, the magistrates held it was indispensable to take the address as well as the name of any purchaser of poison so that his whereabouts could be found in the event of his being wanted. The book used for the purpose of registering sales of poison, however, did not provide for the address of the purchaser to be entered, and if, as we presume, this book was one with printed forms it would be desirable at once to have it replaced by one properly prepared in accordance with the provisions of the Act.

As remarked by one of the magistrates, the omission was a trifling one, but as it might have resulted in serious consequences there was no alternative but to convict, and the seller of the poison was therefore fined £1 with costs.

We think it desirable to call the attention of our readers to this case as showing the advantage they may derive from careful compliance with the provisions of the Act. If the simple formality of writing down the purchaser's address in the poison sale register had been observed, the seller of the poison would, in this case, have been held blameless in the eye of the law, and even if he had been summoned before the magistrates in reference to the attempted suicide, the result would have been to show that he was in no way censurable, and in so far it would have been beneficial to him rather than otherwise.

THE ANNUAL DINNER.

A MEETING was held at 17, Bloomsbury Square, on Wednesday last, to discuss the preliminaries of the fourth Annual Dinner of the Members of the Pharmaceutical Society and their friends.

It was decided to hold the Dinner at WILLIS'S Rooms, King Street, St. James's, and the following gentlemen were appointed a committee to carry out the arrangements:—

The PRESIDENT.	FREDERICK BARRON.
The VICE-PRESIDENT.	A. F. HASELDEN.
The TREASURER.	Dr. PAUL.
Professor ATTFIELD.	G. W. SANDFORD.
W. R. BARKER.	

Messrs. RICHARD BREMRIDGE and MICHAEL CARTEIGHE, who have again undertaken the duties of Honorary Secretaries, will be glad to receive, on or before Wednesday next, the names of gentlemen who are desirous of acting as Stewards, as it will be necessary to publish the list forthwith.

THE MEDICINE STAMP TAX IN THE UNITED STATES.

LITTLE more than a year since* we referred in these columns to the troubles of our American brethren in respect to the very elastic application of the Medicine Stamp Act of that country to all medicinal preparations kept in packages ready for sale. We learn from the *American Journal of Pharmacy* for March, that by an Act to Amend the Existing Customs and Internal Revenue Laws, which has received the official sanction of the PRESIDENT, the conditions under which medicinal preparations are or are not liable to stamp duty are more clearly defined; and so far the pharmacist has received a boon. It appears that under the provisions of the new law, no medicine which is packed anticipatory of sale, if it be prepared in accordance with a formula published in any standard Dispensatory or Pharmacopœia in common use by physicians and apothecaries, or in any pharmaceutical journal issued by an incorporated college of pharmacy, is to be liable to duty, provided that a distinct reference to the formula and where it is to be found be printed on the label attached to the article, and no proprietary interest therein be claimed. In other cases, no stamp is to be required if the formula of the preparation be printed on the article and no proprietorship be claimed.

THE EBERT PRIZE.

IT will be remembered that on the occasion of retiring from the Presidency of the American Pharmaceutical Association in 1873, Professor ALBERT E. EBERT, of Chicago, devoted a sum of five hundred dollars to the establishment of an annual prize for the best essay or written contribution containing an

* Vol. iv., p. 517.

original investigation of a medicinal substance or information respecting improved methods for the preparation of chemical or pharmaceutical products. The committee appointed to award the prize has recently made its report upon the essays presented at the last meeting of the Association. Three papers were selected for special consideration, viz., 'On Colchicia,' by Mr. EBERBACH, 'On Iron by Hydrogen,' by Mr. J. CREUSE, and 'The Active Principles of the Officinal Veratrums,' by Mr. C. L. MITCHELL. The Committee recommends that the EBERT Prize for 1874 be given to Mr. C. L. MITCHELL, the author of the latter paper, which is now in course of publication in this Journal.

CINCHONA IN MADEIRA.

A LETTER received by Dr. HOOKER from Madeira seems to show, according to the *Gardener's Chronicle*, that the climate of that island is especially suited to the growth of *Cinchona succirubra*, since a specimen planted two years and a half ago in a garden at an elevation of 500 feet above the sea is now nearly twenty feet high, and blossoms freely. *C. Condaminea*, however, does not appear to succeed so well; some plants sent from Kew six years ago have been increased by cuttings, but these are reported to be making but little progress.

A MEETING of the London Local Committee of the British Pharmaceutical Conference was held on Wednesday last at 17, Bloomsbury Square. The Honorary Local Secretary, Mr. CARTEIGHE, reported that the contributions to the Fund subscribed by the London members and their friends to defray the expense of entertaining the visitors from the country to the Annual General Meeting in August last, had amounted to £650 18*s.* 6*d.* Of this sum £584 3*s.* 2*d.* had been expended, leaving a balance in hand of £66 15*s.* 4*d.* In accordance with the unanimously expressed wish both of present and absent members of the Committee, it was proposed by Mr. A. C. WOTTON, seconded by Professor ATTFIELD, and resolved that this balance should be presented as a donation to the Benevolent Fund of the Pharmaceutical Society.

AT the Leicestershire Easter Sessions, held on the 5th inst., Mr. JOSEPH YOUNG, Pharmaceutical Chemist, was reappointed Public Analyst for the County. Some opposition was offered to the reappointment by Mr. PELL and Sir HENRY HALFORD, who wished to defer action in this matter until after the Government Bill now before Parliament has passed; but a motion to that effect was lost.

Mr. JAMES DEWAR, Demonstrator of Chemistry in the University of Edinburgh, has been elected to the Jacksonian Chair, at Cambridge.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING MARCH, 1875.

	£	s.	d.
A Friend, Doncaster	0	5	0
Ackerman, Henry, Broad Street, Chipping Sodbury	0	10	6
Ackerman, Theophilus, Redcliff Hill, Bristol	1	1	0
Agnew, James, 278, Great Homer Street, Liverpool	0	5	0
Allchin, Alfred, England House, Primrose Hill Road, N.W.	0	10	6
Amos, Daniel, 1, Parade, Canterbury	0	10	6
Anthony, John L., High Street, Bedford	0	10	6
Applegate, E., 5, Hercules Terrace, Holloway Road, N.	0	10	6
Arnold, Spencer, 42, Mount Ephraim, Tunbridge Wells	0	10	6
Astrop, Henry, 730, Old Kent Road, S.E.	1	1	0
Atkins, Samuel R., Market Place, Salisbury	0	10	6
Bagshaw, William, 37, Yorkshire Street, Oldham	0	10	6
Bainbridge, Robert R., 16, High Street, Stockton-on-Tees	0	2	6
Baker, William, 6, Taptonville, Sheffield	0	10	0
Balcomb, John, Cheltenham	0	5	0
Barnitt, John, Upper Parade, Leamington	0	10	6
Barret, Edward L., 20, Spencer Road, St. John's Hill, New Wandsworth	1	1	0
Barrett, Henry, High Street, Colchester	0	5	0
Barrow, William, 37, Winchcomb Street, Cheltenham	0	5	0
Barton, Charles, 77, King's Road, Brighton	0	10	6
Barton, Henry, 77, King's Road, Brighton	0	10	6
Bate, Henry, 44, Thorne Road, South Lambeth	0	10	6
Bateman, John M., Cairo	0	10	6
Bates, T. W., High Street, Colchester	0	5	0
Bates, W. I., Mill Street, Macclesfield	0	10	6
Baxter, Robert, Huntingdon	0	10	6
Baxter, William, Central Public Laboratory, Kennington Lane	1	1	0
Beckett, William, Market Place, Heywood	0	10	6
Berridge, Alfred, 11, Cheapside, Leicester	0	10	6
Billing, Thomas, 86, King's Road, Brighton	0	10	6
Billington, Frederic, 127, Wavertree Road, Liverpool	0	5	0
Bing, Edwin, 41, St. George's Street, Canterbury	0	10	6
Bingham, William Hill, 100, High Street, Eton	0	10	6
Bird, Augustus, Wood Lane, Shepherd's Bush	2	2	0
Bird, William L., 42, Castle Street, East, W.	1	1	0
Blunt and Moses, Wyle Cop, Shrewsbury	1	1	0
Borland, John, 7, King Street, Kilmarnock	0	10	6
Boyce, John P., Windsor	0	10	6
Braddock, George, Market Place, Oldham	1	1	0
Brailey, Charles, Heavitree, Exeter	0	5	0
Brayshay, Thomas, 38, High Street, Stockton-on-Tees	0	10	6
Brayshay, William B., 38, High Street, Stockton-on-Tees	1	1	0
Bright, Richard, 29, Broad Bridge Street, Peterborough	0	10	6
Brodie, Robert, 253, Crown Street, Glasgow	0	5	0
Bromfield, Charles, 2, Northernhay Street, Exeter	0	5	0
Broof, Richard, North Gates, Leicester	0	10	6
Brunton, C., 747, Commercial Road, E.	0	10	6
Bulley, William H., 26, High Street, Exeter	0	2	6
Burton, John, Ousegate, Selby	0	2	6
Butland, Charles, 153, St. Sidwell Street, Exeter	0	5	0
Butler, Charles, Walton-on-the-Hill, Liverpool	0	10	6
Cadman, Daniel C., 12, Rendezvous Street, Folkestone	0	10	6
Cameron, W. A., 51, Well Street, Bedford	0	5	0
Carr, William G., Berwick-upon-Tweed	0	10	6
Caswell, Edward, Avenue Road, Leamington	0	10	6
Chater, Edward M., High Street, Watford	1	1	0
Chater, Matthew T., High Street, Watford	1	1	0
Cherry, Edwin, 41, Commercial Street, Newport, Mon.	0	10	6
Child, Thomas, 84, Wellington Road, Leeds	1	1	0
Clark, W. B., 15, Belvoir Street, Leicester	0	10	6
Clayton, William, The Wicker, Sheffield	0	10	6
Cocking, George, Bull Ring, Ludlow	0	5	0
Coke, Richard S., 22, Albert Road, Morice Town, Devonport	0	5	0
Colchester, W. M., 2, Crown Street, Hoxton Square	0	5	0
Colchester, W. M., jun., 6, Marquess Road, Canonbury, N.	0	5	0
Cole, Frederic A., Botolph Street, Colchester	0	5	0
Cole, Walter Thomas, 17, St. Mary Street, Weymouth	0	5	0
Collett, Charles B., 15, South Street, Exeter	0	5	0
Collins, Henry G., High Street, Windsor	0	5	0
Colton, Thomas, Ousegate, Selby	0	2	6
Committee of the Chemists' Ball	21	0	0
Cooper, George, 101, Fore Street, Exeter	0	10	6
Cooper, Henry, 44, Market Place, Leicester	0	5	0
Cooper, Thomas, 44, Market Place, Leicester	0	10	6
Cooper, W. H., 5, Andover Terrace, Hornsey Road	0	5	0
Corder, Octavius, 2, London Street, Norwich	0	10	6
Cornish, William, 174, Western Road, Brighton	0	5	0
Coupland, Joseph, 20, Regent Parade, Harrogate	0	5	0
Cowgill, Brian H., 28, Manchester Road, Burnley	0	5	0
Cracknell, Charles, 217, Edgware Road, W.	2	2	0
Crawshaw, Henry, 240, Moorfields, Sheffield	1	1	0
Cross, William G., Mardol, Shrewsbury	0	10	6
Cross, William G., Jun., Mardol, Shrewsbury	0	10	6
Croyden, Charles, 45, Wigmore Street, W.	0	10	6
Cubley, George A., High Street, Sheffield	0	10	6

Culverwell, John S., High Street, Windsor	0	5	0
Cuthbert, John M., 19, High Street, Bedford	0	10	6
Cutting, James, 33, Bath Street, Leamington	0	10	6
Cutting, Thomas J., Finkle Street, Selby	0	5	0
Davidson, Charles, 205, Union Street, Aberdeen	0	10	6
Davis, Frank P., 36, Northbrook Street, Newbury	0	10	6
Davis, Henry, 19, Warwick Street, Leamington	0	10	6
Davis, R. H., 26, Regent Parade, Harrogate	0	5	0
Davis, Robert S., 374, Old Kent Road, S.E.	0	10	6
Dawson, Oliver R., 63, Bellevue Road, Southampton	0	5	0
Deck, Arthur, 9, King's Parade, Cambridge	0	10	6
Delves, George, 187, High Street, Exeter	0	10	6
Dickins, John, Bridlington Quay	0	2	6
Dingley, Richard L., Bridge Street, Evesham	0	5	0
Dobb, Joseph T., West Bar, Sheffield	0	10	6
Dunhill, Son, and Shaw, Doncaster	1	1	0
Dutton, John, King Street, Rock Ferry	1	1	0
Dyer, William, 1, Corn Market, Halifax	0	5	0
Ekins, John, High Street, Bedford	0	5	0
Ellinor, George, 41, The Wicker, Sheffield	0	10	6
Elliott, Samuel, Liskeard	0	5	0
Elliott, Robert, High Street, Gateshead	0	10	6
Eyre, Jonathan S., Launceston	0	10	6
Fairley, Thomas, 160, High Street West, Sunderland	0	5	0
Faulkner, Henry, 81, Commercial Road, Newport, Mon.	0	2	6
Field, Ebenezer, Hills Road, Cambridge	0	5	0
Fletcher and Palmer, Cheltenham	1	1	0
Foster, Henry, Castle Street, Ludlow	0	5	0
Franklin, Alfred, 60, West Street, Fareham	0	10	6
French, Benjamin, North Cross Street, Gosport	0	10	6
Frost, George, Derby	0	10	6
Fryer, Charles, 12, St. Nicholas Street, Scarborough	0	10	6
Gadd, Charles, 1, Harleyford Road, S.E.	0	10	6
Gadd, Henry, 97, Fore Street, Exeter	0	10	6
Gadd, Robert, 1, Harleyford Road, S.E.	0	10	6
Gardner, Austen W., Canterbury	0	5	0
Gaunt and Fuller, 221, Union Street, Borough	1	1	0
Gedge, W. S., 90, St. John Street, E.C.	0	10	6
Geldard, John, St. Austell	0	5	0
George and Welch, Worcester	1	1	0
Glaisyer, Thomas, 12, North Street, Brighton	0	10	6
Glew, William, Finkle Street, Selby	0	2	6
Gordelier, John Thomas, Sittingbourne	1	1	0
Gratte, Henry J., 55, Commercial Road, Newport, Mon.	0	5	0
Grant, Edward, 119, Fore Street, Exeter	0	5	0
Green, John, 196, Lower Street, Deal	0	10	6
Greenwell, William C., 118, High Street, Gateshead	0	5	0
Griffiths, Waldron, Market Place, Cirencester	0	10	6
Grieves, Herbert, Old Street, Ludlow	0	5	0
Groves, Wellington E., Blandford	1	1	0
Gulliver, William, 6, Lower Belgrave Street, S.W.	0	10	6
Gunn, John, Hambledon, Hants	0	5	0
Hadfield, George B., 817, Commercial Road, E.	0	10	6
Hall, Frederick, 117, High Street, Stockton-on-Tees	0	10	6
Hallaway, John, 52, Castle Street, Carlisle	0	5	0
Hammerton, Edward, High Street, Colchester	0	5	0
Hargraves, Henry L., 30, High Street, Oldham	0	10	6
Hardy, William, Victoria Terrace, Stockton-on-Tees	0	5	0
Head, John, High Street, Lewes	0	10	6
Heathorn, Joshua, Lees Road, Oldham	0	10	6
Hibberd, John, 24, North Street, Exeter	0	5	0
Hicks, James S., Fore Street, Looe	0	5	0
Hickman, Frederick, Market Place, Newbury	0	10	6
Hill, Arthur Stephen, Southfields, Clapham Park	2	2	0
Hill, Richard, Bruton	0	5	0
Hinds, James, Jordan Well, Coventry	0	10	6
Hitchcock and Son, 108, High Street, Oxford	1	1	0
Houghton and Son, 53, High Street, St. Clement's, Oxford	0	10	6
Hopton, Edwin, Idle, Yorks	0	5	0
Hornsby, George G., 38, Lewes Road, Brighton	0	10	6
Howorth, James, Doncaster	0	10	6
Hudson, Fretwell, West Bar, Sheffield	0	10	6
Huggins, Henry, 210, High Street, Exeter	0	5	0
Huggins, R., 235, Strand, W.C.	0	10	6
Humphreys, Neame and Wood, 9, Upper Belsize Terrace, Hampstead	0	19	0
Hunter, John, High Street, Gosport	0	7	0
Hurst, John, Market Place, Louth	0	10	6
Hurst, John B., Market Place, Louth	0	10	6
Husband, Matthew, 95, Fore Street, Exeter	0	10	6
Huskisson, Henry O., 77, Swinton Street, Gray's Inn Road	1	1	0
Ibbs, John Thomas, High Street, Maldon	0	5	0
Ive, William, 2, Stanhope Terrace, Kensington, W.	1	1	0
Izod, James, Upper Norwood	1	1	0
Jeffery, Thomas A., Leamington House, Cheltenham	0	5	0
Jennings, John E. H., 45, Church Street, Sheffield	0	10	6
Jervis, William, Broomhill, Sheffield	1	1	0
Jones, John, Castle Squire, Carnarvon	0	5	0
Jones, John, Commercial Place, Aberdare	0	10	6
Jones, Morgan H., Briton Ferry, Glamorganshire	0	5	0
Jones, Richard, Broad Street, Chipping Sodbury	0	10	6
Jones, Samuel U., 4, Upper Parade, Leamington	1	1	0
Jones, W. W., Southwell Street, Kingsdown, Bristol	1	1	0
Jones, William, Lyth Hill, Shrewsbury	0	10	6
Kay, John, High Street, Crewe	0	5	0
Kay, Samuel, Lower Hillgate, Stockport	0	10	6
Kay, Thomas, Lower Hillgate, Stockport	0	10	6
Kemp, John, 12, North Street, Brighton	0	10	6
Kemp, Robert, 205, Holloway Road	0	10	6
Langford, John Brown, Wellington	0	10	6
Lake, John H., 41, High Street, Exeter	0	5	0
Lea, John, 4, Harbour Street, Folkestone	0	10	6
Learoyd, Edwardus Radley, Washington Road, Sheffield	0	5	0
Leigh, John, High Street, Windsor	0	10	0
Lester, Henry, 1, Bridge Street, Nuneaton	0	5	0
Lloyd, William, 26, High Street, Carnarvon	0	5	0
Long, Alfred T., Bognor	0	10	6
Long, W. E., East Street, Chichester	0	10	6
Malcham, Henry, 7, West Bar, Sheffield	0	10	6
Manthorp, F. W., High Street, Colchester	0	5	0
Marston, Alfred, Bull Ring, Ludlow	0	5	0
Martin, Thomas, High Street, Cliffe, Lewes	0	10	6
Millidge, W. H., Newport (I. of W.)	0	5	0
Mills, John P., 8, Paris Street, Exeter	0	5	0
Moore, Edward, Cheltenham	0	2	6
Morgan, Richard, The Cross, Newtown	0	10	6
Mumby, Charles, High Street, Gosport	0	10	6
Mumford, Alfred, Sussex House, Albion Place, Southampton	0	10	6
Murdoch, David, Falkirk	0	10	6
Muter, Dr. John, Central Public Laboratory, Kennington Cross	3	3	0
Napier, George L., 40, South Street, Exeter	0	5	0
Newby, Charles A., Leamington	1	1	0
Nicholson, John J., 226, High Street West, Sunderland	0	10	6
Nickson, James, Broad Street, Ludlow	0	5	0
Northway, John, 27, Great Tower Street	1	1	0
Oldfield, Henry, 86, Villa Street, Boyson Road, Camberwell	0	10	6
Oldfield, Henry, 48, Market Street, Hyde	0	10	6
Oldham, Gervase, Chestergate, Macclesfield	0	5	0
Paine, Charles, 3, Commercial Street, Newport, Mon.	0	10	6
Parker, Edward, 6, Botchergate, Carlisle	0	5	0
Parry, William, 345, Scotland Road, Liverpool	0	5	0
Pasmore, George, St. Sidwell's, Exeter	0	5	0
Pearse, John, Petty Cury, Cambridge	0	5	0
Perfect, George, 151, Commercial Road, Landport	0	5	0
Phillips, John, 92, Commercial Street, Newport, Mon.	0	10	6
Portway, John, Bury St. Edmund's	0	2	6
Potter, Fanny Elizabeth, Kibworth	0	5	0
Potts, Thomas, 5, Granger Street, Newcastle-on-Tyne	0	10	6
Pound, Matthew, 60, Leather Lane, E.C.	1	1	0
Powell, John, Shaftesbury	0	5	0
Preston, Job, 4, High Street, Sheffield	0	10	0
Price, George, 127, Commercial Street, Newport, Mon.	0	5	0
Priestley, Henry, Norfolk Street, Sheffield	0	10	6
Prior, George T., 52, Broad Street, Oxford	0	10	6
Prosser, Evan T., Head Street, Colchester	0	5	0
Prust, Richard, Meteor Street, Splotland, Cardiff	0	5	0
Pullin, W. H., 115, Warwick Street, Leamington	0	10	6
Parnell, Henry A., Cheltenham	0	10	6
Quinlan, Joseph, 59, Barnsbury Road, Islington	0	10	6
Radley, William V., 74, Market Place, Sheffield	0	10	6
Randall, W. B., 146, High Street, Southampton	1	1	0
Rankin, William, 7, King Street, Kilmarnock	1	1	0
Readman, Henry, 18, Mortimer Street, Cavendish Square, W.	0	5	0
Reed, George, Yarm, Stockton-on-Tees	0	10	6
Reid, Neil, 39, George Street, Perth	0	5	0
Rhind, William W., 69, Gloucester Road, N.W.	0	10	6
Richardson, George, 12, Norland Place, Notting Hill	0	10	6
Rodger, John, Inverary	0	5	0
Rose, Alfred, 441, Edgware Road, W.	0	10	6
Russell, C. J. L., Windsor	0	10	6
Salisbury, W. B., 3, Market Street, Leicester	0	10	6
Salter, Joseph B., Castle Street, Shrewsbury	0	10	6
Sanson, Henry, 7, South Parade, Leamington	0	10	6
Sapp, Arkas, Market Place, Basingstoke	0	10	6
Saxby, Henry, High Street, Lewes	0	10	0
Shakerley, Benjamin, 27, Market Place, Penzance	0	5	0
Sharp, David B., Tavistock Place, Sunderland	0	10	6
Sharp, E. K., 44, Market Place, Leicester	0	5	0
Shenstone, James B. B., High Street, Colchester	0	5	0
Sheppard, Alfred, 51, Hollywood Road, West Brompton	0	10	0
Sirett, Henry, Market Square, Brackley	0	10	0
Slack, William, Doncaster	0	5	0
Slade, John, Tenbury	0	5	0
Slipper, Edward, 8, Dalston Lane, E.	0	5	0
Smith, Charles S., Cirencester	1	1	0
Smith, John, High Street, Bridlington	0	1	0
Smith, Nathaniel, 373, High Street, Cheltenham	0	10	6
Smith, Tenison, 8, Park Terrace, Sutton	0	10	6
Smith, Walter Henry, 36, St. George's Road, Brighton	0	10	6
Stainer, John, 59, Sandgate Road, Folkestone	1	1	0
Stanley, Herbert, 10, Upper Parade, Leamington	0	10	6
Stevens, John, High Street, Broseley	0	10	6
Steer, Philip R., Walthamstow	0	10	6
Stone, Frederick, 166, Fore Street, Exeter	0	10	6
Stone, John, 166, Fore Street, Exeter	0	5	0
Stevenson, William L., 165, Edgware Road, W.	0	10	6
Stott, William, Sowerby Bridge	0	10	6
Straughton and Brown, 54, Main Street, Cockermouth	1	1	0
Sumners, Michael C., Heckington	0	5	0
Swingburn, Richard H., South Molton	0	5	0
Taplin, W. G., 75, Hampstead Road, N.W.	1	1	0
Taylor, John U., 19, High Street, Bedford	0	10	6
Taylor, Joseph H., James Street, Harrogate	0	10	6
Taylor, W. R., Linthorpe Road, Middlesborough	0	5	0
Thickitt, Robert, Lansdown Road, Sheffield	0	10	6

Thomas, Horace, 14, South Colonnade, St. Leonards	1	1	0
Thomas, James, Bridge, Kent	0	5	0
Thomas, Watkin J., 10, Commercial Place, Aberdare	0	10	6
Thompson, Andrew, 33, English Street, Carlisle	0	10	6
Thompson, Edward, 1, King Street, Dover	0	5	0
Thompson, Henry, Southwark Street	0	10	6
Thorne, John, Wellingborough	0	10	6
Thurland, Henry, 41, St. Giles Road, Oxford	0	10	6
Tighe, Henry W., 4, High Street, Exeter	0	5	0
Todd, Joe, Carlisle	0	5	0
Tomlin, Albert R., Shambles Street, Barnsley	0	10	6
Umney, Charles, 40, Aldersgate Street, E.C.	0	10	6
Walker, Charles, 133, St. George Street	0	5	0
Wallworth, David, High Street, Maldon	0	5	0
Walton, John, 300, High Street West, Sunderland	0	10	6
Watson, William, 6, St. Paul's Road, Bow, E.	0	5	0
Weller, George, High Street, Windsor	0	10	6
Whaley, Edward, Kingston-on-Thames	0	10	6
Whitfield, John, 113, Westborough, Scarborough	1	1	0
Whitfield and Son, Worcester	1	1	0
White, Thomas, Church Street, Launceston	0	10	6
White, J. L., St. Loyers, Bedford	0	5	0
Whittaker, William, High Street, Runcorn	0	10	6
Williams, Jabez V., St. Alban's House, Weymouth	0	5	0
Williams, Joel D., Bodmin	1	1	0
Williams, Thomas, Bute Street, Cardiff	0	10	6
Williams, Thomas H., 44, Seven Sisters Road, N.	0	5	0
Wilson, Edward, London Road, Sheffield	1	1	0
Wilson and Kitchin, 27, King Street, Whitehaven	1	1	0
Wing, Samuel W., Colsterworth	0	10	6
Wise, Walter, 43, Duke Street, Manchester Square	0	10	6
Witherington, Thomas, 8, Foregate Street, Worcester	1	1	0
Wood, Edward, 20, Sussex Street, Warwick Square, S.W.	0	10	6
Wood, Richard, Mill Street, Macclesfield	0	10	6
Woodliffe, Alfred, High Street, Bridlington	0	2	6
Woodman, George, Market Place, Basingstoke	0	5	0
Wootton, Alfred C., 44, Burghley Road, Highgate, N.W.	1	1	0
Wright, Alfred, 16, Little Alie Street, E.	0	10	6
Wright, William Fred, 30, Regent Street, Leamington	1	1	0
Wynne, Edward P., 3, Pier Street, Aberystwith	0	10	6
Young, John, 20, High Street, Newport, Mon.	0	10	6
Youngman, Edward, Bury St. Edmund's	0	2	6

Donations.

Biggs, B., 3, Laurence Pountney Hill, E.C.	5	5	0
Clark, John William, 15, Belvoir Street, Leicester	1	0	0
Cousins, Thomas G., 17, Magdalen Street, Oxford	0	10	6
Good, Thomas, 47, Minories, E.	2	2	0
Smith and Co., 132, Borough	5	5	0
Williams, John, 16, Cross Street, Hatton Garden	10	10	0

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A special meeting of the above Society was held in the Architectural Society's room, Gold Street, on March 22, 1875, Jas. Barry, Esq., J.P., in the chair.

The early part of the evening was occupied in looking at some very beautiful stereoscopic views of continental scenery lent by the chairman, and a variety of microscopic objects shown by Messrs. Osborne, Magger, and Druce, including sections of medicinal woods, crystals of the alkaloids, etc. Mr. Camplin exhibited one of Weiss's batteries. Specimens of jaborandi were exhibited by Mr. Wallis, and salicylic acid was also shown. Mr. Druce exhibited a collection of old officinal plants such as dittany of Crete, cydonia, staphisagria, etc., and nearly all the English *Rosaceæ*, and Mr. Dadford lent a large kaleidoscope.

In commencing the business part of the meeting Mr. Hester, the President, alluded to the prosperous state of the Society's finances and said he thought it would be proper, considering they were getting so wealthy, to elect as trustees some principals in the town. After some discussion he formally moved—"That five principals should be elected to administer the affairs of the Association, and when from any cause the number be reduced to three a meeting of the Association should be called to fill up the vacancies."

This motion having been seconded by Mr. Amery, and put to the meeting by the chairman, was carried *nem. con.*

Messrs. Barry, Berry, Bingley, Jeyes, and Magger were then elected as trustees.

Mr. Kemp said that if at any time—and he hoped and thought it would be a far distant time—the Association should come to an end, it would be proper for the members to intimate their desire in what manner the proceeds should be utilized, so he proposed—"That in case the affairs of the Association should ever be wound up, the balance of the effects, after paying all debts, be handed over to the Benevolent Fund of the Pharmaceutical Society."

Mr. Wallis seconded the proposition, and it was after discussion carried unanimously.

The Secretary said that they had received the calendar from the Pharmaceutical Society, and Mr. Barry had kindly offered two volumes of Faraday's 'Researches on Electricity.' After a cordial vote of thanks to Mr. Barry the meeting terminated at an unusually late hour.

It is intended to hold morning botanical classes in May.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Tuesday evening, March 30, a lecture on "Water, its Impurities, and How to Detect Them," was delivered before the members of the above Association, by Mr. J. Young, public analyst to the counties of Leicester, Rutland, and Northampton. In the absence of the President, the chair was taken, at half-past eight o'clock, by Mr. W. B. Clark, who briefly introduced the lecturer.

Mr. Young in his opening remarks dwelt on the importance to pharmaceutical chemists of a practical knowledge of the various methods for determining the purity of water, inasmuch as no question is more frequently referred to them for investigation than the fitness or unfitness of water for potable purposes. He then proceeded to enumerate the impurities usually found in water, and to classify them according to their nature and the sources from which they are derived. The first group consisted of those salts of calcium and magnesium, such as the carbonates, sulphates, chlorides, etc., which are derived from the soil through which the water percolates, and which, according to the quantities present cause it to be more or less hard. The question whether the presence of these salts is a disadvantage was also discussed, and various medical authorities cited, showing that, whilst a small quantity might be beneficial, yet, if the amount exceeds thirty or forty grains in each gallon of water a continued use of such water would be deleterious to health. The soap test proposed by Professor Clark for estimating the comparative hardness of water was then performed and explained, and the audience were instructed how to prepare the standard solutions necessary for its performance. The lecturer then passed on to the second group, which consisted of impurities derived from contact with decaying animal matter, etc. He stated that there are always two substances present in water which is contaminated with organic matter, viz., chlorine and ammonia. With regard to chlorine, he said that though the presence of organic impurity involved that of chlorine, yet the converse was not true, as chlorine is frequently found in water perfectly free from those substances. The presence and relative quantity of chlorine in water might easily be ascertained by the addition of a standard solution of nitrate of silver, until a precipitate ceases to be formed, were it not very difficult, from the opacity of the liquid, to know when to stop. A much more accurate result would be obtained, however, by the addition of a little solution of chromate of potassium previous to the precipitation with nitrate of silver; this causes a deep red precipitate of chromate of silver directly the chlorine has all been neutralized. With regard to ammonia, Mr. Young said, its presence in water proved conclusively that the impurity arose from contact with organic substances, it was, therefore, a much more valuable test of the purity or otherwise of water than the presence or absence of chlorine, the more so, because, by means of the reagents generally employed the presence of an infinitesimally small quantity, such as the millionth of a grain, could be ascertained with certainty. The test usually applied is that discovered by Nessler, viz., the addition to the suspected water of a solution of biniodide of mercury in liq. potassæ or liq. sodæ, the result being that, if ammonia is present, a brown tint is imparted to the liquid, caused by the precipitation of biniodide of mercury. If the animal matter should have been further decomposed in the water so as to form nitrites of potassium, etc., with salts already existing, these might be detected by the application of a test, founded on the fact that nitrous acid readily liberates iodine from its combinations. Solutions of iodide of potassium and starch are, therefore, added together with some mineral acid, and if nitrites be present a deep blue coloration is at once produced. Mr. Young concluded by referring to another class of impurities occasionally found in water, viz, lead (which is, perhaps more dangerous than any of those before mentioned) and iron. These substances, generally derived from the pipes, etc., through which water is conveyed, are not found in such large quantities as might be expected, owing to the fact that the salts of calcium and magnesium, already alluded to, form insoluble double salts with them, lining the pipes and protecting them from the action of the water. If present, however, they could easily be detected by the black precipitates thrown down on passing sulphuretted hydrogen through the water. The lecture which occupied upwards of two hours in delivery treated the subject in a most masterly manner, and being illustrated by numerous experiments, every test and operation was strongly impressed on the minds of the audience.

A very hearty vote of thanks to Mr. Young for his services, brought the proceedings to a close.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 1st April 1875, Professor Abel, F.R.S., in the chair. After the usual business of the Society, a paper describing some "Researches on the Action of the Copper Zinc Couple on Organic Bodies: VIII. On Chloroform, Bromoform, and Iodoform," by Dr. J. H. Gladstone and Mr. A. Tribe, was read by the latter. Dr. W. A Tilden then read a paper "On the Action of Nitrosyl Chloride on Organic Bodies: II. On Turpentine Oil." The action gives rise to a molecular compound of terpene and the chloride, which by the action of alcoholic potash yields *nitrosoterpene*, $C_{10}H_{15}NO$. Dr. A. W. Hofmann made two communications to the Society, one, on the decomposition of the fulminates by ammonia and by sulphuretted hydrogen, the other, a striking lecture experiment to show the atomic relations of oxygen and chlorine. The meeting was then adjourned until Thursday, 14th April, when papers were to be read on :—"The Gases enclosed in Coal from the South Wales Basin and Gases evolved by Blowers and by Boring into the Coal itself," by F. W. Thomas; "On Narcotine, Cotarnine, and Hydro-Cotarnine," by G. H. Beckett and Dr. Wright; "Note on Isomeric Change in the Phenol Series," by Dr. Armstrong; "On Andrewsite and Chalkosiderite," by Professor Maskelyne; "An Examination of Methods for effecting the Quantitative Separation of Iron, Sesquioxide, Alumina, and Phosphoric Acid," by Walter Flight.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of the above Society was held on Wednesday, March 3, under the presidency of M. Planchon, who, after the preliminary business had been transacted, read a paper on Jaborandi, giving a very detailed description of roots, branches, and stalks of different sizes, leaves of various ages, inflorescence bearing buds and flowers, and an imperfect fruit, which had been picked out from a parcel of jaborandi received at the Pharmacie Centrale.

M. Planchon is of opinion that there can be no doubt the plant belongs to the genus *Pilocarpus*, of which it presents all the characters, the disposition of the flowers and their structure being exactly those of plants of that genus. The fruit resembles in all points those in the museum belonging to the genus *Pilocarpus*, and particularly *P. heterophyllus*, A. Gray; the fruit of *P. pennatifolius*, Linn., is unknown. Referring to the question whether the occurrence of glabrous and very pubescent leaves indicates that they are derived from plants of two different species, he remarks that if they occurred alone it might have been supposed that they were, and the opinion would have received support from the positions occupied by the inflorescence, it being sometimes terminal and sometimes occurring upon branches which had already lost their leaves. But after examining some specimens bearing several branches upon the same stem, he thinks he is justified in saying that leaves exist in all the gradations between the glabrous and pubescent forms. Moreover, Lemaire's diagnosis of *Pilocarpus pennatifolius** indicates that the plant, though at first pubescent, becomes glabrous proportionally as it increases in age: "frutex prima juventate totus puberulus, deinde glabratus." The difference in the position of the inflorescence does not appear to be accompanied by a corresponding difference in the organs of vegetation and is not sufficient to divide the plants into two true species. Assuming, then, that the specimens examined were the products of a single species, M. Planchon considers that, notwithstanding they are yet imperfect, they confirm the original conjecture of Baillon that they are referable to *Pilocarpus pennatifolius*. The larger glabrous leaves correspond in all respects to those of that species in the herbarium of the museum. The flowers, however, differ in some respects, but the differences he considers are probably individual rather than specific. The terminal inflorescence hitherto discovered with the jaborandi is not sufficiently developed to compare with the adult inflorescence of the museum specimens, whilst the latter do not include a plant having lateral inflorescence. Examined under the microscope the roots were found to contain numerous large resiniferous cells in all the layers, except the thin exfoliating periderm. In the bark, below the suberose layer, is a circle of well characterized glands, analogous to the oleiferous glands of *Citrus*; whilst in the liber layer are sclerogenous cells, containing a drop of resinous matter, and more internally are resiniferous cells resembling those of the root. The anatomical structure of the leaf is rather simple. An amorphous cuticle covering a single layer of square or rectangular cells represents the epiderm. Upon the upper side, immediately below this epiderm is a series of long narrow cells, extending perpendicularly to the surface, crowded together and containing chlorophyll. Lastly there is a loose parenchyma of cells also containing green granular matter. This parenchyma, frequently interspersed with air lacunæ, extends to the epidermic layer of the lower surface. Here and there fibrovascular bundles occur, corresponding to the section of the nerves, and in the middle, at the point where the median nerve would be found, is a well developed bundle of ligneous tissue intermixed with spiral vessels. In the middle of the parenchyma are large translucid oleiferous glands, formed of intercellular cavities, surrounded on all sides by special cells, which are smaller than those of the surrounding tissue, and which form a continuous wall to the gland. These cells are scattered here and there through all the section; sometimes they approach the upper surface, breaking in upon the layers of chlorophyll cells, but the greater number occur towards the lower surface. The stomata of the leaves, which are especially numerous on the under surface, are rather small, ellipsoid in form and surrounded by two reniform cells; the hairs are simple and unicellular. The thick tawny-grey or brown petals of the flower are marked by numerous well-developed oil

* Lemaire, 'Jardin fleuriste,' vol. iii., pl. 263.

glands, and it was noticed that when moistened with warm water for the purpose of dissection they gave off an odour which was much finer and more agreeable than that of the leaves, and resembling the smell of citron. In reply to a question, M. Planchon stated that from recent experiments the stem bark appeared to possess the same properties as the leaves.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture V.

On the secondary action of Alcohol on the animal functions, and on the physical deteriorations of structure incident to its excessive use.

It is my business in this course of lectures to treat upon the specific action of absolute alcohol. I have therefore specially avoided all reference to the spirituous drinks of which it forms a part. As a rule, in every form of strong drink the source of the action of it, for good or for evil, is the spirit it contains, and the influence of the drink is potent according to the amount of that spirit present in it. To put the matter simply, if all the liquors sold under the name of wine, brandy, gin, rum, whisky, ale, stout, perry, cider, and so forth, were divested of their alcoholic spirit, they would contain comparatively little of anything that would affect those who partook of them.

Deleterious Additions to Alcoholic Drinks.

But as I am about to-night to speak of the deleterious action of alcohol, it is fair I should admit that some bad effects do spring from so-called wine and kindred drinks independently of the pure spirit they contain. Something less of evil than now obtains would be secured if none but natural wines and ales were drunk by the people. To return to the times before Brantwein was distilled, and to have no intoxicating beverages save pure wine and sound ale, were doubtless an improvement on the state of things which now exists; for in truth at the present time the characters of pure ethylic wine are hardly known. A *bonâ fide* wine derived from the fermentation of the grape purely cannot contain more than seventeen per cent. of alcohol, yet our staple wines, by an artificial process of fortifying and brandying, which means the adding of spirit, are brought up in sherries to twenty and in ports to even twenty-five per cent. Some wines and spirits are believed to be charged with amylic alcohol. Other wines are charged with foreign volatile substances to impart what is called bouquet, and still other so-called wines—I allude specially to the effervescing liquids sold under that name—are actually often undergoing the fermenting process at the time they are drunk, and thus are invited to complete their fermentation in that sensitive bottle, the human stomach.

If the subject were specially looked into, a very important chapter of facts might be collected bearing upon the injurious effects of these additions to ales, wines, and spirits. I have noticed the evils that follow upon the administration of an alcoholic drink that has been adulterated with amylic alcohol, and have shown that they are exceedingly serious. The disturbances excited by the other faults, when they do not arise from excess of absolute alcohol, are shown in symptoms of indigestion and in the promotion of an acid condition of the secretions of the body beyond what is natural.

Presuming, therefore, it be actually determined by any one that he will take some alcoholic fluid, he will do nearest to that which is most wise if he take wines or other spirituous drinks in which the quantity of alcohol is simply confined to the natural amount, in which the process of fermentation has ceased, and in which no foreign substance has been introduced to add either bouquet, body, piquancy, narcotizing influence, or other artificial quality.

Absinthe.

The admitted addition of some actively poisonous substances to alcohol, in order to produce a new luxury, is the evil most disastrous. The drink sold under the name of *absinthe* is peculiarly formidable. In this liquor five drachms of the essence of absinthum, or wormwood, are added to one hundred quarts of alcohol. Thus the liquor is not only very strong as a mere alcoholic drink, but it is charged with another agent which has been discovered to exert the most powerful and dangerous action upon the nervous functions. The essence of absinthum in doses of from thirty to fifty grains produces, in dogs and rabbits, signs of extreme terror and trembling, followed by stupor and insensibility. In larger doses it causes epileptiform convulsions, foaming at the mouth, and stertor of the breathing. Its effects, as they occur from the taking of it in the form of absinthe in man, have been most ably described to me by one who indulged in it until it induced in him the peculiar epileptiform seizure. He described the effects as resembling those produced by *haschish*, the narcotic of the East which has been known for so many ages as the *nepenthes* of Homer, and which owes its properties to extract of Indian hemp or *Cannabis Indica*. The partial insensibility caused by the absinthe is attended with the ideal existence of long intervals of time, in which the events of a whole life are arrayed and appreciated, to be succeeded by terrific hallucinations and intellectual weakness, ending in unconscious struggling as if for life. In time, if the use of the absinthe be continued, these phenomena become permanently established and the result is inevitably fatal.

The doubly poisonous absinthe is made the more seductive to its victims by the fact that it excites a morbid craving for food which is never felt except when it is tempted by the destroying agent. Indeed, such are the terrible consequences incident to this agent, that I agree with Dr. Decaisne in maintaining that it ought, by legal provision, to be forbidden as an article for human consumption in all civilized communities. Even in small quantities taken daily, say one or two wine-glassfuls, it causes quickly a permanent dyspepsia, and what is of still more consequence it tempts its victims on and on, so that they cannot take food until absinthe has prompted the desire for it, by which time they are too often hopelessly and mortally in its power.

Until recently absinthe has not been publicly offered for sale in this contry on a large scale. But now unhappily the poison is openly announced even here, and the consumption is on the increase; I am doing therefore a public duty in denouncing its use solemnly from this platform, whence so much that is beneficial to society has for a century past been spoken.

Addition of other Agents.

The intentional additions of poisonous agents to the alcohol of ales, wines, and spirits, pale when absinthe appears in sight, but they are not to be ignored. It is true that we very often hear accounts of the effects for evil of bad wine, when, in fact, the evil is due to the excess of ordinary alcohol that has been taken by the complainant. At the same time it is not to be denied that there exists in our midst a system of mixing, compounding, blending, and reducing wines and spirits, which, carried even to artistic perfection, is additionally prejudicial to the business of selling the various alcoholic beverages.

To be just to our own age, this artistic performance is not an invention of it. The adulteration of wine is indeed one of the oldest devices, extending from the Greeks and Romans onwards to this day. In the Middle Ages many prohibitory acts were passed against it by various governments. As late as the close of the seventeenth century an Act was passed by Duke Everhard Louis of

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

Wurtemberg making it an offence punishable with death and confiscation of property to adulterate wine with bismuth, sulphur, or the salt of lead called litharge, now known as the yellow protoxide of lead. In the year 1705-6, John Jacob Ernhi of Eslingen was actually beheaded for carrying out adulteration with the forbidden poisonous lead compound.

Into our modern civilization a different system of treating strong drinks, in order to rectify bad qualities or to impart new, is as a rule followed. The plan of using gypsum or sulphate of lime to remove the acidity of wine, a practice that was followed both by the Greeks and Romans, is however still resorted to; so also is the practice of using lime for the same purpose, and for which Jack Falstaff so severely criticizes the landlord of the "Boar's Head":—

"You rogue, here's lime in this sack too. There is nothing but roguery to be found in villanous man: yet a coward is worse than a cup of sack with lime in it; a villanous coward."

But on the whole, the new day has brought new plans and new inventions, having reference to the different forms of drinks, namely, ales, wines, and spirits, which pass from the hands of the vendor to the consumer.

(*To be continued.*)

Parliamentary and Law Proceedings.

The Sale of Vermin Killers.—A Chemist and Druggist Fined.

At the Wolverhampton Borough Court, on Monday, April 11, Messrs. W. J. Reade and Thomas Reade, chemists and druggists, of Victoria Street, were summoned for having on the 3rd of April unlawfully sold to Samuel Harvey a packet of Battle's vermin killer containing strychnine, Harvey not being then known to them, nor having been introduced to them by some person known to them, contrary to the Pharmacy Act. The proceedings arose out of an assistant to the defendants named Sibthorpe selling a packet of "Battle's Vermin Killer" to Samuel Harvey, who with it attempted to commit suicide.

Mr. Thomas Reade, who represented his firm, said they pleaded not guilty to the charge. They admitted that they sold the vermin killer, and that it contained strychnine, but their assistant knew the man Harvey to whom he sold it, and therefore they contended that they had complied with the Act.

Samuel Harvey was then called and said that he did not remember going to Messrs. Reade's shop on Saturday week. He was so drunk that he did not know where he went, nor he did not remember anything about it. In reply to Mr. Reade, witness said he did not know whether he was drunk when he went into their shop. If he did go into the shop he must have been drunk. He had been drinking all the previous week, and he attributed his loss of memory to being drunk.

Stephen Sibthorpe, assistant to the defendants, said Harvey came into Messrs. Reade's shop between six and seven o'clock on Saturday night week. He asked witness for two packets of rat poison, and said he supposed he would have to sign for it. He asked for two threepenny packets, and witness supplied him with one sixpenny packet. After entering the sale of the packet in their "poison book," Harvey signed the book, but did not give his address.—In reply to the Bench, witness said he knew Harvey by sight, as he had frequently come to the shop for oil for Mr. Hunter, the manager at Messrs Chubb's works, Horsley Fields. When witness sold the poison he took Harvey to be sober.

Mr. Reade here handed up a book provided by them for the sales of poison to be entered in. He said it did not provide for any address, but only for the signature of the purchaser.—In reply to the Bench, Mr. Reade said he did not produce the book in which the sale of the poison to Harvey was entered. The book was being used at their place of business. They were quite in the hands of their assistant Sibthorpe. They had complied with the Act by the fact of Harvey having signed their book. The Act did not say that they must be on visiting terms with the purchaser, or that they must even know his address.

Mr. Barber (deputy magistrates' clerk) said the object of the Act was to know the purchaser's whereabouts in the event of his being wanted.

Mr. Umbers (magistrates' clerk) observed that the Pharmacy Act stated that it was unlawful to sell poison to any person unknown to the seller, besides which the seller should, before delivery of a poison, make an entry in a book kept for the purpose of the name and address of the purchaser, and the quantity and kind of article sold.

Mr. Barber remarked that if Harvey's attempt to commit suicide had proved fatal they (the defendants) would not have known where to find him.

Mr. Reade said the object of the Act was not to prevent suicide but to prevent murder.

Sir John Morris said the assistant had failed to comply with the regulations of the Act by not entering Harvey's address in their book.

Mr. Reade stated that was an omission, but their book was issued by a very respectable firm, and it did not make any provision for the address of the purchaser to be entered.

Mr. Sibthorpe said he knew the address of Harvey from the fact of his having been employed at Messrs. Chubb's.

Sir John Morris: But you did not conform with the Act by putting his address in your book.

Mr. Umbers: Are you prepared to be more careful in future?

Mr. Reade: Yes, sir, but we have always been scrupulously careful about the sale of poisons.

Mr. Sibthorpe: I have frequently refused to sell poisons to persons whom I did not know.

Sir John Morris: The Bench have no other course to pursue than to decide for a conviction to take place. The man (Harvey) was evidently drunk, and in an unfit state to be supplied with poison, and you have not complied with the Act.

Mr. Reade: I think that man's evidence is not fit to be put against ours, who have a good character and reputation to maintain. I think you ought not to allow that man's evidence to go alongside ours.

Mr. Barber: The question is not whether the man was sober or drunk, but whether you have complied with the regulations of the Act.

Sir John Morris (to Mr. Reade): It is clear you have not complied with the Act, and we are bound to convict. You will be fined £1 and costs.

Mr. Reade: We tried to conform to the Act, or we should not have made any register of the sale at all.

Sir John Morris: There is a trifling omission which might have resulted in very serious consequences.

A fine of £1 and costs, amounting altogether to £3 1s., was then imposed, and Mr. Reade at once paid the money. —*Midland Counties Express.*

Examination Papers.

At Bow Street Police Court, on Saturday, April 10, Samuel Cowap, aged 21, described as a chemist's assistant, residing at 42, Castle Street East, Oxford Street, was charged on remand before Mr. Flowers, with inciting one George Austin to steal an examination paper of the Pharmaceutical Society from his employers, Messrs. Stevens and Richardson, printers, of 5, Great Queen Street, Lincoln's Inn Fields.

Mr. Douglas Straight, instructed by Messrs. Flux and Co., solicitors to the Pharmaceutical Society, again prosecuted.

James Wallis Butcher, detective sergeant, said that upon Saturday, April 3, he went, according to instructions, to the corner of Tottenham Court Road, about 4 o'clock in the afternoon. He saw Austin there and saw him meet with the prisoner and go with him into the Horse Shoe Tavern, at the corner of Tottenham Court Road. Austin handed the prisoner a paper, and he in return handed something back to Austin, who threw it on the counter as if to test it, and witness then saw it was half a sovereign. Witness immediately said to the prisoner: "I am a detective officer, and shall take you into custody on the charge of inciting this man (Austin) to steal the examination paper of the Pharmaceutical Society from his employers." The prisoner replied: "My God! I have not looked at the paper. You are too fast this time. Will you let me go?" Witness said he would have to go to Bow Street, and on the way to the station prisoner said: "I don't know what I shall do. I did not think of this. I am in a respectable position as a chemist's assistant. I was to go up to an examination on Monday, and have paid the fee, and studied hard, but I did not think I should pass and so took these means for getting the paper to enable me to do so." Witness asked him where he was employed, and he said at Mr. Bird's, Castle Street East. Witness went there and found his statement correct. At the station prisoner was searched and the examination paper in question found on him. Witness had ascertained that the prisoner had previously borne a very good character, and Mr. Bird, his employer, was in court to speak for him and was also willing to continue him in his employ.

This being the case for the prosecution,

Mr. Straight said that since the last occasion of appearing at this court, on Monday, April 5, he and those for whom he appeared had had the opportunity of considering this case. Upon the last occasion he (Mr. Straight) had intimated that under certain circumstances, namely, if the prisoner had been employed by some professional "coach," who wished to obtain the paper to enable him the better to "cram" his pupils, the case would assume a very serious aspect. That was the case in 1871, when the Apothecaries' Company prosecuted and the then prisoner was sentenced to twelve months. But in this case full investigation had been made and the result was that the prisoner was shown to be a young man in the confidence of his employer and bearing a very good character, but who had, unfortunately, without thinking of the consequences, given way to the temptation of making more sure of passing his examination by obtaining this paper. Under these circumstances the Society had left the matter entirely in his (Mr. Straight's) hands, and what had decided him in taking the course he was about to adopt was that Mr. Bird, the prisoner's employer, was present to speak for him, and also was anxious to continue to employ him, and further that he had received a letter from Mr. Cooper, the rector of the parish in which the prisoner lives, in which he says he has known the young man for a long while and was surprised, judging from his previous upright behaviour, to hear that he had thus given way to temptation. Having thus received from all sides testimony to the prisoner's previous good character, the Society did not wish to press the matter against him. At the same time they wished the public to perfectly understand that they were guided solely by the peculiar facts of this case. Any repetition of the offence will not be passed over in this way. Mr. Straight concluded by asking his worship's permission, under the peculiar circumstances of the case, and as the offence was a misdemeanor, to withdraw from the prosecution.

Mr. Flowers said that he felt no difficulty himself in adopting this course. He had thought all along that this was a very different case to the one in 1871. He was glad to see the prisoner's employer, Mr. Bird, become bail for him on the last occasion as it proved that Mr. Bird had a good opinion of him. It was also evident from the prisoner's behaviour in the dock, that he was very sorry for what he had done. Had he had the pluck to go up for the examination honestly, he (Mr. Flowers) believed the prisoner would have passed. Had this been a case of a man who had obtained the paper to enable him to "coach" pupils and so defraud the Society, the punishment would have been severe, for there was no calculating the amount of harm that might be done by young men being placed in positions they were not qualified to fill, owing to their having passed examinations dishonestly. After fully considering, however, all the facts of this case and all that Mr. Straight had urged in the matter, he (Mr. Flowers) should offer no objection to the course the Society proposed to take, and the prisoner might therefore be discharged. Mr. Flowers also expressed a hope that this case might prove useful as a warning to others.

The Residue from the Manufacture of Aërated Waters.

At Marlborough Street Police Court, on Thursday, April 8, Mr. Thomas Codey, mineral water manufacturer, No. 88, Whitfield Street, St. Pancras, was summoned before Mr. Knox for allowing the discharge of mineral waters and other offensive matters and the deposit of the residue from the manufacture of aërated waters into the sewers, thereby causing a nuisance.

Mr. Cooper, solicitor to the Vestry of St. Pancras, prosecuted; and Mr. Edward Lewis was retained for the defence.

Mr. Cooper, in opening the case, said that one flushman had been killed on entering the sewer, and others had been so affected that they refused to go down. The defendant, having had notice given to him, discontinued for some time the practice of discharging refuse into the sewer, thereby evolving a gas of a most injurious nature, but on the 18th February, it having been found that he had resumed the practice, the present proceedings were instituted.

John Hartley, inspector of nuisances for St. Pancras, proved serving notice on the defendant to discontinue the nuisance. He went down the sewer on the 18th February, and saw some refuse from the drain brought out by a man named Francis, and saw it taken away. The refuse was very offensive matter; it made him giddy when he stood over it. The matter appeared to be a sediment of lime.

Thomas Francis, foreman of the flushers of St. Pancras, proved taking some of the matter from the sewers, which he considered was dangerous to health. One flusher had lost his life through it; others had been made ill, and he became ill in consequence of inhaling the stuff, some of which he took to the analyst at Guy's Hospital.

Replying to Mr. Lewis, witness said he had been ill previously. After going down the sewer he was attacked with giddiness. He took some medicine the next day.

Medical evidence having been given,

Dr. Stevenson, lecturer on chemistry at Guy's Hospital, stated that he had examined the stuff taken from the sewer. The deposit was a white solid substance, such as forms the refuse from aërated water factories and ordinary sewage. The refuse from soda water consists of whiting and a product of the action of oil of vitrol and whiting, known as sulphate of lime. The refuse was odourless, but when it is shut up with sewage it undergoes decomposition and loses oxygen. The carbonic acid of the sewage then by its action on the decomposed refuse liberated a poisonous gas from it, known as sulphuretted hydrogen. The white refuse also detained the sewage mechanically; that caused its decomposition *in situ*. The refuse thus acted deleteriously both by its mechanical and its chemical actions.

Mr. E. Lewis was prepared to show by other professional evidence that the charge of nuisance could not be sustained, and that no danger to health was to be feared from the practice of the defendant.

Mr. Wanklyn, analyst, had examined the soda water refuse, and found that it contained two per cent. of free sulphuric acid. Such a refuse if diluted with water would act as a disinfectant, and would not liberate noxious gases from sewage, for the quantity of liquid would be more than sufficient to dissolve all the sulphuretted hydrogen liberated by the action of the acid.

An application having been made for an adjournment, in order that further rebutting evidence might be produced,

Mr. Cooper would not oppose the application, but he hoped an early day would be fixed for a decision, because it was a matter affecting not the health only of flushmen, but of the inhabitants of the district.

Upon the case being resumed,

Mr. Cooper wished to put in the joint opinion of the Solicitor-General and Mr. H. B. Bland.

The opinion was to the effect that a magistrate could make an order on the manufacturers, under section 12 of the 18th and 19th Vict., cap. 121. After reciting several decisions and cases, the counsel went on to say that the case submitted to them was an important one to the Vestry of St. Pancras, as the men sent into the sewer to flush it as required could not do their work without having their health injured. As the question was not free from doubt—though if a magistrate gave an order of prohibition they had no doubt it would be sustained—they would suggest that the magistrate if requested should state a case for the opinion of the superior courts.

Mr. Knox said he was prepared to give his decision, and, after referring to cases decided by Justices Blackburn and Mellor, remarked that there was a conflict of evidence in the case before him—one scientific gentleman stating one thing and another something different. Under these circumstances he felt compelled to rely on the evidence of the medical gentleman on the part of the parish, that putting the refuse matter into the sewer was injurious to the public health, and he should therefore make an order that the nuisance be discontinued, and if Mr. Lewis thought proper to ask for a case he would give one. At the same time he would suggest to the defendant the expediency of mixing water freely with the refuse so as to render it harmless in its character.

Prosecution under the Adulteration Act. Alleged Adulteration of Vinegar.

At the Stone Petty Sessions the adjourned hearing of a summons against Mr. Thomas Slater, grocer and druggist, of Stone, for selling vinegar alleged to be adulterated was proceeded with on Tuesday, March 30. The proceedings were taken by Mr. Knight, inspector under the Adulteration Act, whose assistant procured a pint of vinegar at the defendant's shop, on January 21, which was afterwards submitted to Mr. Scott, the county analyst, and certified by him to be adulterated with some preparation of or containing lead so as to be injurious to health and also with sulphuric acid. The defendant was not satisfied with the result of the analysis, and at his request the case was adjourned in order that an independent analysis might be obtained. Messrs. Hill and Evans, the manufacturers of the vinegar, having in the meantime become interested in the case with a view to establish the purity of the article manufactured by them, not only was the remaining portion of the vinegar purchased for Mr. Knight sent to be tested by Dr. Thudichum, but two other samples of the same vinegar were sent respectively to Dr. Letheby and Dr. Voelcker. On the present occasion, Mr. C. Fulford, barrister, appeared for the prosecution, and Mr. J. Underhill, barrister (instructed by Mr. Southall, of Worcester), in behalf of the manufacturers. Drs. Letheby and Voelcker were in attendance to state the result of their analyses, but Dr. Thudichum was not present, and Mr. Underhill objected to his certificate being taken as evidence. Mr. Fulford said that Dr. Thudichum would have been in attendance only that the prosecution wanted to save expense to the defendants. Dr. Thudichum would require a twenty-five guinea fee to come down, and they did not know that there were gentlemen connected with this case who were prepared to pay all these costs, or Dr. Thudichum would certainly have been there. It was a usual thing in these cases to save expense by accepting the certificate as evidence. If in this case the certificate were not admitted, an adjournment must take place. Mr. Underhill said the question was such an important one that he should have thought not only Dr. Thudichum but Mr. Scott would have been present. He would suggest a course, however, which might obviate the necessity for Dr. Thudichum having to attend, and it was that they should proceed with the case as far as they could, and examine witnesses *pro* and *con.*, and if at the close the Bench were not in a position to pronounce a decision, then that an adjournment should take place for the attendance of Dr. Thudichum. This course having been agreed to, Mr. Fulford proceeded to recall the circumstances of the case, and to refer to the certificate given by Dr. Thudichum, which, it appeared, stated that the vinegar was adulterated with sulphuric acid so as to be injurious to health, but made no mention of lead. The learned counsel pointed out that there would be a difficulty in showing that the second samples were taken from the same barrels as the first sample, and argued that the most reliable test must be that made upon the remaining portion of the article purchased for the inspector. John Johnson, the person who bought the vinegar for Mr. Knight, having been cross-examined at considerable length, Mr. Underhill then addressed the Court for the defence. He said they desired in this case to fight the broad question whether that vinegar was adulterated or not, and having mentioned several instances in which Messrs. Hill and Evans had victoriously established the purity of their vinegar, he proceeded to comment upon the fact that Mr. Scott had found lead in the vinegar, but that Dr. Thudichum had found only sulphuric acid or oil of vitriol. The difference between the two certificates showed either that one analysis was very imperfect, or that there must be some considerable mistake on the part of one or both of the analysts. When doctors disagreed, who was to decide? He concluded by sketching out the evidence as testified to by the following witnesses:—James Burnett, assistant to the defendant, deposed that he supplied Mr. Knight's assistant with a pint of vinegar on January 21. Some time afterwards he drew off a pint of vinegar from the same barrel, and it was put into a bottle and sealed by Mr. Slater in witness's presence. That bottle was sent to Dr. Letheby by railway. Subsequently he drew off a further quantity, which was also put in a bottle and sealed, but he did not know of his own knowledge to whom it was sent. The vinegar was just in the same state as when it came from Messrs. Hill and Evans. Cross-examined: They kept two kinds of vinegar at the shop; one kind at 2*d.* and the other at 3*d.* a pint. Johnson bought the cheapest kind. Dr. Letheby, Professor of Chemistry at the College of the London Hospital, said that on March 1 he received a bottle of vinegar for analysis from Mr. Slater. He made a very careful and complete analysis of it. He could say with the utmost confidence that there was not a trace of free sulphuric acid in the vinegar. He found traces of combined sulphuric acid, but that was contained in the water from which the vinegar was made, and was not at all injurious to health. Dr. Letheby also showed that unless a peculiar test were made the combined sulphuric acid, which was perfectly harmless, might be mistaken for the noxious element of free sulphuric acid. The analyst might have jumped to a conclusion, as a similar error had been committed by chemists of great reputation. Of lead he found no trace whatever. Dr. Voelcker, who had made an entirely independent analysis of the second bottle, corroborated Dr. Letheby's evidence in almost every particular. Mr. Fulford thought, after the evidence that had been given, it would only be fair that Dr. Thudichum and Mr. Scott should be present, and have an opportunity of upholding the conclusion to which they had come. It must be borne in mind that there was no means of ascertaining whether Barrett was perfectly accurate in his recollection of what he did—whether, in fact, the vinegar was the same as that sold to Johnson. The Bench adjourned the case for a month.

Suicide by Laudanum.

An inquest was held at Liverpool, on Saturday, the 3rd inst., respecting the death of Mr. S. Perris, late librarian at the Lyceum Library, Bold Street. It appeared that the deceased had, in consequence of bad health, been unable to attend to his duties; the sub-committee had therefore passed a resolution that he should be presented with a gratuity of £100, and that his future services should be dispensed with. He became very depressed in consequence of the loss of his situation, and on the Thursday morning previous to the inquest he was found lying dead in the library opposite his father's picture, and a broken bottle that had contained laudanum was in the fireplace. Dr. Dawson said he had no doubt the death of deceased had been accelerated by laudanum.

The jury returned a verdict that death had been caused by poison taken whilst deceased was labouring under mental derangement.

Notes and Queries.

[435]. CEMENT FOR COMPOSITION MORTARS.—Can any reader tell me of a satisfactory cement for mending large broken composition mortars? I have tried several, but they are all unsatisfactory.—"VINEGAR."

[436]. UNG. PAGENSTACHEN.—Can anyone give me information about Ung. Pagenstachen? I had a prescription presented the other day with ʒij of said Ung. and ʒi Adipis, and am utterly at a loss to know what it is.—W. B. C.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Glasgow Memorial.—Explanatory Note.

Sir,—Will you kindly permit us to explain in connection with this memorial that by an unfortunate oversight, Mr. Frazer had not been supplied with a copy of it while asking him to support its prayer; hence, we presume, he was unable at the moment to decide in what form he should bring it before the Council. It is only right also for us to state that the only meeting in connection with it at which Mr. Frazer was present was the meeting of the Glasgow Council where there were nine members (including Mr. F.) present; but that the draft memorial had previously been adopted by a meeting of the trade, convened by circular, at which there were about sixty representatives, both town and country members, while many who could not get to the meeting sent letters of apology expressing their entire sympathy with the objects of the meeting, which were, of course, set forth in the circular calling it. We think it only due to ourselves also to point out an awkward error which has crept into the second suggestion, namely, the words "That the Board of Examiners be ballotted for from year to year as in the election of Members of Council, that is to say," should read thus: "That the Scotch Board of Examiners be ballotted for from year to year by the Council as in the case of the London Board last year, and that."

We gladly further take this opportunity afforded us of disclaiming altogether the impression which seems to have been made on the minds of Messrs. Betty and Mackay, regarding the memorial, namely, that it was intended in any way to impugn the honour of the Board of Examiners in Scotland. Nothing could have been further than this from the intention of the memorialists, nor do we see how anyone in carefully reading the memorial can form such an estimate of it; we know at all events that it was not the desire of the meeting to cast the slightest reflection upon either past or present members of the Examining Board in Scotland. Not only so, but, although Mr. Mackay has evidently forgotten it, circulars convening the two or three public meetings, which were held to discuss the question and at which the draft memorial was adopted, were sent to several members of the Examining Board at Edinburgh, Mr. Mackay, if we mistake not, being amongst the number, while the meetings and their objects were notified in reports published in the *Pharmaceutical Journal* and *Chemist and Druggist*.

In conclusion, we cannot but express regret that seeing Mr. Frazer declined to discuss the substance of the memorial until he found himself in order to do so in a formal manner, that the matter on its merits was entered upon at all by any of the other members of Council present, or that you yourself, sir, should have taken it up in your editorial columns. We earnestly hope that the memorial will receive that fair and impartial consideration that its importance demands when it comes before the Council through Mr. Frazer's motion next month.

JOHN CURRIE, *President.*
JAS. M. FAIRLIE, *Secretary.*
Glasgow Chemists and Druggists' Association.

The Glasgow Memorial.

Sir,—The extraordinary production purporting to emanate from the Glasgow chemists and druggists (and signed by Messrs. Currie and Fairlie), read at the Council meeting of 7th April, has all the appearance at the present moment of being a huge joke, played on the Council at the expense of our friends of the West of Scotland. This opinion is confirmed not only by the nature of the meeting at which the extraordinary resolutions were adopted, a meeting apparently partaking very much of the character of the historical meeting of the Tooley Street tailors, but it is confirmed more especially if we notice that it was quite evidently intended that the document should reach the Secretary's hands on the 1st of April, All Fools' Day. Under these circumstances it is quite possible that the production may have too much importance attached to it; and yet seeing the Council have given some little consideration to it, and seeing also that our respected Scotch member, Mr. Frazer, has fallen innocently into the trap, I venture, at the risk of having it voted an infliction, on stating one or two plain truths by way of reply to the memorial.

In doing so I pass in silence the fling which Messrs. Currie and Fairlie, together with the five other unnamed gentlemen present at this meeting, have at all and sundry connected with the examiners and examinations; nor do I in the meantime intend calling particular attention to the wonderful logic running through the whole production, intending to prove that examinations, and more especially examinations in Edinburgh, and scarcity of apprentices and assistants are cause and effect. In these respects I will let the memorial speak for itself, and I have a strong conviction that comment is superfluous.

There is one point, however, which requires serious inquiry and explanation, viz.:—Why, and under what conditions, Mr. Fairlie signed this memorial? As Secretary of the Glasgow Chemists and Druggists' Association it is highly probable that Mr. Fairlie had a considerable hand in drawing out and framing this memorial; but whether he drew it out or not he must at least have been conversant with its contents previous to signing it. Now, did Mr. Fairlie, or did he not, give the Glasgow Chemists' Association, or the Council of the Association, or the six gentlemen present along with himself at this extraordinary meeting, any information on the following points, *videlicet*, Did he inform them of an Executive or Council in Edinburgh whose duty it was to nominate, not elect, examiners for Scotland? Did he tell them that this Executive or Council was popularly elected after the manner of the London Council, by sending ballot papers throughout the length and breadth of Scotland, and that gentlemen were nominated annually from almost every town of any importance in Scotland? And further, Did he tell them that he himself had sat on this Executive for at least the last two years, and never once during that time suggested any improvement on this mode of nominating the examiners (as indeed he could not), nor once complained of the "limited area" from which the examiners were drawn, or of the influences "detrimental to the interests" of the candidate for examination under existing arrangements? If he did not explain to them all the foregoing, previous to agreeing upon and drawing out this memorial, then, I for one, would not care to characterize his conduct; if, on the contrary, he did, he confessed himself guilty of the grossest dereliction of duty, not only to the constituency which he represents, but also to his brethren of the executive, and in either case his signing this document is almost incomprehensible. It is all the more incomprehensible if we bear in mind that Mr. Fairlie knew, or would have known had he attended the meetings, that year by year efforts had been made to draw examiners from districts other than Edinburgh, not even excluding Glasgow, and that year by year they had failed, much to the disappointment not only of the executive but of the old examiners—failed from the simple fact that no one cared to enter on duties so irksome, so unthankful, and above all, so unprofitable. If Messrs. Currie and Fairlie's memorial draws the attention of the Council in London to this fact, it will probably induce them to consider the hardships of the examiners as much as the examined, and the executive as well as the Board of Examiners in Scotland may thus ultimately have cause to be even grateful for the scant courtesy (to call it by no harder name) which prompted and produced this memorial to the London Council without note or whisper to their Edinburgh brethren.

I feel I have already exceeded the limits allowable for a letter, but if you will kindly grant me space on another occasion, I will return to the subject of this memorial with more immediate reference to the points raised in it, of examiners, examinations, and scarcity of assistants.

SCOTUS.

Sir,—Observing in the Journal of Saturday the 10th a memorial from the Glasgow Chemists and Druggists' Association, which contains many misstatements and altogether shows a great amount of ignorance, I feel inclined to dispute their arguments.

In the first suggestion contained in that memorial it is stated that it is the rule for other examining boards in Scotland to admit candidates for their respective examinations to a subsequent examination after having failed, and without extra fee. Were the memorialists meaning Good Templars? I am unacquainted with the manner they conduct their examinations, but I can assure your readers it is not the rule of any other examining body in Scotland. The only examination that a candidate has two opportunities of passing for one fee is the preliminary examination of the Faculty of Physicians and Surgeons of Glasgow, but that body retains £2 for candidates who fail in their other professional examinations. The last clause of the suggestion is so absurd and untenable that it would not be held by any examining body in Scotland.

As regards suggestion 2, it appears that the memorialists are thoroughly unacquainted with the manner in which examiners are appointed; and thus the memorialists may be misunderstood; for some time since a furious attack was made on the Edinburgh Council about the manner their business was conducted, and the manner in which the members were elected, which resulted in the election of one of our western brethren. Has he done anything by his appearance or non-appearance to remedy these defects; or did they only exist in imagination? Perhaps if a similar course were pursued with the present memorialists they would be thoroughly satisfied, and we should hear no more of Scotland's hardships in the west; but owing to the qualifications necessary to become an examiner this is impossible. That the examinations are not the cause of driving young men from the trade in Glasgow is clearly proven by the fact that so many are studying for the medical profession, where examinations are more stringent, and the time and money required much greater. The real cause lies in the fact that the hours are much longer and the salaries much smaller than in any other branch of industry in this populous centre; a great deal also depends on the readiness with which young men can obtain access into other trades and professions, medical education being more accessible here than in any other city. The allurements of position and a decent livelihood on the one hand far outbalance £60 per annum with night bell and no society on the other. That such are the opinions of a vast amount of the assistants in Glasgow may be presumed from the fact that at the Glasgow Chemists and Druggists' Association a motion has been before the meeting for the last two nights, to the effect that none but those who close their places of business at 8 P.M. shall be eligible for election as office-bearers; thereby showing an inclination to dispose of your memorialists, as their qualifications, if the resolution were carried, would be found enormously wanting. A great deal is made of the expense incurred by candidates travelling from Glasgow to Edinburgh and back; but what about candidates from Aberdeen and the north of Scotland? As the whole expense for a return ticket to Edinburgh is 4*s.* 6*d.*, they talk about nominal fees of 5*s.* for botanical and other classes here, yet make such a cry about this 4*s.* 6*d.* In conclusion I would recommend the Society to present the Glasgow Chemists and Druggists' Association with one of their Calendars, and I am confident any of the Licensing Boards and Universities in Scotland will, on application, kindly grant them a syllabus of the manner they conduct their examinations, in order that next time they memorialize they may have a correct idea of what they are memorializing about.

ASSISTANT.

Glasgow, April 13, 1875.

Messrs. Kimnond and Co.—We have seen nothing of the samples mentioned in your letter of the 29th ult.

A Founder.—Possibly from your point of view a different day would be preferable, but a change would probably cause quite as much inconvenience to other parties concerned.

W. W. W.—De Fivas' 'Grammaire des Grammaires' and Otto's German 'Conversation Grammar.'

R. H. R.—Rimmel's 'Book of Perfumes,' or Piesse's 'Art of Perfumery.'

J. T. Jenkins.—The books you already have are good, and sufficient for your purpose. We cannot recommend you to spend your money upon guides to examinations.

F. R.—*Daphne Laureola* is an evergreen plant with green flowers; the leaves are two or three times as long as those of *D. Mezereum*, and more leathery. The flowers of *D. Mezereum* are reddish purple, and appear before the leaves.

X. Y. Z. (Reading) and *X. Y. Z.* (Greenwich).—Section 16 of the Pharmacy Act, 1868, provides that nothing contained in the sections relating to Registration shall extend to or interfere with the making or dealing in patent medicines, or with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing.

J. T. C. Williamson.—(1) Bentham's arrangement would be accepted. (2) No notice need be sent previous to sending the collection.

W. R. F.—There is no section which relates to homœopathic medicines in the Act.

J. S.—Sect. 1 of the 'Act to Amend the Pharmacy Act, 1868,' provides that nothing contained in the registration clauses shall "prevent any person who is a member of the Royal College of Veterinary Surgeons of Great Britain, or holds a certificate in veterinary surgery from the Highland and Agricultural Society of Scotland, from dispensing medicines for animals under his care;" but this does not entitle him to keep open shop as a chemist and druggist.

W. Gunn.—(1) The plants could in all probability be obtained through one of the herbalists in Covent Garden Market. (2) *Anthoxanthum odoratum* is, we believe, the only indigenous grass known to yield coumarin.

"*Minor.*"—The phosphate of lime should be freshly precipitated and moist if possible. See a paper by Mr. Daniels, on p. 213 of the present volume.

J. S. is referred to the rule respecting anonymous communications.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. E. Davies, Mr. Cotterell, Mr. Hemsley, Mr. W. J. Barnes, Mr. Pocklington, A.C.

EXAMINATION OF SOME SPECIMENS OF OPIUM.

COMMUNICATED BY PROFESSOR FLÜCKIGER.

In the 'Pharmacographia,' published in common with my late friend Daniel Hanbury, we alluded (p. 58) to the analyses of several samples of opium. It is perhaps not quite useless to supply a few particulars referring to their examination. The following samples have been submitted to analysis in my laboratory, mostly by Dr. Buri:—

I. *Patna* garden opium, 1838, wrapped in wax. Under the microscope it is seen to consist for a large part of nice crystals, and to be devoid of starch. The crystals may partly consist of alkaloids, partly of sugar.

II. *Medical Indian* opium, 1852–1853, portion of a square brick. It contains large crystals, no starch.

III. *Abkari* provision opium, Patna, No. 5380 (see also 'Pharmacographia,' 49). Small crystals, no starch.

IV. Garden *Behar* opium; exquisitely crystalline, no starch.

V. *Malwa* opium, portion of a flat cake. This is not distinctly crystallized, and exhibits numerous starch grains, fraudulently admixed, starch not being a constituent of poppy juice.

VI. *Sind* opium, No. 28; large crystals.

VII. *Hyderabad*, Sind.

VIII. Opium from *Candeish*, not distinctly crystallized, containing some starch.

IX. *Persian* opium, presented to me by Mr. Howard (1872), highly crystalline, no starch.

X. *Egyptian* government opium, from Thebes, as exhibited in 1867, Paris Exhibition. Not distinctly crystallized.

XI. Opium produced in 1823 at Playford, Suffolk; containing large crystals.

XII. *English* opium, 1859, from Mr. Morson. Small crystals.

The process for the estimation of narcotine and morphine was that described in the 'Pharmacographia,' p. 59. The extract *a* of the following table is that afforded by means of boiling ether, with which the powdered opium had almost absolutely been exhausted by repeating the treatment with ether from about twenty to thirty times. The extract remaining after the evaporation of the ether was boiled with acetic acid, 1·04 sp. gr. This liquid, after the acid had been driven off, yielded *b, crude narcotine*, as a crystalline brownish mass. It was washed with ether, and then afforded *d, purified narcotine.* Under *c*, the difference between *a* and *b*, representing the amount of *waxy matter*, is calculated. It includes also the oily matter, with which the Persian opium, No. IX, is impregnated, as well as a little wax in the case of sample I.

In exhausting the opium with ether a slightly yellowish fluid is obtained which displays a *bluish fluorescence*, due to an unknown constituent of the drug.

Before precipitating the morphine, the aqueous solution was concentrated in order to get a smaller volume. It afforded *e*, the *crude, dried morphine*, which, after twice or three times repeated recrystallization, finally furnished *f, purified morphine.* This purification of morphine cannot be performed without a loss of morphine; the real practical percentage of that alkaloid may therefore more correctly be regarded as somewhat superior to the figures *f.* It would be desirable to apply a process furnishing the exact percentage; yet there is, as far as I know, no such method thoroughly satisfactory. I have been struck with the very large discrepancy, in the Indian opium, of the figures under *e* and *f*, which I think is larger than in opium from Asia Minor. Another fact well worth considering is the usually low percentage of morphine of Indian opium, narcotine being frequently present to a larger amount. This has already been pointed out in the 'Pharmacographia,' p. 57. It would appear, however, that this is of no consequence for the Chinese consumption, yet possibly it will be so some day if the home production of the Chinese further increases. Perhaps a more careful preparation of the Indian opium would at least prove of importance, not so much with regard to the smokers of the drug as to the possibility of extracting morphine from Indian opium profitably It is not needful to point out that this would be highly desirable.

The results of the analyses just mentioned are the following:—

	I.		III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
a. Ethereal extract, *i.e.*, residue dried after the evaporation of the ether...	24·2	21·7	22·0	20·6	14·1	17·4	20·4	——	25·0	23·7	18·1	23·6
b. Crude *narcotine*....	10·0	9·0	8·5	7·6	7·6	8·0	9·7	——	10·2	12·2	9·3	11·6
c. Wax; difference between *a* and *b*...	14·2	12·7	13·5	13·0	6·5	9·4	10·7		14·8	11·5	8·8	12·0
d. Purified *narcotine.*	4·0	6·1	5·5	4·5	4·7	3·1	5·4	7·7	6·4	8·7	6·0	8·1
e. Crude *morphine*....	11·2	11·2	14·1	10·6	14·4	——	——	——	——	——	——	——
f. Purified *morphine*..	8·6	4·3	3·5	4·6	6·1	3·8	3·2	6·07	7·1	5·8	4·3	8·3

A NEW METHOD OF MAKING SUPPOSITORIES, MEDICATED PESSARIES, AND BOUGIES.

BY ALEXANDER ELLIS, A.P.S.

To the dispenser of medicines the making of the above articles has always been a bugbear. Even if he possess a supply of proper moulds it is more than probable it will prove of little value unless it include every conceivable size. Prescribers are not bound by any law in regulating the size of these articles, although the amount of active ingredient may vary little.

Several different plans have been advocated for making these articles. Thus we have the metal mould, a machine not possessed by every dispenser. Mr. Procter, in his 'Lectures on Practical Pharmacy,' gives directions for extemporizing moulds of tin foil. I have tried this method, but not with unvarying success, as on one occasion, during frosty weather, I had the misfortune to break my minim measure on pressing the hot sealing-wax into it. Mr. Procter forgets to state what size the cones should be made, so that it is almost impossible to divide the quantity of ingredients evenly between each mould.

In the *Pharmaceutical Journal* of the 27th February, I find an extract from a paper read before the Philadelphia College of Pharmacy by Mr. George W. Kennedy, on "Suppositories." This gentleman, whilst condemning the practice of using moulds or of buying suppositories from the wholesale druggists (as not being reliable for the equal distribution of the medicaments) offers a new method for making them which I think to be a very *dirty* and impracticable one, especially to any one who suffers from hot hands. Suppositories containing half their weight of ung. hyd. mit. or ung. hyd. nit. mit., which are now frequently prescribed, could not be made by the process recommended by this gentleman.

Now, there is no reason why anyone may not turn out suppositories, pessaries, or bougies *cleanly* and *expeditiously*, at a moment's notice, without the aid of a metal mould, or soiling the fingers, if the following directions be attended to. I have practised the mode for some time now; it has always given satisfaction, and I am in no dread of suppositories being required at any time or of any size.

Take a sheet of moderately stiff *glazed* paper (note paper will do, if of good quality), cut it into pieces of about three inches square. Pieces of less size will do if the operator can form cones with them, but for all ordinary purposes three-inch squares will be found the most convenient to work with. Taking hold of these squares between the forefinger and thumb of each hand turn them into cones precisely as a grocer would make a sugar-paper, being particular to twist the bottom evenly and tightly. Now cut the top off evenly with a pair of scissors, so that the cone for 15-grain suppositories will measure one inch in length inside, the diameter at the top being three-eighths of an inch, and for pessaries of one drachm, one inch and three-eighths deep, diameter, three-fourths of an inch. Fill these cones with water and insert them into the mouths of one-ounce phials; let the water remain in them for a couple of minutes, when they may be emptied; they are then fit to receive the ingredients of the suppository. During the time the moulds are being folded and prepared the cacao butter can be gently melted. Allow it to cool until it becomes of a creamy consistence, or so as it will run. Stir in the active ingredient which has previously been rubbed up on a slab with a little oil, glycerine, or lard, such as its nature requires; then pour into the moulds, using a glass rod to direct the stream, and stirring between each filling. In two or three minutes the suppositories will be sufficiently hard to be transferred, with the paper mould still on them, to a mortar full or a stream of cold water. Let them remain there for about five minutes, or less in cold weather, when they can be taken up and the paper easily detached, commencing by unfolding the bottom of the cone. The suppositories will turn out perfectly formed, with perhaps the least fringe at the top which may be pared off with a pocket-knife.

I have lately had to make rods one and a half inch long by one-third of an inch in diameter, as prescribed by Dr. Tanner in his 'Practice of Medicine.' These may be made by taking the same kind of paper as used for suppository moulds, but about eight inches square; roll it on the counter to the required diameter, something like a cartridge mould. Tie it with shop twine in the middle and at each end. Seal up one end with sealing-wax and insert it into an eight-ounce bottle, letting it pass to the bottom. Any number of these moulds may be made at a time. Now, proceed as directed for suppositories, and when the rods are sufficiently hardened, cut the twine, place them on a slab, when the paper can be easily unrolled from them, and the rods cut into the required lengths.

I quite agree with Mr. Kennedy in stating that the best excipient for suppositories is cacao butter. No other substance, possessing the same consistence when cold, will melt at the low temperature this will, and it is of importance that suppositories or pessaries should do their work quickly without the chance of remaining whole and causing irritation when used, or of being expelled after some hours in the same condition as when administered. But attention should be paid to the fact of the cacao butter being pure and not mixed with animal fat; that, in fact, it answers to the characters given it in the British Pharmacopœia. Should this be so the dispenser need not fear preparing a few suppositories for stock even in hot weather.

Skelton-in-Cleveland, March, 1875.

THE INFLUENCE OF BORAX UPON FERMENTATION AND PUTREFACTION.*

BY J. B. SCHNETZLER.

During the discussion which has taken place in the French Academy between MM. Pasteur and Fremy upon the theory of fermentation, M. Dumas intervened, and pointed out that there are two kinds of ferments: those which live and multiply during fermentation, of which beer yeast is the type, and those which destroy during their action, of which diastase is the type. In reserving the name of fermentation to the chemical action produced by the ferments of the first type, M. Dumas arrived at the conclusion that fermentation is a chemical phenomenon accomplished under the necessary influence of the life of the yeast. After having studied the action of a large number of substances upon yeast, he investigated the properties of borax. He found that this body coagulated yeast, dissolved the membranes which remained suspended in an unfiltered solution of white of egg, prevented the interversion of sugar by yeast water, arrested the action of diastase, and paralysed synaptase. This communication was the point of departure for the following experiments and observations by M. Schnetzler:—

(1) *Action of Borax upon the Protoplasm of Vegetable Cells.*—(*a*) Leaves of *Elodea canadensis*, in the cells of which the protoplasm presents an easily observed rotatory movement, were plunged into a concentrated solution of borax. The plasmatic current continued for some minutes, then slackened and stopped completely. The protoplasm contracted, receded from the cell-wall, and condensed into one or two rounded masses containing grains of chlorophyll. The living matter of the cell had been killed by the borax.

(*b*) When fresh leaves of *Vaucheria clavata* were plunged intact into a concentrated solution of borax, the protoplasm was coagulated and receded from the cell-wall, which became perfectly transparent. The globules of chlorophyll were contracted and recurved, becoming crescent-shaped. When the spores of *Vaucheria* are transferred from the mother cell into water they execute some rapid movements by the aid of small vibratory hairs. In a solution of borax these movements were almost immediately arrested; the protoplasm of the spore contracted

* Abstracted from the *Comptes Rendus*, vol. lxxx., p. 473.

and was transformed into a finely granular mass in the interior of the cell.

In a similar manner borax produced coagulation of the protoplasm in the spores of *Oïdium Tuckeri* (the grape fungus), in the cells of yeast, moulds, etc.

(2) *Action of Borax upon the Animal Organism.*—(*a*) Infusoria, rotifera, and entomostraca, placed in water containing borax quickly ceased to move, and then died; the contraction and coagulation of the sarcode of the infusoria being distinctly perceptible.

(*b*) The larvæ of frogs, rendered transparent by prolonged keeping in obscurity, when placed in the solution of borax manifested convulsive contractions in the muscular fibres of the tail. The circulation of the blood slackened gradually, the plasma of the blood coagulated, and in less than an hour death took place.

The preceding observations showed that borax caused a cessation of the properties by which the life of vegetable and animal protoplasm is manifested. If, therefore, fermentation is a chemical phenomenon, accomplished under the influence of the life of the yeast, borax ought necessarily to act antagonistically to fermentation. To test the correctness of this inference some experiments were made upon the—

(3) *Action of Borax upon Fermentescible Matters.*—(*a*) In October, 1872, some very ripe single grapes were placed in a concentrated solution of borax, together with an entire bunch, and kept in a closed vessel. The liquid, at first colourless, became slightly brown; but both the single berries and the entire bunch, presented after two years the same appearance, whilst there was no trace of fermentation. Although, however, the grapes were well preserved, they were not eatable. Diffusion had taken place: a great part of the sugar had passed through the skin of the grape, whilst the borax had penetrated to the interior where it had coagulated the albuminous matter of the cells. The same result was obtained with currants. When the flasks were well closed no trace of mould was seen; but when the air had either free or limited access, a mould (*mucor*) was formed, without fermentation, accompanied by disengagement of gas. When, as a counter test, grapes were placed in a well-closed vessel filled with ordinary water, after a time, according to the temperature, fermentation took place, with evolution of carbonic acid.

(*b*) Thirty cubic centimetres of fresh milk were placed in a test tube with 1 gram of borax. The cream quickly formed a rather thick layer in the upper portion. Notwithstanding the test tube was closed by a cork, a mould was formed upon the cream; but the remainder of the liquid underwent no acid fermentation, and retained during several months the appearance of very clear creamed milk. Afterwards, under the influence of summer heat the liquid became perfectly limpid, and deposited the casein as a soft white matter; but neither the deposit nor the liquid had an acid taste, and after three months they still had the odour of fresh milk. Fresh milk put into a well closed test tube without borax underwent acid fermentation in from two to three days, and became thick by coagulation of the casein.

(*c*) A piece of sheep's brain was powdered with borax. Eight days afterwards it gave off a spermatic odour; later there was a disengagement of sulphuretted hydrogen without any appearance of putrefaction properly so-called. The matter after retaining a soft consistence during several months became hard, and almost horny, without any disagreeable odour.

(*d*) A pound of beef was placed in a concentrated solution of borax, in a tin case not hermetically closed. The colouring matter of the blood diffused into the surrounding liquid as well as a portion of the soluble nitrogenous substance of the meat. After some weeks the liquid assumed a brown colour and gave off a rather disagreeable odour without any putrefaction of the meat. When the liquid was removed and the meat washed with cold water it had an odour *sui generis*, but having no similarity to that of putrefying meat. After a year and a half, notwithstanding the heat of the summers of 1873 and 1874, this meat—the surrounding liquid having been renewed three times—had not the least odour of putrefaction. It was of a yellowish colour, but as soft and tender as fresh meat. Removed from the borax solution the meat remained in the same state in the air.

(*e*) Beef, veal, and portions of sheep's brain were placed in a vessel which was filled with solution of borax and hermetically sealed. The liquid soon became clear red, and this colour remained during several months without alteration. The meat presented not the least disagreeable smell as long as access of air was prevented. Meat placed in water in a flask hermetically sealed became rotten in a few days.

The peculiar odour of meat preserved in borax in contact with air the author considers to be due to the decomposition of matters which result from the metamorphosis of substances that constitute the muscular and intermuscular fibre. Although probably the use of borax will not be applicable to the preservation of meat for culinary purposes, the author considers that it may be economically substituted for alcohol in the preservation of anatomical specimens. Moreover, its power of suspending life in the lower organisms would seem to indicate its probable utilization in the treatment of wounds, etc.

NEUTRAL HYDROBROMATE OF ESERINE.*

BY M. DUQUESNEL.

Eserine, the active principle of the Calabar bean, is an alkaloid discovered by Vée, which combines readily with acids. The salts that it forms are generally uncrystallizable and very hygroscopic. An exception to this rule however has been met with in the hydrobromate of eserine, which has been recently brought under the notice of the French Academy of Medicine by the author.

The best known of the salts of eserine is the neutral sulphate frequently employed by oculists. It occurs under the form of a yellowish—sometimes red—mass; but it may be obtained colourless by preventing completely the oxidizing action of the air, which converts the eserine into a red crystallizable, but inert, substance. In the amorphous state the sulphate appears to be present as a supersaturated solution; for if left to itself, stellate groups of acicular crystals are sometimes formed by the absorption from the atmosphere of a small quantity of moisture.

After employing several acids—hydrochloric, oxalic, etc.—without obtaining any better results than with sulphuric acid, the author employed hydrobromic acid, which yielded slowly, but regularly, stellate groups of crystals and a fibrous crystalline crust. The product was slightly coloured, but M. Duquesnel hopes in further experiments to obtain the salt nearly white. Meanwhile the present product yields almost colourless solutions, especially if boiling distilled water be used, with a slight addition of glycerine, which ensures the preservation of the solution.

The advantages claimed by the author for the new salt are its crystallizability, its perfect solubility in water, in which it forms a neutral solution, and that it can be preserved perfectly even in a humid atmosphere. It contracts the pupils as well as the other salts of eserine.

THE ACTIVE PINCIPLES OF THE OFFICINAL VERATRUMS.†

A. CHEMICO-PHYSIOLOGICAL STUDY.

BY CHARLES L. MITCHELL.

PART II.—CHEMICAL.

(*Continued from page* 787.)

The quantity of alkaloids in veratrum album varies quite as much as in veratrum viride; from two different lots I obtained the following results:—

* *Répertoire de Pharmacie*, [N.S.], vol. iii., p. 105.

† Read before the American Pharmaceutical Association. Reprinted from the 'Transactions.'

In One Pound Avoirdupois (7000 grains.)		No. 1.	No. 2.
Alkaloid soluble in ether	grs.	40·50	30·3
Jervia	,,	11	8
Resin	,,	240	200
Oily matter	,,	144	105

The alkaloid soluble in ether resembles very much the veratrum viride alkaloid veratroidia. It is white, uncrystallizable, of a bitter, acrid taste, leaving a burning, tingling sensation in the fauces, even more acrid and irritating than veratroidia, and produces the most violent sneezing. It is soluble in alcohol, amylic alcohol, ether, chloroform, carbon bisulphide, and sparingly in benzin. It forms with the acids soluble salts, which are uncrystallizable. It fuses at 340°, and sublimes in small feathery crystals. The alkalies and their carbonates precipitate it from its acid solutions in white, semi-crystalline flakes, which are slightly soluble in an excess of the precipitant, especially when ammonia is used. With the bicarbonates it yields a precipitate only on heating.

The jervia corresponds chemically to that from veratrum viride. All these alkaloids are precipitated from their solutions in tartaric acid by bicarbonate of soda. Their behaviour with colour reagents is seen in the following table as compared with veratria.

Reagent.	Jervia.	Veratroidia.	Veratria.	Alk. Verat. Album (Veratralbia.)
Sulphuric Acid.	Yellow, changing to a deep green.	Yellow, changing to a brick-red.	Yellow, changing to a crimson.	Yellow, changing to a rich, dark-red.
Sulph. Acid and Br.	Changes from green to a very light brown colour, almost colourless.	Brown.	Brick-red.	Dark-brown.
Sulphuric Acid and Chromate Potass.	Yellowish-brown.	Brown.	Brown.	Brown.
Hydrochloric Acid (cold)	Diss. to a colourless solution.	Diss. to a colourless solution.	Diss. to a colourless solution.	Diss. to a colourless solution.
Hydrochloric Acid (hot)	Yellow, deepened by boiling.	Yellow, deepened by boiling.	Yellow, when boiled changing to a deep solferino colour. (*Trappe's Test.*)	Yellow, deepened by boiling.
Nitric Acid.	Yellow, deepened by boiling.	Yellow, deepened by boiling.	Yellow, deepened by boiling.	Yellow, depeened by boiling.
Percholor. Gold.	Curdy yellow ppt.	Yellowish white ppt.	Yellow-white ppt.	Straw-yellow ppt.
Iodohyd. Potass.	Curdy white ppt.	White ppt.	White ppt.	White ppt.
Bichlor. Plat.	Gran. yellow ppt.	Flocc. yellow ppt.	Very faint ppt.	No reaction.
Sulphocyan. Potass.	Flocc. white ppt.	White ppt.	White ppt.	White ppt.
Chlorine Water.	Faint whittish ppt.	White ppt., faint.	White ppt., faint.	White ppt., faint.
Tannic Acid.	White.	White ppt., faint.	White ppt. faint.	White ppt., faint.

We thus see that this alkaloid from veratrum album differs from both veratria and veratroidia. It is, I think, a distinct principle, as will be further shown by its physiological action. It is much more powerful than either of these alkaloids. For this principle I propose provisionally the title of veratralbia.

Dr. Peugnet's resin proved pretty conclusively that dilute acetic acid would not exhaust the root; I tried a small experiment with the same menstruum and came to the same conclusion.

The question of the profitable extraction of the alkaloids from veratrum viride and veratrum album, is a matter of considerable uncertainty, and I doubt very much if they can ever be brought into extended use. They exist in extremely small proportion, and their separation is attended with so much difficulty and expense, that I think it extremely unlikely their manufacture on a large scale will ever be attended with success.

SABADILLA.

Four pounds of finely ground sabadilla seeds were exhausted by percolation with alcohol 85 per cent., the alcoholic tincture evaporated to a small bulk, acidulated with 4 fluid ounces of acetic acid, and poured with constant stirring into 4 gallons of distilled water. The acid liquid was evaporated to 2 pints; the separated resin being mixed with that first precipitated, dissolved in 2 pints of alcohol, and set on one side. Milk of lime in excess was added to the concentrated acid liquid, the whole allowed to stand twenty-four hours, and then filtered, and the precipitate well washed, drained and dried. This was powdered, mixed with some animal charcoal, and then the whole mass repeatedly digested with strong alcohol, until nothing more was dissolved. The alcoholic solution was evaporated to dryness, and the resulting resinous mass dissolved with gentle heat in dilute sulphuric acid, concentrated to a small bulk, and set aside to deposit jervia. After the lapse of some days, the liquid still remained perfectly clear, showing that it contained no jervia. It was now decolorized by boiling with a little pure animal charcoal, a little alcohol added, and then precipitated with an excess of sol. soda. The precipitate when washed and dried weighed 840 grains. This was agitated with successive portions of ether, and the ethereal solution shaken frequently with dilute sulphuric acid, the heavier liquid separated, warmed slightly to free it from ether, and then precipitated with sol. soda, washed and dried. It weighed 800 grains, was quite white, and corresponded to veratria in its reactions.

The residue remaining from the ether was boiled with distilled water, the insoluble portion filtered off, and the filtrate concentrated and set to one side, to see if it would crystallize; the residue on the filter was treated with dilute sulphuric acid. This partly dissolved it, the insoluble portion being resin. This soluble resinous matter corresponded to Couerbe's "Le Veratrin," being insoluble in ether, soluble in acids, and precipitated by alkalies. On adding ether to this solution, then, excess of soda, and agitating, the precipitate at first formed was nearly all dissolved, there remaining only a small portion of resinous matter adhering to the sides of the bottle. The ethereal solution was removed, and the heavier liquid acidulated with sulphuric acid, which now only partially dissolved the resinous matter. The insoluble portion was separated, and as I found the solution still gave a precipitate, it was again treated in the same manner. The precipitate this time was nearly all taken up by the ether, only a little resinous matter remaining. When this was treated with the acid it did not dissolve, and the liquid gave no precipitate with an alkali. The different insoluble portions filtered out were found to be resin. The ethereal solutions were mixed, and the alkaloid extracted; it weighed 30 grains, and chemically and physiologically proved to be veratria. I therefore conclude that Couerbe's "Le Veratrin" was only an intimate mixture of resin and veratria.

The liquid which was set aside gave a small quantity of crystals, which answered to all Hübschmann's tests for sabadillia. The quantity was too small to admit of any physiological experimentation.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, APRIL 24, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE GLASGOW MEMORIAL.

WE regret that it is again necessary for us to refer to this subject, but the nature of several of the communications that have reached us from Scotland leaves no alternative.

As regards the official disclaimer of the Scotch examiners that they had any cognizance of what was going on in Glasgow, it will probably suffice to call the attention of our readers to the letters that appear in this number from Mr. TAIT, the Chairman of the Board, and from Mr. GILMOUR. The same course may be taken in regard to the letter of Mr. MACKAY, which is to the same effect, and we must leave our Edinburgh and Glasgow friends to settle amongst themselves an explanation of the contradictory impressions under which they have been acting.

Judging from what took place at the April Council meeting, when the memorial was read, there was ample ground for the surprise we then felt constrained to express at the absence of communication between the Glasgow Association and the executive of the North British Branch of the Society. Mr. MACKAY not only stated that the Board in Edinburgh had not the least idea of the feeling represented by the memorial as existing in the minds of the Glasgow chemists and druggists, but he also disavowed any knowledge that they were holding meetings for the purpose of producing such a memorial. He even went so far as to suggest by implication that there was no real ground for the production of such a memorial, for in remarking that the Edinburgh Board would gladly have waited on the Glasgow Association to discuss the grievances supposed to exist, he added that the probable result of such a course would have been to prevent the presentation of the memorial.

We consider it as signally unfortunate, at least, that no communication took place between these bodies sufficient to ensure a thorough consideration of the matter by them before it was brought under the notice of the London Council. Considering that there is a Branch of the Society established in Scotland, it seems only natural that matters having, as it seems, a purely local significance, should be dealt with by that Branch, and it is much to be regretted that the disregard of this appropriate official routine should have resulted in causing some degree of antagonism and embarrassment.

In addition to what we have already said of the memorial itself, and of the explanatory note of Mr. CURRIE and Mr. FAIRLIE, we must confess that the further explanations Mr. FRAZER sends for publication this week, as well as other communications on the subject, only tend to confirm our feeling of surprise that the memorial should have been presented at all. According to Mr. FRAZER's own statements we cannot perceive that he recognizes any adequate reason for such a course, or indeed any pretext for it beyond a vague belief that the nature of the examination regulations and the difficulty of getting assistants in the West of Scotland stand in the relation of cause and effect. Our own estimate of this belief leads us to regard it not only as a delusion, but as a proceeding calculated to exercise a very mischievous influence at the present time, when the value and beneficial influence of the examinations are just beginning to be acknowledged.

Under these circumstances we cannot recognize the justice of Mr. FRAZER's objection to our remarks on the memorial. By its publication it had become open to criticism, and that being the case we cannot perceive any reason for delaying such criticism for a month. But Mr. FRAZER's objection is, in itself, an evidence of weakness, and it throws a doubt upon the existence of any reasonable grounds for the course that has been taken by the Glasgow Chemists and Druggists' Association. According to our observation it is now generally the custom, when the desirability of a thing is felt, to seek the publicity of the press as the best and most efficient means of evoking opinions that are latent in the minds of many, but which without some such stimulus would remain unexpressed. One would be disposed to expect that the announcement of a memorial to the Council on the subject of a keenly felt difficulty would have called forth communications from many of those who experienced the difficulty complained of, and that they would have been eager to bring forward facts illustrative of the particular inconveniences they suffered, as well as evidence to show that their view of the causes whence they arose was correct. Such a discussion of any subject in regard to which the Council of the Society had been memorialized would, we imagine, have conduced towards strengthening the position of those who supported the prayer of the memorial whenever it came to be a matter for the Council to decide upon what measures should be taken.

Our remarks afforded opportunity for such discussion, and for that reason alone we consider that they do not merit the condemnation of being either unwise or ungenerous. That the tendency of our remarks should have been unfavourable to the memorial and its objects is a circumstance that we cannot seek to excuse otherwise than by pleading a general regard to the fitness of things. And if we look to the correspondence that has reached us on the memorial there is ample confirmation for the opinion we expressed at first concerning the unsatisfactory state of affairs in the West of Scotland. It seems that while the feeling manifested by the writers is all in one direction, it does support the hypothesis as to the dearth of assistants being referable to the examination in any way.

Mr. KINNINMONT'S letter strongly supports the opinion suggested by the memorial itself, and by all the proceedings we have become acquainted with in reference to it, that the Glasgow Chemists and Druggists' Association has allowed itself to be led away by misconceptions as to the real causes of the evils it complains of. Thus regarded, the discussion of this matter may, we hope, prove to be beneficial to all concerned.

UNUSUAL DOSES OF POTENT DRUGS.

THE question of the advisibility of adopting one recognized method of indicating to the dispenser when an unusually large dose of a powerful ingredient is ordered in a prescription, that is not through an oversight of the prescriber, has recently been under the consideration of the Academy of Medicine and of the Pharmaceutical Association of Richmond, in the United States. It will be remembered that in this country the subject was brought forward at the meeting of the British Pharmaceutical Conference at Bradford in 1873, by Mr. HAMPSON, when the result was the adoption of a report recommending that in prescriptions, after any unusual dose, the prescriber's initials, between brackets, should be placed, and that this recommendation was communicated to the medical profession. A joint committee of the above-mentioned American Societies has, however, reported in favour of the use in such cases of the letters *p. c.* (*prœter consuetudinem*), and this recommendation was adopted at a meeting of the Richmond Academy of Medicine. Another suggestion that the members of both Societies should use every proper means to limit the sale of such drugs as opium and chloral, and a third to the effect that the dispenser should not be considered at liberty to reveal to the patient the components of a physician's prescription written in technical language, were also concurred in. But a recommendation to substitute the use of the Greek Δ for the sign ℨ in order to avoid confusion with the sign ℥, was overruled by a majority of votes.

PERSONATION OF CANDIDATES OF APOTHECARIES' HALL.

IN a letter to the *Medical Times and Gazette* Mr. R. H. ROBERTSON, the Secretary to the Court of Examiners in Arts of Apothecaries' Hall, London, describes what appears to have been a gross case of fraudulently obtaining a certificate by a personation of the candidate. It appears that at the top of the first class of the pass list of the usual examination in Arts, held at the Hall in January last, was placed the name of CHARLES MATTHIAS LAMB, and the certificate was forwarded in due course. Information was afterwards received, however, which gave rise to the suspicion that CHARLES MATTHIAS LAMB had not been present himself at the examination, but that he had been personated by somebody else, who answered the examination papers for him. These suspicions were communicated to Mr. LAMB, accompanied by a demand that the certificate should be returned to be cancelled, as improperly obtained. Their correctness was confirmed by the return of the certificate on the following day, and the Society therefore thinks it desirable that the circumstances should be generally known. We are of opinion our contemporary is quite justified in asking whether Mr. ROBERTSON'S duty ends here, and whether no other steps are to be taken.

THE ACTIVE PRINCIPLES OF JABORANDI.

WE have received from Mr. A. W. GERRARD, too late for insertion in this number of the Journal, a paper describing the method adopted by him in separating what he considers to be an alkaloidal principle representing the active constituent of Jaborandi (*Pilocarpus pennatifolius*), an opinion which appears to be confirmed by the results of some physiological experiments made under the supervision of Dr. SIDNEY RINGER.

COD LIVER OIL BREAD.

COD Liver Oil Bread, which has on more than one occasion been noticed in these columns, has recently formed the subject of a lawsuit in France. A firm of bakers, by whom it had for some years been made, claimed a monopoly of its manufacture in virtue of a patent held by them. This was disputed, amongst others by a pharmacien, and the cause came on for hearing a few days since. The Court decided that the invention could not form the subject of a patent, in that it was not a simple alimentary product, but a medicament. The suit was therefore dismissed with costs against the bakers.

THE SALE OF VERMIN KILLERS.

IT would appear from the fact that we are in receipt of several communications respecting the sale of vermin killers that there still exists a considerable amount of misapprehension as to the conditions under which they can legally be sold. In consequence of the pressure upon our space we are compelled to defer dealing with these communications until next week.

THE ANNUAL DINNER.

WE are requested to state that a list of the names of the gentlemen who have expressed their willingness to act as Stewards on the occasion of the Fourth Annual Dinner of the Pharmaceutical Society and their friends will be published next week. The Honorary Secretaries would, therefore, be glad to hear at once from any gentleman who may desire to have his name included, but who has not yet communicated to them his wish to that effect.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 21st and 22nd, 1875.

Present—(21st) Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Hills, Linford, Martindale, Moss, Schweitzer, Southall, Taylor, and Umney.

(22nd) Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor, and Umney.

MAJOR EXAMINATION.

Ten candidates were examined. *Two* failed. The following *eight* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

	Holt, George Alfred	Douglas.
Equal	Broad, John Morris	Hornsey.
	Harrington, Arthur	Needham Market.
Equal	Lambert, William Henry	Hull.
	Llewellyn, John	Cowbridge.
	Worthington, William	Preston.
	Newhill, John William	Huddersfield.
	Blackwell, Josiah	St. Austell.

MINOR EXAMINATION.

Thirty-nine candidates were examined. *Sixteen* failed. The following *twenty-three* passed, and were declared qualified to be registered as Chemists and Druggists:—

	Ellis, Henry	Rochdale.
	Folkard, Montague	Colchester.
	Saville, George	Wakefield.
	Clarke, Isabella Skinner	Paddington.
	Mackay, Edward	Masham.
	Highmoor, George Samuel	Leeds.
	White, Charles	Southborough.
Equal	Dodd, William Henry	Fulham.
	Leece, Frederick	Preston.
	Butler, James Arthur	Leicester.
	Metzler, Heinrich J. C. L.	London.
	Widdowson, William	Nottingham.
Equal	Cocker, Justus John	Over Darwen.
	Martin, Henry Stephen	Brighton.
	Clegg, Edmund	Manchester.
	Beale, James Hawkins Tizard	Camben Town.
Equal	Phillips, James Arthur	Penge.
	Vaughan, John	Newtown.
	Cant, Hemington	Stratford.
	Spilsbury, James	Stafford.
Equal	Brown, Frederick	Lincoln.
	Slater, Thomas, jun.	Stone.
	Senier, Alfred, jun.	Finsbury Park.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificates of the College of Preceptors.

Gowing, George D. .... Faversham.
Hodgkinson, William E. ....

Certificate of the Royal College of Surgeons.

Womack, Frederick .... Bayswater.

Certificate of the University of Cambridge.

Kirk, William Peele .... Retford.

Certificate of the University of Durham.

Hunter, Frederick William...... Newbottle.

PRELIMINARY EXAMINATION.

ENGLAND AND WALES.

April 5, 1875.

One hundred and eighty-eight candidates presented themselves for examination, of whom *ninety-six* failed. The following *ninety-two* passed, and have been duly registered as Apprentices or Students:—

	*Parker, Charles Henry Mitchell	South Molton.
	*Stroud, Henry	Bristol.
	*Stone, Frederick William Stanley	Bristol.
Equal.	*Hopkins, William Richard	Aberystwith.
	*Smith, John	Crownthorpe.
	*Madden, Ronald George	London.
Equal.	*Chambres, Charles	Denbigh.
	*Cooper, Henry Scarborough	Grantham.
	*Foster, Ferdinand Green	Landport.
	McDonald, John	Liverpool.
	Heywood, Frederick	Manchester.
Equal.	Butler, Christie H.	Tooting.
	Maddocks, William	London.
	Marshall, Daniel	Shrewsbury.
	Adams, Joseph	Bristol.
	Lusby, Absalom	Louth.
Equal.	Gordon, Thomas Elisha	Swansea.
	Hornby, Alfred	London.
	Pavey, Henry John	London.
	Phipps, Frederic	Birmingham.
	Wallbridge, Henry Alfred	London.
Equal.	Cooper, Henry Samuel	Droitwich.
	Jeffreys, John Alfred	Levenshulme.
	Jones, Frank	Fairfield.
	Norris, Alfred Beardmore	London.
	Price, Frederick	Liverpool.
	Stevenson, John Joseph	London.
Equal.	Edmond, Francis Edward	Scarborough.
	Jones, Joseph Humphrey	Wolverhampton.
	Lubbock, John William	London.
	Moore, William Glover	Liverpool.
	Whitaker, Thomas	London.
	Wignall, Walter	York.
Equal	Garrett, John Henry	Notting Hill.
	Jacklin, Alfred	Louth.
Equal.	Ball, William Benjamin	Abingdon.
	Brown, Joseph	Walker-on-Tyne.
	Mordue, William	Haydon Bridge.
	Ninnis, Thomas Martin	Truro.
	White, John	Bristol.
	Duncan, Alexander	London.
Equal.	Knight, Charles	Gloucester.
	Webb, William Henry	Hereford.
Equal	Baker, Henry William Burgess	Haddenham.
	Davies, Frank	Newcastle Emlyn.
Equal.	Berry, Thomas Samuel	Northampton.
	Blades, Arthur Mowbray	Northwich.
	Chapman, William Henry	Birmingham.
	Fox, Richard	Norwich.
	Randall, William Joseph	Wareham.
Equal.	Beard, James Hogg	Manchester.
	Bottomley, Albert Frederic	Halifax.
	Bryant, Richard William	Swansea.
	Fox, Alfred	Hull.
	Gratte, Alfred	Newport, Mon.
	Green, William Travis Nunn	Liverpool.
	Jepson, Xeno	Sheffield.
	Merrell, Arthur James	London.
	Newman, Alfred Pointon	Crewe.
	Mason, Florus	Broughton.
Equal.	Critchlow, Henry	Oldham.
	Moor, George	Grantham.
	Wingrave, Arthur	Coventry.
	Llewellyn, Thomas	Pembroke.

* Passed in the First Division.

Equal.
Batty, Edward ....Ilkley.
Bayley, Cornelius ....Boston.
Botwood, Charles Walker ......Great Bridge.
Brooks, John.........................Poplar.
Cocksedge, George Bloomfield London.
Dakin, John Parker................Clewer Green.
Evans, Benjamin ....Liverpool.
Hartley, Robert Crampton ......Lechlade.
Holden, Austin Caley ....York.
Homes, Joseph Peter ....Dudley.
Howse, Charles Turk ....Cheltenham.
Hughes, John William............Towyn.
Jenks, William......................Bristol.
Lacey, James........................Clifton.
Loosemore, John Wellington ...Bristol.
Mayne, Richard John ....Hull.
Millington, Walter Thomas......Chester.
Oldfield, Arthur ....Grantham.
Power, Joseph ....Stockton-on-Tees.
Pratt, William Edwin ....Newtown.
Roberts, Henry ....Norwich.
Silcock, Thomas ....Bolton.
Steane, Edward Hands ....Coventry.
Thomas, William Hendy.........Penryn.
Watts, Francis ....Wolverhampton.
West, William Painter ....Liskeard.
Whittaker, Joseph ....Salford.
Wood, Francis Wilson ....Sheffield.

SCOTLAND.

Thirty-four candidates presented themselves for examination. Of these *twelve* failed. The following *twenty-two* passed, and have been duly registered :—

*Robertson, Alexander ....Broughty Ferry.
*Whyte, James Samson ....Glasgow.
*Brown, David Matthew.........Dunfermline.
*Waddell, William ....Belfast.
*Symington, Archibald ....Helensburgh.
*Mackay, Alexander ....Aberdeen.
*Patterson, William...............Canonbie.
*Runciman, Wm. Morrison......Kelso.
*Morison, John......................Edinburgh.
Bruce, William Balfour ....Kirkwall.
Equal. { Halley, John Milne ....Edinburgh.
Thomson, William..................Aberdeen. }
Equal. { Stewart, Alexander Reid ....Hamilton.
Thomson, John Francis ....Edinburgh. }
McNeilage, Alexander............Greenock.
Burrell, Thomas ....Montrose.
Mackenzie, Donald ....Dingwall.
McDonald, Alexander Minto ...Edinburgh.
McDonald, Robert ....Edinburgh.
Grant, James.........................Aberdeen.
McIntyre, John ....Edinburgh.
Young, James ....Dumbarton.

The questions for examination were as follows :—

Time allowed : Three hours.

LATIN.

Cæsar—De Bello Gallico, Lib. I.

1. Translate into English :—His Cæsar ita respondit : Eo sibi minus dubitationis dari, quod eas res, quas legati Helvetii commemorâssent, memoriâ teneret : atque eo gravius ferre, quo minus merito populi Romani accidissent ; qui si alicujus injuriae sibi conscius fuisset, non fuisse difficile cavere : sed eo deceptum, quod neque commissum a se intelligeret, quare timeret ; neque sine causâ timendum putaret. Quod si veteris contumeliae oblivisci vellet ; num etiam recentium injuriarum, quod eo invito, iter per Provinciam per vim tentâssent, quod Aeduos, quod Ambarros, quod Allobrogas vexâssent, memoriam deponere posse?

* Passed in the First Division.

Grammatical questions on the preceding passage.

2. Compare *minus, veteris.*

3. Give the principal tenses of *dari, ferre, cavere oblivisci, posse.*

4. Explain the case of *quas, memoriâ, sibi, iter, invito.*

ARITHMETIC.

5. Multiply six hundred and fifty thousand and ninety, by three thousand and eight ; also seventy-six millions, eight thousand, seven hundred and sixty-five, by nine millions, nine thousand and nine.

6. Multiply $\frac{1}{2}$ of $\frac{2}{3}$ by $5\frac{3}{8}$ of 3, and divide $4\frac{1}{3}$ by $2\frac{3}{4}$.

7. Convert $\frac{3}{512}$ and $\frac{3}{51200}$ into decimals.

8. Reduce 4*s*. $7\frac{1}{2}$*d*. to the decimal of £1 ; and 15*s*. $11\frac{1}{4}$*d*. to the decimal of £1.

9. What is the weight in *grammes* of a cubic decimetre of water ? Express the equivalent in *grains* of a decagramme, a centi-gramme, and a milli-gramme.

ENGLISH.

10. Distinguish between transitive and intransitive verbs. Give four examples of each.

11. State the past tense and past participles of the following verbs, *fall, hold, blow, draw, beat, cleave, shake, give, arise, swim.*

12. Write a short sketch of any person celebrated in English history.

The following is a list of the Centres at which the examinations were held, showing the number of Candidates examined at each Centre, and the result :—

England and Wales.

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberystwith......	3	3	0	Liverpool	7	5	2
Barnstaple	1	1	0	London............	33	17	16
Birmingham......	11	6	5	Manchester	14	9	5
Boston	5	4	1	Newcastle.........	5	2	3
Brighton	2	0	2	Northampton ...	2	1	1
Bristol	11	7	4	Norwich	6	3	3
Cambridge	2	1	1	Nottingham	3	0	3
Canterbury	2	0	2	Oxford	2	2	0
Cardiff	1	1	0	Peterborough	2	0	2
Cardigan	1	1	0	Plymouth	1	1	0
Carlisle............	1	0	1	Portsmouth	3	1	2
Carmarthen	4	1	3	Preston............	4	0	4
Carnarvon	2	0	2	Reading	1	0	1
Cheltenham	5	3	2	Salisbury	2	0	2
Chester............	4	3	1	Scarborough......	2	1	1
Darlington	2	1	1	Sheffield	3	2	1
Doncaster.........	1	0	1	Shrewsbury	2	1	1
Hull	5	2	3	Swansea	4	2	2
Leamington	2	2	0	Taunton	1	0	1
Leeds	7	1	6	Truro	4	2	2
Leicester	1	0	1	Worcester.........	4	1	3
Lincoln............	3	3	0	York...............	7	2	5

Scotland.

Aberdeen	10	4	6	Glasgow	9	6	3
Dumfries	2	0	2	Inverness	1	1	0
Dundee............	1	1	0	Perth	1	0	1
Edinburgh	10	10	0				

Erratum.

No. 251, page 837, col. 1, line 45 from top, for "Clark, John William," read "Clark, John Webster."

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Ninth General Meeting of the session was held at the Royal Institution, March 11. The President, Mr. A. H. Mason, F.C.S., in the chair. Donations of the Calendar of the Pharmaceutical Society, and the *Pharmaceutical Journal*, were received and acknowledged.

Mr. Davies, F.C.S., said that having found a difficulty in detecting small quantities of chlorates in presence of much nitrate and chloride, he had devised a method which had proved very successful. It consists in mixing the dry salts with an equal quantity of dry oxalic acid, and heating gently, preferably in a water bath, in a test tube. Peroxide of chlorine is evolved, and can be recognized by its odour and by the yellow colour on looking down the tube. A mixture of equal parts nitrate and chloride of sodium, with 1 per cent. of potassium chlorate was tested, and gave a decided reaction.

Mr. Murphy, F.C.S., alluded to the Adulteration Act, and said that recently he had tested some green peas, said to contain copper. He found that they only contained 0·008 per cent. of that metal, and he thought to call that an adulteration was absurd, and if so small a quantity could affect the health, something might be said for homœopathy.

Mr. Shaw asked if Mr. Murphy had tested the Liverpool gas lately.

Mr. Murphy said that he tested it at intervals, and found that the illuminating power had increased to 16½ to 17½ candles. In his opinion to use two candles as a standard light and to burn five feet of gas per hour, produced so much glare that no satisfactory results could be obtained, especially with a 60-inch scale. He preferred to use one candle, and to burn only 3 to 3½ feet per hour.

The meeting then adjourned to the Gallery of Arts, where several microscopes were arranged. The President exhibited micro-photographs; Mr. Abraham some injected physiological preparations; and the Secretary specimens of crystallized metallic arsenic and arsenious oxide. Mr. Murphy exhibited a polarizing saccharometer, and showed the manner of using it to determine the strength of a sugar solution. Other objects of interest were also exhibited.

The Tenth General Meeting was held April 8, 1875. The President in the chair.

Donations of the 'Year-Book of Pharmacy,' the *Pharmaceutical Journal*, the *Canadian Pharmaceutical Journal*, and the *American Chemist*, were received and thanks voted to the donors.

Mr. Abraham expressed his pleasure in seeing that Dr. Edwards had been appointed Consulting Chemist to the Board of Inland Revenue of the Dominion of Canada. He looked upon it as an honour to pharmacy and to the Liverpool Chemists' Association.

The President alluded to the same subject, and then called the attention of members to the loss which pharmacy had sustained in the death of Mr. Hanbury. He was an authority to whom was submitted almost every new drug, and his place would be difficult to fill. It was a matter of congratulation that his 'Pharmacographia' was finished before his death. The President also mentioned the warning by the Public Analyst of Liverpool, with reference to the presence of lead in drugs.

Mr. M. Murphy, F.C.S., then read the following

Remarks upon Analytical Processes in Relation to Public and Industrial Requirements.

"I hope there is little necessity to plead the importance and value generally of analytical processes before members of the Chemists' Association. Chemistry, as a branch of physical science, has made considerable progress during the present century, and every day it is growing into greater esteem as well by its own votaries as by the leaders and students in other sciences which appear often desirous to be affiliated with them. Even among the great bulk of the people, who some time ago had only a very hazy notion of what chemistry concerned herself with, and what she was accomplishing in the way of elevating the range of human thought and human pursuits, or who, if they entertained a notion at all, biassed it in the direction of evil spirits and pandemoniac indulgences, contemplating the patient laboratory worker as a monstrosity half human and half fiend—even these are throwing off their superstitious fears of the chemist and gradually making a hopeful estimate of the possible benefit chemical knowledge may extend to them. Now, if we ask ourselves a question respecting the causes which have brought about such results, already very great yet still only in their adolescence, we will come to view them as due almost in a primary degree to analytical processes. I do not wish to undervalue the power of intellect in conceiving and elaborating a train of results in the abstract. Mind so applied is certainly productive of good sometimes, but we must not forget the wonderful fact that notwithstanding such minds have at all times adorned the human race, yet it was not till analytical processes were adopted that chemistry, as an offshoot of former knowledge, made any real progress in opening men's eyes to the conception of the nature of things and endowed society with many benefits.

"The scientific chemist who enters at thought's gate the wide domain of theory cannot securely advance to any great distance undirected by analytical processes.

"Should he decide to ignore or dispense with their guidance and rely on his imagination only I think it might be fairly predicated of such a one that he will soon involve himself in a labyrinth of conflicting relations whence he cannot emerge except indeed he be pioneered by analytical processes.

"I think instances could be given, since Gerhardt propounded his system of nomenclature, to show that many who have essayed the theoretical in relation to the exposition of chemical data have confused rather than simplified the science of chemistry.

"It is not my wish to dwell further on this point; I choose rather to refer briefly to the assistance analytical work and processes have already rendered and are yet likely to render to the physiologist, the pathologist, the agriculturist, and the sanitarian. Taking physiology—without a systematic and studious course of analytical determinations of the quantity and quality of the organs and secretions of the body as well as of the food and drink consumed to sustain life, physiological study would comprise little more than an empirical record of personal sensations. But when we retrace our steps in the way our progress has advanced, and inspect the labours of Boussingault, Mulder, Liebig, Berzelius, Prout, and a cohort of other workers, we are at once impressed by the apparent diligence and assiduity with which each and all endeavoured to establish their conclusions, not on the basis of logical or metaphysical consequence, as was the practice in olden times, but rather on the results of analytical processes applied in direct elucidation of the questions at issue.

"It can readily be understood that when crucial methods of this description were applied to trace the changes of food matter in the animal body, and determine how its constituents, already definitely ascertained, were disposed of in the formation of corporal parts and adjuncts, to be thrown off, after they had done their work, as excreta, the advance to a defined and true system of physiology was inevitable. A similarity of procedure in respect of pathological inquiries has contributed to a definition of the causes of diseases, and defined fairly and broadly the line of treatment that is consistent with the urgency of the case.

"Again, in the important principles involved in agriculture, how much have we gained in the knowledge of the requisite properties of soil by analytical process! And what a cycle of exertion it has required to establish the truth that we must give back to the soil matter in proportion to that abstracted from it by the crop and drainage to maintain it in a proper and suitable condition of fertility! We cannot presume to say that either of these questions has been definitely settled, logically and experimentally, but we are fairly in a position to postulate that we are on the high road to the goal of truth respecting them.

"Viewing the influence of analytical results from a sanitarian's stand-point, what great advantages have been gained! And firstly, as regards the air, a primary necessity of animal existence.

"Till analytical processes determined the true composition of the air and its necessity to the maintenance of healthy animal existence, the only criterion of impurity which the medical man and sanitarian could apply was that of smell. If the smell were bad the air was unhealthy, and contrariwise if there was no cognizable odour the air was esteemed good. Bad odours—*i.e.*, offensive ones—have long been regarded as dubious or prejudicial to health; but I may say that previously to the labours of Dr. Angus Smith, of Manchester, the causes of mischief in a sanitary point of view were not so well defined or explained. Of Dr. Smith's great labours, embodied principally in his work 'Air and Rain,' I may say it appears to me their value does not depend so much upon the mental reach with which he invested the subject, but rather with the care, diligence, and untiring repetitions of analytical process.

"Consequent upon the recognition of the fact that air may become polluted and the proximate cause of endemic diseases, the attention of medical sanitarians was drawn to that of water as the next most important natural necessity of life. Here, again, analytical processes become public health conservators; so much so, that at the present day there is not a municipal body or petty local board that does not seek to know the fitness of the water supply of the district by the agency of analytical processes.

"Finally, the Government of this country, or in other words the outspoken voice of the populace, have determined legislative measures securing the qualities of the food and drink of the people by means of the definitions which analytical processes are able to apply. And taking the general expressions of the community as our determinant, we are forced to the conclusion that the latent benefits which my pet subject, analytical processes, has conferred in this department of its operations are equal to, if not transcending those which they have produced in the spheres already referred to.

"If now we turn to industrial enterprises of a nature to be benefited by analytical processes, what is the first impression that is likely to be made upon any thoughtful mind? It is obvious that there is not one of them wherein complex matters are dissociated or diverse matters conjoined for the purpose of producing useful products, but analytical processes are, so to speak, the presiding genius that leads them to successful results. It would be a difficult task to specify any industry of this order which is indifferent to, or independent of analytical processes. Situated as we are here within easy reach of the chief centre of one of the principal trades of the world—the soda trade—and within close proximity to other large centres of no less important trades—the iron and pottery industries—not to speak of the tinctorial, metallurgical, manurial, and other industries that stud the land, I would be inclined to think that I need only mention the fact of each and all of them being necessitated to subsidize analytical processes to contribute to their being properly and economically conducted to enlist your acquiescence and admit the truth of the proposition without further argument.

"Now, reviewing the great importance that I have attached to analytical processes in the details which I have crudely submitted to you, it must be evident that to reap the full measure of benefit which may possibly be derived in every department from them, it is necessary that they be well conceived in relation to the purposes to which they may be applied, that they be applicable generally, and above all designed so as to afford reliable and trustworthy results. Plainly as I conceive the value of analytical processes, I must not swerve from admitting that much of it is lost in consequence of their varied character and of want of definiteness of their application.

"Whilst a general plan is recognizable among chemists generally, and although in chemical schools a systematic method of procedure is taught for arriving at definite results, we must not overlook the fact that almost every individual chemist engaged in analytical processes builds up his own system of analytical work, and that in spite of the earnestness of the individual chemist to arrive at truth for truth's sake alone, much diversity arises and leads to a great deal of confusion oftentimes. This is a feature that has always been observable in the labours of the most advanced masters in chemical science almost in an equal ratio as was to be found in the results of her most retiring students.

"Something has been gained certainly of late from the facility of intercourse which the railway, the steamboat, and the press have contributed, yet still it may be said that every chemist has his own codex and abides by it.

"Now I think the time has come for representative chemists and those advanced in collateral sciences to form a congress or convocation so as to produce such a digest of the various systems as would serve for a universal guide for analytical procedure and in accordance with which every result ascertained with honest care and attention, no matter where or by whom, would be comparable and of specific value.

"Lately a few persons chiefly occupying public official positions have given intimation of the need of such a convocation as I have alluded to. Far from me to question the laudableness of the union of these men in thought and action so as to secure conformity, yet I fear it must seem to a great many, as under some phases it does to myself, in the character of a species of trades union, and, inasmuch as it does so, inadequate to give that assurance of unbiassed truthfulness which I would wish to see."

The Secretary said that a committee had been appointed by the British Association to report on the analysis of phosphates and potash salts. He agreed with Mr. Murphy that more uniformity was desirable, but contended that considering that it was only within the last hundred years that analysis had been developed, we could hardly expect it to have reached perfection.

Mr. Murphy said that he thought that the production of a standard work on analysis would be the result of such a congress as he advocated. To such a work all would gladly contribute.

A vote of thanks to Mr. Murphy concluded the meeting.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The twenty-fourth annual meeting of this Society was held in Anderson's University, 204, George Street, Glasgow, on Wednesday evening, 14th April. Mr. John Currie, the retiring President, occupied the chair.

The preliminary business included the announcement of a donation from Mr. Duncanson, of Stirling; the report from the Early Closing Committee, by Mr. Murdoch; and the adoption of a motion proposed by Mr. J. A. Clarke, to the effect that the past presidents of the Association be distinguished on the printed syllabuses of the Association in some way from the other members.

Mr. McCann then moved: "That on and after the end of the session no member of the society shall be eligible to hold office unless he agrees to shut his place of business at 8 o'clock."

Mr. Murdoch moved the previous question, which was carried by a large majority, only six voting for the motion.

The Honorary Secretary (Mr. J. M. Fairlie) was then called upon, and read the Council's Annual Report. It touched on the operations of the Adulteration Act, pointing out that only two druggists (one a surgeon druggist) had been prosecuted under this Act, in Glasgow, namely, in the scammony cases, and as it was well known the inspector had made purchases from the bulk of the chemists in town, it showed that so far as the drug trade in Glasgow was concerned the Act had little effect. The report then referred to the great outcry that had been made regarding lead in soda-water, which to some extent was justifiable, yet the water used had a great deal to do with it, as the same complaints were not made where the water used was of a "harder" nature. As regards the "morning tonic" question, the less they as pharmacists had to do with medicines in this special form the better. Referring to the British Pharmaceutical Conference, it was suggested to send a deputation to Bristol in August next, to invite that body to Glasgow in 1876. Coming to the particular work of the Association, a small but excellent library had been established which, together with Mr. Price's manuscript prescription book, and the Messrs. Evans' materia medica cabinet and microscope, had been largely taken advantage of by the members; and in connection with the microscope, Mr. Hunter, President of the Assistants' Section, had mounted a large number of objects which had proved of great interest. Eight lectures had been delivered during the session, apart from the eight meetings of the Assistant Section, each had been reported regularly in the *Pharmaceutical Journal* and *Chemist and Druggist.* Two of the lectures, viz., that on "Zymotic Poison," by Dr. Dougall, and on "Some of the Laws of Health," by Dr. Miller, had been published in full by the courtesy of the editors of these journals, and two hundred and fifty copies of each had been distributed among the members and friends, and the Council desire a special vote of thanks to the proprietors for their kindness. Dr. Black, one of the lecturers, had left the city for London, and the Council wish him every success in his new sphere. The only lecture announced on the syllabus and not delivered was that on "Electrical and other Influences in the Atmosphere on the Death Rate," Dr. Slirton being engaged at the time on some government work, but it will be delivered next session. Mr. Emmerson MacIver, F.C.S., took his place, his subject being the "Spectroscope." For beautiful illustrations and striking mechanical effects, the lecture of the President of the North Branch of the Pharmaceutical Society (Mr. Gilmour) on "Chromatic Phenomena of Crystallization," and that on "Artificial Illumination," by Mr. Dittmar, of the Andersonian, were much admired.

Two classes had been organized at the commencement of the session; about forty members joined the tutorial class, conducted by Mr. Lindsay, B.Sc., and twenty enrolled for the practical chemistry class, conducted by Mr. Dittmar. The education committee has visited their classes from time to time and report very favourably regarding them. A botany class is now being organized to be under the superintendence of Mr. Keddie, Teacher of Science, Free Church College, which it is hoped will be largely taken advantage of.

The early closing movement is in much the same position as last year, some adhering to the 8 o'clock hour, others evading it. The trade price list committee have had several meetings, and a remit was made to the Association for larger powers. This was referred to a special meeting of the trade, held on the evening of 16th December last, but as there were few country members present, it was adjourned till the 13th of January, at mid-day. This meeting was a most successful one in point of numbers, while letters of apology were read from different parts of the country. The decision come to was that the price list committee should have power to enlarge the next edition of the list, and if thought advisable amalgamate it with that published in Edinburgh. The council also thought that the question of examinations and fees should be considered at these meetings, which was accordingly announced on the circular convening them. The result was that after deliberation a draft memorial was agreed to be presented to the London Council, which has been done; and judging from the reception it has received already, and the threat held out that instead of granting concessions, the Council is contemplating further restriction, another special meeting of the trade may, therefore, be necessary, to appoint a strong deputation to attend the annual meeting in May, so as to lay the whole matter before the Society at large.

The Council have to acknowledge that the Assistants' Section has been a great help to the Association this session, the whole of the committee working most harmoniously together, the services of the active Secretary, Mr. J. Foster, deserving special mention. The membership and subscriptions have very materially increased this session, and now stands at forty-five employers, sixty assistants, and twenty-one apprentices. It is hoped that the same energy and enthusiasm which has characterized the whole proceedings this session will go on from year to year so that all connected with the business may derive the benefit which ought to accrue from a large and powerful organization such as should exist in this great city of industry and capital.

The financial statement was then read by the Treasurer, Mr. McKenzie, of which the following is an abstract:—

RECEIPTS.

	£	s.	d.
To Library Fund	39	7	6
,, Class Fees	54	0	0
,, Festival Accounts	45	11	9
,, Donations and Subscriptions	23	14	6
,, Price List Sales	3	17	0
	£166	10	9

PAYMENTS.

	£	s.	d.
By Library Account	22	1	10½
,, Classes ,,	65	6	6
,, Festival ,,	45	0	0
,, Hall Rent, Printing Account, Postages, etc.	19	9	6
,, Balance of Cash	14	12	10½
	£166	10	9

The reports were unanimously adopted.

The Secretary of the Assistants' Section then read the report of their committee, which was remitted to the section for its approval at their business meeting on the 28th inst.

The election of officers, etc., for the ensuing year was then proceeded with, the following being the result:—President, Mr. William Greig (New Apothecaries' Company); Vice-President, Mr. Alexander Kininmont; Treasurer, Mr. J. McGill Murdoch; Hon. Secretary, Mr. J. M. Fairlie. Council: Messrs. John Currie (Sauchiehall Street), D. Frazer, T. Davison, J. Jaap, R. C. Rait (Partick), James McDonald (Glasgow Apothecaries' Company), W. Whyte, J. Fenwick, R. Brodie, J. A. Clarke, A. Paul, G. Garry, and W. McKenzie. Auditors: Messrs. J. C. Steele and James Whitelaw.

On the motion of Mr. Greig, seconded by Mr. J. A. Clarke, a vote of thanks was awarded the retiring officers, for which Mr. Currie responded. The meeting separated at a late hour.

HULL CHEMISTS' ASSOCIATION.

The winter course of lectures delivered by Mr. H. J. Parson, in connection with the Hull Chemists' Association, is just concluded, the number of students having been slightly in excess of last year. The lectures comprised Chemistry, Materia Medica, and Pharmacy, and these were followed by examinations in each subject. The prizes for the first two were offered by the Association, and Mr. G. Myers, Vice-President, gave one for Pharmacy. The results were as follows:—

Chemistry .... Mr. E. A. Allison.
Materia Medica .... Mr. W. G. Blythe.
,, ,, ... Mr. E. A. Allison.
Pharmacy...................... Mr. W. G. Blythe.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 15th April, 1875, Professor Abel, F.R.S., in the chair. The ordinary business of the Society having been transacted, Mr. J. W. Thomas read a paper "On the Gases Enclosed in Coals from the South Wales Basin, and the Gases Evolved by Blowers and by Boring into the Coal Itself." These gases were found to be marsh gas, carbonic anhydride, and nitrogen in all three of the classes of coal examined, namely, bituminous coals, steam coal, and anthracite. A paper "On Narcotine, Cotarnine, and Hydrocotarnine, Part I," by Mr. P. H. Beckett and Dr. C. R. A. Wright, was then read by the latter, after which Dr. H. E. Armstrong communicated a "Note on Isomeric Change in the Phenol Series." The meeting was finally adjourned until Thursday, 6th May, when the following papers will be read:—"The Quantitative Separation of Iron Sesquioxide, Alumina, and Phosphoric Acid," by Dr. W. Flight; "On Andrewsite and Chalkosiderite," by Professor N. Story Maskelyne; "On Sodium Ethylthiosulphate," by Mr. W. Ramsay; and "On a Milligrade Thermometric Scale," by Mr. J. Williams.

Parliamentary and Law Proceedings.

The Sale of Food and Drugs Bill.

The House of Commons went into Committee on this Bill on Tuesday last, the 20th inst. When the first five clauses had been considered and agreed to with amendments the Committee reported progress.

In the course of the discussion on clause 2,

Mr. W. Stanhope moved that "water" should be inserted after "drugs" to make it clear that water might, under this Bill, be subject to analysis.

On Clause 3,

Dr. Cameron moved the omission of the word "knowingly" in the fourth line, because if it were necessary in order to obtain a conviction to prove that a vendor of adulterated articles knew they were adulterated it would be impossible to obtain a conviction.

Mr. Sclater-Booth thought the hon. gentleman should have directed his observations to a subsequent part of the clause, and not to this, the first part of it. As the first part of the clause would impose a punishment of six months in case a person permitted articles injurious to health to be bought from him, it was only reasonable that a guilty knowledge should be proved against him before convicting him.

Dr. Playfair thought his hon. friend was right in asking for the first "knowingly" to be left out, but he would preserve the second "knowingly."

Sir A. Lusk said that the magistrates were always tender with a man who broke the law from ignorance, and he would keep the word "knowingly" where it was in the Bill.

Mr. Gordon was of opinion that the onus of proving his innocence should be thrown upon a tradesman who mixed one thing with another so as to be injurious to health.

Mr. Forsyth would retain the word "knowingly." The House did not wish to punish offences committed accidentally.

Mr. J. Fielden predicted that the Act would be quite inoperative if the word "knowingly" were retained.

Mr. W. E. Forster said that the accidental tradesman would be sufficiently protected by the clause, but that the word "knowingly" would enable a trader to escape conviction when he ought to be convicted.

Mr. C. P. Villiers thought the Committee ought to know that this Bill was regarded with great suspicion, because it weakened the security which the former Act was intended to give against the practices and usages of trade. The present Bill, however, went in the other direction, and all sorts of excuses would be made that the tradesman had procured the adulterated article from some one else. If the Committee were in earnest in putting down adulteration, they ought not to insert these unnecessary words.

Mr. Sclater-Booth thought that the right hon. gentleman could not have read the original Act. The clause exactly followed the language of the old law, except that it used the word "knowingly" instead of "wilfully."

Sir J. Kennaway said it was important the word "knowingly" should be taken out, because it gave a wrong impression in regard to the wish of the House. If the word were omitted it was by no means likely that an innocent man would be convicted.

Mr. Sullivan said that an Act of this kind in Dublin had been obstructed for several years by the insertion of this word "knowingly." The City analyst again and again brought the vendors of "sweetstuffs" before the magistrates, but they were always able to throw the onus back upon the manufacturers, and the children continued for some years to be poisoned until an alteration of the Act could be obtained. He warned the House that if the word "knowingly" were left in the clause it would obstruct the operation of the Act in the same way.

Mr. Mundella was of opinion that there was very little adulteration of food in the country. It would not pay as a rule to adulterate. He hoped the Committee would not make the Bill too stringent, as if they did magistrates would not convict.

Mr. Boord hoped that if the word "knowingly" were retained it would be explained and defined.

Dr. Playfair observed that the first "knowingly" was not required in the clause. If a person mixed deleterious materials with food, he must be taken to do so with the intent to adulterate.

Sir H. Peek concurred with the hon. member for Sheffield that there was not so great an amount of adulteration practised as some hon. members seemed to think, and that opinion was borne out by the report of the Select Committee.

The amendment was then agreed to.

Mr. Sullivan moved the insertion after the words "any article of food with any ingredient or material," of the words "whereby to reduce its value as an article of commerce." The effect would be to prevent the adulteration of food by substances which were not poisonous—such as of milk by water.

Mr. Sclater-Booth pointed out that the cases to which the hon. gentleman alluded were sufficiently provided for by Clause 3.

The amendment was withdrawn.

Dr. Cameron moved the omission of the word "knowingly" in the clause.

Mr. Forsyth said that it would be extremely hard upon shopkeepers if the word "knowingly" were omitted from the clause, because they would in that case be liable for any improper ingredient which might be introduced into an article which they received from the wholesale manufacturer abroad.

Mr. W. E. Forster thought that the word could not in justice be struck out.

Mr. Sclater-Booth believed that the word must be retained.

Mr. Macdonald should support the amendment of the hon. member for Glasgow.

Dr. Cameron, after what had fallen from the right hon. gentleman below him, would withdraw his amendment.

The amendment was withdrawn.

Sir A. Lusk proposed the insertion in lieu of the word "of," of the words "not exceeding," with a view of leaving it to the discretion of the magistrates whether a lesser penalty than £50 might not be inflicted.

The amendment was supported by Mr. Watkin Williams and others, and opposed by Mr. Denison, who did not think the penalty named in the clause too severe, seeing that the offence must be proved to have been knowingly committed. The amendment having been accepted by Mr. Sclater-Booth, was eventually agreed to.

Mr. O'Sullivan rose to propose an amendment, the object of which was to prevent the sale of a compound known as "silent" whisky. He had asked a friend of his to try the liquor without letting him know what sort it was. His friend drank it, and seeing he made a wry face, he asked him what he thought of it. His answer was, "It was like a torchlight procession going down my throat." By adulterating with rubbish which was bought at 2*s* 8*d*. a gallon, of course the genuine article, which was worth 6*s*. a gallon, could be under-sold. And the Government encouraged that practice, which was so injurious to the health and the sanity of the people. In the Government stores there were sometimes large quantities of so-called Dublin whisky, which contained only a very infinitesimal percentage of the genuine article, or even none at all. The Government gave the same permit for the sending out of that poisonous and deleterious stuff as for genuine whisky, and thus the purchaser and the consumer were deceived and defrauded. The only object of that could be to destroy a branch of Irish industry. That was no laughing matter. The Irish woollen trade had been destroyed by an Act of Parliament; but in the present case the same thing was being done by more subtle means—viz., by a fraud on the public. He declared he should persevere until the injustice of which he complained was removed.

Mr. Brooks said a real injury was done to an Irish industry, and he hoped his hon. friend would go to a division.

The Chancellor of the Exchequer said this matter lay a little outside the Bill. If the question was as to the mixing of any article that would be injurious to health that was already prohibited by the Bill, but if it was intended to take advantage of this clause to prevent the mixing of whisky in bond then it went far beyond the scope of the Bill. He suggested that the hon. member should make an appointment to see him and talk the matter over with him, the practical officers of the Customs being present, so as to come to a settlement.

Mr. O'Sullivan said the consumers got no information that the whisky was blended, as there was only the letter "B" rudely scratched on the casks. He would accept the offer of the right hon. gentleman, the Chancellor of the Exchequer.

Mr. Butt thought the matter was within the scope of the Bill, but advised his hon. friend to accept the right hon. gentleman's offer, on condition, however, that he should not be put to the test of tasting any of this whisky.

The amendment was then withdrawn, and the clause agreed to.

On Clause 4,

Dr. Cameron proposed to omit the words, "of a nature injurious to health" in the case of drugs, which might be adulterated to an extent very prejudicial to the health and even to the life of a patient, by means of substances which were not injurious to health. Besides, chemists were not likely to do anything ignorantly, and therefore there could be no hardship in compelling them to sell their drugs in a state of purity.

After some conversation, Dr. Cameron's amendment was withdrawn to give place to the following, which was adopted:—

"So as injuriously to affect the quality or potency of such drug."

Dr. Lyon Playfair moved the omission of the word "knowingly," on the ground that the persons who would be affected by this clause would not be ignorant shopkeepers, but chemists and druggists, who ought to be better informed as to the nature and quality of the articles they sold.

Mr. Mundella and Mr. Pease opposed the amendment.

Mr. Sclater-Booth said he had received representations from the Pharmaceutical Society, who could scarcely be supposed to desire the sale of adulterated drugs, against the principle of the amendment. He therefore hoped the proposal would not be pressed.

Dr. Playfair withdrew his amendment in deference to what appeared to be the will of the House, and not because he had changed his view.

The clause as amended was added to the Bill.

On Clause 5,

Lord F. Cavendish moved to amend the clause by inserting after the word "appearance" the words "unless such matter is used to conceal the inferior quality of the article."

The amendment was adopted.

Clause 5 was then agreed to, upon which the Chairman was ordered to report progress.

The following tabular arrangement will allow of a comparison of the five clauses of the Sale of Food and Drugs Bill that have thus passed through Committee with the corresponding portion of the Bill as originally introduced under the title of the Adulteration of Food and Drugs Bill:—

As read a first time; the parts now altered or omitted printed in italic:—	As agreed to by the Committee; the new and altered parts printed in italic:—
1. From the commencement of this Act the 23 and 24 Vict. c. 84, 31 and 32 Vict. c. 121, s. 24, and the 35 and 36 Vict. c. 74, shall be repealed, except in regard to any appointment made under them and not then determined, and in regard to any offence committed against them or any prosecution or other act commenced and not concluded or completed, and any payment of money then due in respect of any provision thereof.	1. From the commencement of this Act the *statutes of the* twenty-third and twenty-fourth of Victoria, chapter eighty-four, *of the thirty-first and thirty-second of Victoria, chapter one hundred and twenty-one, section twenty-four*, of the thirty-third and thirty-fourth of Victoria, chapter twenty-six, section three, and of the thirty-fifth and thirty-sixth of Victoria, chapter seventy-four, shall be repealed, except in regard to any appointment made under them and not then determined, and in regard to any offence committed against them or any prosecution or other act commenced and not concluded or completed, and any payment of money then due in respect of any provision thereof.
2. *This Act shall not apply to Scotland or Ireland except as herein provided.*	
3. The term "food" shall include every article *eaten or drunk by man other than drugs*:	2 [formerly 3]. The term "food" shall include every article *used for food or drink by man, other than drugs or water*:
The term "drug" shall include medicine for internal or external use:	The term "drug" shall include medicine for internal or external use:
The term "county" shall include every county, riding, and division, as well as every county of a city or town not being a borough:	The term "county" shall include every county, riding, and division, as well as every county of a city or town not being a borough:
The term "justices" shall include any police and stipendiary magistrate invested with the powers of a justice of the peace.	The term "justices" shall include any police and stipendiary magistrate invested with the powers of a justice of the peace *in England, and any divisional justices in Ireland.*

Description of Offences.	*Description of Offences.*
4. No person shall *knowingly* mix, colour, stain, or powder, or order any other person to mix, colour, stain, or powder, any article of food with any ingredient or material *of a nature* injurious to health, with intent that the same may be sold in that state, and no person shall knowingly sell any such article so mixed, coloured, stained, or powdered, under a penalty in each case *of* fifty pounds for the first offence; every *subsequent* offence, after a conviction in such penalty, shall be a misdemeanour, for which the person, on conviction, shall be imprisoned for a period not exceeding six months with hard labour.	3 [formerly 4]. No person shall mix, colour, stain, or powder, or order, *or permit* any other person to mix, colour, stain, or powder, any article of food with any ingredient or material *so as to render the article* injurious to health, with intent that the same may be sold in that state, and no person shall knowingly sell any such article so mixed, coloured, stained, or powdered, under a penalty in each case *not exceeding* fifty pounds for the first offence; every offence, after a conviction *for a first offence*, shall be a misdemeanour, for which the person, on conviction, shall be imprisoned for a period not exceeding six months with hard labour.
5. No person shall *knowingly*, except for the purpose of compounding as hereinafter described, mix, colour, stain, or powder, or order any other person to mix, colour, stain, or powder, any drug with any *other* ingredient or material *of a nature injurious to health*, with intent that the same may be sold in that state, and no person shall knowingly sell any such drug so mixed, coloured, stained, or powdered, under the same penalty as in the *last clause* for a first and subsequent offence.	4 [formerly 5]. No person shall, except for the purpose of compounding as hereinafter described, mix, colour, stain, or powder, or order *or permit* any other person to mix, colour, stain, or powder, any drug with any ingredient or material *so as to affect injuriously the quality or potency of such drug*, with intent that the same may be sold in that state, and no person shall knowingly sell any such drug so mixed, coloured, stained, or powdered, under the same penalty *in such case respectively* as in the *preceding section* for a first and subsequent offence.
6. No person shall *knowingly sell* any article of food or any drug which is not of the nature, substance, and quality of the article demanded by the purchaser, under a penalty of twenty pounds, except as herein excepted and provided; that is to say, except— *Where any matter is mixed therewith for the purpose of rendering it portable, or of preserving it;* *Where a harmless ingredient is mixed with it for the purpose of rendering it palatable or of improving its appearance;* *Where according to the usage of trade it is sold in a mixed state;* *Where it is the subject of a patent in force, and is supplied in the state required by the specification of the patent;* *Where British, colonial, or foreign spirits are reduced from their ordinary strength by persons licensed and paying duties under the excise;* *Where a drug is compounded either in conformity with a prescription of a registered medical practitioner or otherwise according to the usage of trade;* Where the article is unavoidably mixed with some extraneous matter.	5 [formerly 6]. No person shall *sell to the prejudice of the purchaser* any article of food or any drug which is not of the nature, substance, and quality of the article demanded by such purchaser, under a penalty of twenty pounds, except as herein excepted and provided; that is to say, except— *Where any harmless matter or ingredient is mixed therewith for the purpose of rendering it portable or palatable, or of preserving it, or of improving its appearance, unless such matter is used to conceal the inferior quality of the article.* *Where the article named is a proprietary medicine, or is the subject of a patent in force, and is supplied in the state required by the specification of the patent;* *Where a drug is compounded as hereinafter described;* Where the article is unavoidably mixed with some extraneous matter *in the process of collection or preparation.* *Provided that no article shall be deemed to be within any of the exceptions above set forth, if the matter or ingredient mixed therewith shall have been added with intent fraudulently to increase the bulk, weight, or measure of the article.*

Poisoning by Vermin Killer.

On Wednesday, April 14, Dr. Diplock held an inquest concerning the death of Clara Emma Banbury.

Thomas Saul Banbury, Box Villa, Albion Road, Hammersmith, gentleman, stated that deceased was his daughter; her age 29 last birthday. The deceased was single, and in her ordinary health on Monday, except that she had a delusion that her mother would die first. At twenty minutes past ten on Monday night she bought a tin of ox-tail soup at Walton, Hassell, and Port's, but her mother did not like it, and witness thought she must have purchased the poison with which she killed herself. The deceased was of a very affectionate disposition. On Tuesday morning witness thought he heard her go down at seven o'clock, but on getting up found her door open, and went in and saw deceased on the floor on a thick petticoat. Witness fetched Dr. Chapman, and found part of the poison in paper, and on looking round saw the glass, with some contents of a crystalline character.

Dr. C. W. Chapman stated that he was called to see the deceased on Tuesday morning at a quarter past eight o'clock. The last witness said his daughter was very ill or dying. Witness followed him, and found deceased dead; she had been dead some hours. On the dressing-table witness found a paper produced, with a pencil alongside, on which was written "My poor mother is dying of a broken heart, I will poison myself to-night. Oh, my poor father, and I hope I shall die.—April 10th.—Clara. I bought it at Walton, Hassell, and Port's. Oh, my poor father; Oh, God help me." Found also a packet of Battle's Lincoln Vermin Killer, marked "poison." Witness also found the glass it had been mixed in. Made a *post-mortem* examination and found the organs healthy, and took away the intestines for examination. The muscles of the face were drawn, and he believed in all probability she had died from strychnine poison.

One of the witnesses asked if such poison was allowed to be sold?

The Coroner said it was allowed to be sold as a compound. The evidence pointed to the cause of death. He had frequently called attention of juries to sleeplessness as the forerunner of suicide, and the necessity of persons being looked after when those symptoms appear.

The jury returned a verdict of "Suicide by poison while of unsound mind."

Several members of the jury complained of the readiness given to persons to purchase deadly poisons at these chandlers' shops that sold everything. They felt that the sale of poisons should be restricted to the law that affected chemists.

Dr. Chapman said that a packet of Battle's Vermin Killer cost threepence, and would kill five persons, or poisoning might be done at a half-penny per head. He concurred with the jury on the careless mode of sale. The most excruciating pain attended the taking of Battle's Vermin Killer.—*West London Observer.*

Poisoning by Caustic.

An inquest has been held at Brighton to investigate the circumstances attending the death of Alfred Richardson, aged 49 years, a commercial traveller.

William James, a hawker of publicans' beer cans, said that, at about half-past eleven at night, he was with deceased, whom he had known between five and six years, in the commercial room of the Prince Albert Hotel. Deceased, who was sober, asked him for some tobacco; and witness put his hand to his pocket and pulled out some in a piece of paper. In taking out the paper, he also pulled out a small pill box in which was a piece of caustic, about the size of an ordinary pill. The caustic fell on the table, and deceased picked it up. Witness went to light his pipe, when he heard deceased say "That's just what I wanted, an antibilious pill." Witness responded "Good God, you've not taken it?" and deceased replied "Yes, I have." Witness then exclaimed "You're poisoned, its caustic." Deceased replied "Well, if it is, I've got it," and then drank some ale, after which he said that he had a burning in his throat. Witness at once asked deceased to go to a doctor's, and they went to a chemist's in the street, and then to several surgeons, two of whom refused to get up. Ultimately they went to Mr. Hart, surgeon, who saw deceased. Witness and deceased returned home, and went to bed in the same room. At about three o'clock on Sunday morning deceased awoke and commenced murmuring, and witness got up and obtained some medicine from Mr. Hart. Deceased, however, got worse, and Mr. Hart was sent for; but deceased died about eight o'clock whilst witness had gone for some leeches. The box was marked "caustic—poison."

Mr. James Barker, assistant to Mr. Moon, chemist, Trafalgar Street, deposed to deceased having been taken to his employer's establishment on the night on question. Witness gave deceased some milk, some ipecacuanha wine and water, and an emetic, and afterwards accompanied him to Mr. Hart's. Whilst in the street, deceased remarked that it was all his own fault, he having taken the the caustic in mistake for a pill.

Mr. E. J. Hart, surgeon, deposed to attending to deceased, as mentioned. On seeing him on Sunday morning, witness found him exhibiting every symptom of suffocation. Witness went to the dispensary to get some instruments, and on his return performed tracheotomy and tried artificial respiration, but it was of no avail, and deceased died soon after. A *post-mortem* examination showed that the stomach and œsophagus were much congested, but beyond that there was no trace of nitric acid. Between the folds of the mucous membrane was a large red spot where the caustic had evidently lodged, and the passage to the lungs was completely blocked up by a swelling caused by the action of the acid. Thus the actual cause of death was suffocation.

The jury found that deceased met his death by misadventure. In drawing up the inquisition, the Deputy-Coroner highly commended Mr. Barker for the intelligence and care he had displayed and the trouble he had taken on the unfortunate man being brought to him.—*Brighton Herald.*

Review.

On British Wild Flowers Considered in Relation to Insects. By Sir John Lubbock, Bart., M.P., F.R.S. With numerous illustrations. London: Macmillan and Co. 1875.

The existence of sexual organs, even in flowering plants, has been generally admitted by botanists only in quite recent times. It was an Englishman, Nehemiah Grew, who first maintained, in his 'Anatomy of Plants,' published in 1682, the necessity for the action of pollen on the pistil for the production of fruit. The new doctrine was fiercely contested as heretical, and even impious, by some; by others, as Tournefort in 1700, on philosophical grounds. After Linnæus had firmly established the nature and functions of the reproductive organs, the next great step was made by J. G. Kölreuter, who published in 1761 his 'Vorläufige Nachricht von einigen das Geschlecht der Pflanzen betreffenden Versuchen und Beobachtungen,' wherein he maintained, as the result of his own observation, that in all Cucurbitaceæ, in all Irideæ, in the fig, and in not a few species of Malvaceæ, the pollination of the female flowers or organs is the work of insects alone; and that in Iris the relation of the various parts of the flower to one another is such that the pollen cannot reach the stigma either by itself or with the assistance only of the wind. He was also the first to notice the phenomenon of dichogamy, or the fact that in hermaphrodite flowers the male and female organs are very commonly not in a functional state at the same time. Kölreuter's work was followed, in 1793, by the better known and often quoted volume of K. C. Sprengel's 'Das neu entdeckte Geheimniss der Natur im Bau und in der Befruchtung der Blumen,' who supported his theorem that "Nature does not intend any hermaphrodite flower to be fertilized by its own pollen," by a great number of illustrations beautifully and ingeniously worked out. He also first called attention to the advantage enjoyed by bright-coloured and sweet-scented flowers in the inducements thus held out for the visits of insects. Kölreuter's and Sprengel's observations attracted, however, but little attention until within the last fifteen years, when—not to mention continental workers in the field—the writings of Darwin have directed a large amount of observation to the phenomena of the fertilization of flowers by the agency of insects.

In the little volume before us Sir John Lubbock gives a very carefully compiled and interesting account of the main facts brought out by older and more recent observers as far as British wild flowers are concerned. The introductory portion is devoted to the general subject which is explained in a manner to interest even the unscientific reader:—the part played by the honey in attracting insects; the advantage possessed by those individuals of a species which exceed the others in beauty of colour or scent, and the consequent probable perpetuation and gradual increase of their peculiarities; the inconspicuous character of "anemophilous" flowers, or those fertilized by the wind, as contrasted with the "entomophilous," or those fertilized by the agency of insects; and the mutual adaptation of the arrangement of the parts of the flower and of the structure of the legs and bodies of insects for the purpose of cross-fertilization. In the second chapter the special contrivances met with in natue are described, by which self-fertilisation is hindered or rendered impossible, and cross-fertilization promoted—dichogamy, dimorphism, etc.; and Sir John details a series of interesting observations tending to show that bees at least have a keen appreciation of differences in colour. In the remainder of the volume the author takes up each of the natural orders of flowering plants in succession, and gives a summary of the facts at present collected by diffeerent observers respecting the mode of fertilization of the various species belonging to it which are included in the British flora. As the author remarks at the close of the volume, the field is a very wide one, and our knowledge at present very limited; but the lover of nature could not wish for a better introduction to it than Sir John Lubbock's interesting little volume.

Notes and Queries.

[437]. CEMENT FOR COMPOSITION MORTARS.—A correspondent asks in last week's Journal for a form for a cement with which to repair composition mortars. He will find either of the three following effectual. I have used each in its turn, but give the preference to No. 2.

No. 1.—Take fresh slaked lime and mix it into a paste with the white of a fresh egg, having previously broken up the stringiness of the albumen by whisking it in a tea cup or jelly pot by means of a small bundle of fine iron wire.

No. 2.—Dissolve gum shellac in methylated spirits of wine or wood naphtha to the consistency of ordinary mucilage. Take of the finest plaster of Paris, such as is used by dentists for modelling, and mix with it so as to form a paste; apply speedily, as it soon sets. Time should be allowed for it to thoroughly harden, and the parts should be kept from shifting their position.

No. 3.—Take ordinary brick-dust, powdered fine. Mix this with mucilage of gum Arabic to the consistency of a stiff paste, and apply *sec. artem.* By ordinary brick-dust I mean the article used in most households for cleaning knives, and commonly known as Bath brick, but why so named I am at a loss to know, as the so-called Bath bricks are made of a peculiar sand obtained from the bed of the river Parret, near Bridgewater, in Somersetshire. This sand consists chiefly of the very minute skeletons of fossil infusorial animalcules, accumulated in beds of vast extent, and consisting of almost pure silica in a state of minute division.

P.S.—Nos. 1 and 3 have already been published, but I am not aware that No. 2 has, if so, I have never seen it; the idea occurred to me, and the cement has proved very satisfactory.—T. C. Maggs, *Yeovil.*

[438]. MICROSCOPIC EXAMINATION OF STARCHES. — How may specimens of various *starches* be best mounted for microscopic comparison? In glycerine or balsam I find the markings imperceptible. Is it possible by distinctive microscopic characters to discriminate between St. Vincent's or Natal arrowroot, and genuine "Bermuda," at five or six times the price?—Micro.

[439]. TOOTHACHE DROPS.—The following four recipes for "toothache drops," are quoted in the *American Journal of Pharmacy*, from the *Dental Cosmos* for November, 1874:—

1.—Chloroform,
Sydenham's Laudanum . . . āā ʒii
Tinct. Benzoin . . . . . . ʒi

2.—Creasot,
Chloroform . . . . āā ʒii
Sydenham's Laudanum . . . ʒiv
Tinct. Benzoin . . . . . . ʒi

3.—Oil of Peppermint,
Rhigalene,
Chloroform . . . . āā ʒiii
Camphor . . . . ʒii

4.—Chloral,
Camphor . . . . āā ʒi
Morphia . . . . gr. ii
Oil of Peppermint . . . . ʒii

Obituary.

Notice has been received of the death of the following:—

On the 3rd April, 1875, Mr. Henry J. S. Hopwood, Pharmaceutical Chemist, of Richmond, Surrey, aged 77. Mr. Hopwood was one of the Founders of the Pharmaceutical Society.

On the 11th April, 1875, Mr. Alfred Towerzey, Pharmaceutical Chemist, of Glasshouse Street, London, aged 66. Mr. Towerzey had been a member of the Pharmaceutical Society since 1842.

On the 20th March, 1875, Mr. James Bailey, Chemist and Druggist, of Oldham, aged 59.

On the 21st March, 1875, Mr. Sampson Rogers, Chemist and Druggist, of Shaldon, Devon, aged 35.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Glasgow Memorial.

Sir,—At a meeting of the Board of Examiners for Scotland held here this forenoon, attention was called to the "Explanatory Note" from Messrs. Currie and Fairlie, which appeared in last week's Journal in regard to a memorial sent to the London Council.

Without at present making any remarks on the extraordinary nature of the document thus sent for consideration to London, the Board distinctly states that the authors of the note already referred to are entirely in error when they say that circulars have been sent to several members of the Board convening meetings in connection with the draft memorial.

No such intimations were received by any of the members of the Board, with the exception of Mr. Kinninmont, of Glasgow, and the first notice of such a memorial was obtained from the printed copy appearing in the Journal of the 10th April.

Signed on behalf of the Examining Board,

William Tait, *Chairman.*

Edinburgh, 21*st April*, 1875.

Sir,—Referring to the proceedings which took place this forenoon, at the meeting of the Board of Examiners here, I think it right to state that I explained to the Board I had received from Glasgow a printed halfpenny post-card some time ago intimating a meeting of the West of Scotland Chemists and Druggists, but the terms of which I could not now recollect, having paid no attention to it. This is the only intimation of a meeting which I am aware of ever having received, and I certainly never for a moment construed it to mean an invitation.

Wm. Gilmour.

Edinburgh, April 21, 1875.

Sir,—The Glasgow memorial and explanatory note will doubtless receive due consideration at the next Council Meeting.

To preserve my own consistency, however, I beg to state that the parties who sign the note are in error when they say, "although Mr. Mackay has evidently forgotten it, circulars convening two or three public meetings, which were held to discuss the question, and at which the draft memorial was adopted, were sent to several of the Examining Board at Edinburgh, Mr. Mackay, if we mistake not, being amongst the number."

I am not an examiner, and the Board must speak for itself, but I distinctly affirm that neither directly nor indirectly was I aware of the proposed memorial, until I received the agenda of business to come before the last meeting of Council in London.

My regret is as deep as ever that our friends in Glasgow sent such a document as the one now lying on the Council Board in Bloomsbury Square.

John Mackay.

Edinburgh, April 20, 1875.

The Glasgow Memorial.—Further Explanations.

Sir,—To "hang a man and then try him" may be vastly agreeable to the operators, but it could not fail to be very much the reverse to the victim operated on. Such, as it seems to me, at least, is the case of the "Glasgow memorial" at present. As I am, in some measure, responsible, though all unwittingly, for this, I will, with your permission, add a few explanatory words to those already addressed to you on the subject by my neighbours and friends—Messrs. Currie and Fairlie.

First, the "memorial" was put into my hands for the first time during an animated discussion on the "Sale of Food and Drugs Act," and it was only by snatches when I could, while watching this debate in which I felt called on to take part, that I got it read at all.

When my friend Mr. Mackay got up, as he was permitted to do in consequence of his inability to be present at the meeting in May when the subject is, for the first time, to be formally discussed, he not only had in his hand, as it seemed to me to be, a verbatim copy of the report, but in the course of his speech he mentioned, as I heard it, that he had been in possession of it from the previous Saturday morning. I did not, and do not complain of this, but on the surface it proves in how superior a position he was for entering upon its discussion to myself, or, I suppose, any other member of Council present.

Notwithstanding this disadvantage, from having previously had a general knowledge of the points discussed in the memorial, and from three or four brief jottings of these points taken on reading the document itself at the table, I was quite willing, as I repeatedly stated to the Council, to discuss it on its merits at once, and to give it a general support, had I only had pointed out to me by any of my more experienced colleagues the proper form in which to do it.

No one coming to my rescue in the matter, I declined absolutely, as I still do, to enter upon the merits till I could do so in proper form, stating as my reason for this course, I had no idea of allowing the question "to end in mere talk," as I never cared "to bark when not prepared to bite."

Second, as to the large amount of argument founded by yourself and others upon the numbers present at the last meeting of the Glasgow Council, when the memorial was finally adopted. If you will kindly ask our admirable reporter to look over his notes, you will probably find that when Mr. Mackay founded an argument against the memorial on the smallness of the meeting at which it had been adopted in my presence, I interrupted him in his statement, and explained that the matter had been discussed over and over again during the previous six months, but, that not having been present at their previous meetings, I could not state how many members were present at them. Mr. Mackay, then, you will also find, or should find, spoke of this as a great aggravation of the offence. He complained of the little confidence placed in the Edinburgh Board or Council by the Glasgow memorialists as proved by their meetings not having been reported to their friends in Edinburgh.

Third, as to your deeming yourself called upon to discuss the whole question in your leading article, and as to your permitting it to be discussed in your correspondence columns. Technically, doubtless, from the memorial itself having appeared in your columns, you were quite entitled to do this. But I consider that in the circumstances of its discussion being delayed till May, the publication of the memorial was a distinct mistake. Hence my great surprise at seeing it published at full length in our Journal.

In conclusion, I hope you will excuse my adding that I think it was hardly generous to me, and that I feel pretty sure it was not wise, either on the part of any member of Council, or on your own part, to enter upon a discussion of the memorial on its merits till I had an opportunity of bringing it in proper form before the Council. I greatly regret the trouble and loss of time I have caused to the Council and to yourself from my ignorance of the form in which to treat such a document as the "Glasgow Memorial."

DANIEL FRAZER.

Sir,—It is most unfortunate that the memorial from Glasgow should have been so worded as to convey to all outside the circle of its immediate authors an impression that it is an attack on the constitution and character of the Boards of Examiners, especially in Scotland.

However much its words seem to bear out this interpretation, I am certain that no such insult was intended, and confidently affirm that at no meeting of the trade in the West of Scotland, whether of sixty or of nine members, would such a document have been adopted, had the import of its phrases been carefully considered; indeed some of the members of the Glasgow council who were present at the meeting at which the memorial was finally adopted, have stated to me that they supported it only after Mr. Fairlie's assurance "that as to the changes suggested, their Edinburgh brethren were one with them," and so the objectionable phrases passed unobserved.

I regret much that business engagements prevented me from being present at the second meeting, and the final one was called on a day on which I was acting as examiner in Edinburgh, so that I had not an opportunity of seeing the memorial before its appearance in the Journal.

Had I seen it, I think I should have observed the absurd position we seem to assume in it, namely, that of censuring, as members of the council of the Glasgow Druggists' Association our own conduct as members of the Council of the North British Branch in the mode of nominating examiners, etc.; and as four of our members possess this double qualification, we are made to appear ridiculous in complaining of certain things being done, of which the blame, if blame there be, falls on ourselves.

As to the mode of appointing examiners, it is impossible to conceive of any system more liberal than that at present in operation. As stated in the letter of "Scotus," a Council is elected by balloting papers, one of which is sent to every member of the Society in Scotland. This Council is now composed of members resident in Edinburgh, eight; Glasgow, four; Dunfermline, one; Stirling, one; Portobello, one; so that of the fifteen we have a fair share of representatives.

Any member of the Council can nominate such persons as they think fit for the post of examiner, guaranteeing, of course, that their nominees will serve if elected. We have never had any need to have recourse to a ballot, as the difficulty has been to make up the number, and Mr. Mackay and others of the Board have frequently endeavoured to induce members from different parts of the country to allow themselves to be nominated—without success. I have also tried hard to get another from Glasgow, but "they all, with one consent, make excuse."

In conclusion, I hope that my Edinburgh brethren will accept of this explanation as to the apparently insulting expressions in the memorial, and that the London Council, setting aside all idea as to resenting the supposed attack, will proceed calmly to discuss the other points suggested in it on their own merits.

ALEX. KINNINMONT.

Sir,—In all the vague and disagreeable insinuations of the Glasgow memorialists, it is satisfactory to have at least one positive assurance even though it has been obtained by the help of an explanatory note, viz.: that it was not intended in any way to impugn the honour of the Board of Examiners in Scotland, past or present, or in any way cast the slightest reflection upon them. This is so far satisfactory. But it would have been more satisfactory still had we also obtained the assurance of what they did mean by asserting that the present system of examination was inimical to the future progress of the trade and estranging young men from the business, and what was further meant by tacking on to this assertion the demand that the Board should be drawn from a wider area, that there should be a change in its constitution yearly, and (singularly modest request) that it should sit twice a year in Glasgow. If the first part of the memorial is simply a philippic against examinations in general, nothing need be said against it here further than that it was unfortunate its meaning was not more clearly expressed. If, on the contrary, it means to insinuate something in the conduct of the examinations in Edinburgh different from that pursued in London; then the insinuations are entirely gratuitous and unwarrantable, inasmuch as the memorialists can have no direct knowledge of the understanding at present existing betwixt the two Boards other than the repeated assurance that at no previous time had they worked more harmoniously together, nor had the examinations more closely assimilated. It is almost inconceivable that the Glasgow druggists in the face of these assurances would still assume that there was a difference in the two examinations, and on the assumption draw out a public memorial, knowing it would be rigidly overhauled and criticized, both in the Council and out of it. What, then, can be the meaning and intention of this memorial?

In trying to solve this problem one is naturally led to consider the demand tacked on to the first part of the memorial for a general reconstitution of the Examining Board in Scotland; a most extraordinary demand, if we consider they impute nothing against the honour—and in the honour we assume the ability—of the present Board, nor against the mutual understanding existing betwixt the two Boards. Why should these demands have been tacked on to the allegations regarding the examinations, and above all, why should the examinations be associated (not certainly directly in as many words, but implied in every sentence of the memorial, and directly connected in Mr. Frazer's remarks) with the scarcity of assistants? It is here the cloven foot appears. That the Glasgow druggists are exercised regarding a scarcity of assistants is apparent, and that this scarcity is associated in their minds with the examinations may safely be taken for granted, and this being the case, what more natural than that they should seek to have these examinations changed; and how can they more effectually change them than by getting a Board appointed who shall give effect to their views? and how can they get such a Board appointed but by the means indicated in their memorial? Read in the light of this explanation, the whole memorial becomes clear as daylight; without it, it is the most unintelligible production that probably ever emanated from a public meeting. Be all this as it may, the subject of the appointment of examiners is of too great importance not to be seriously considered from every point of view, and in what remains of this letter I purpose considering the whole method of appointing examiners in Scotland without prejudice, so far as I know my own mind, either in favour of the present system or against the modifications suggested in the Glasgow memorial.

In considering then the whole question, there is at least one peculiarity connected with the Board in Scotland which tends to change, in some little degree, the relationship of that Board, in comparison with the London Board, to the Council, which must not be overlooked. This peculiarity is, that whereas the latter Board, as at present constituted (or even as probably it will ever be constituted), is in an eminent degree composed of men whose abilities and character are individually known, or may be known, to each member of the Council personally. This is not, and cannot be the case with the Scotch Board. Here, the members of the pharmaceutical body generally are comparative strangers to the Council. They are, with few exceptions, essentially unknown to them, either as regards ability or indeed any other acquirement specially fitting them for the important duties of examiners. The consequence of this is that to speak of a ballot under such circumstances becomes a mere farce if we would still retain the fittest men as examiners, unless there also accompany this ballot a nomination by responsible parties. Hence the wisdom of the Council—a wisdom I have always admired—of granting and giving effect to a Scotch nomination. But here the important question comes in, how and by whom should this nomination be conducted? In reply to this I answer, not assuredly by any individual or even body of individuals influenced by local opinions, local prejudices, and above all local jealousies. The Glasgow memorial itself, emanating though it does from a body say of sixty or seventy individuals (how many of these were assistants and apprentices?), is a stronger protest against local, which in other words just means indiscriminate, nominations than any argument which I could possibly adduce. No one can fail to see in that memorial the expression of local feeling alone, a feeling probably embracing in it both much of prejudice and jealousy, a feeling most certainly embracing in it the desire for a reduction of the examinations standard, elements I need not say, which if allowed at all to enter, would prove disastrous to the efficiency of the Scotch Board, and the harmony of both. If not then by individual, or even local action, we are of necessity shut up to a nomination by a representative body popularly elected so as to embrace not only all the localities, but all the opinions, and such a body I believe already exists in the executive which has hitherto nominated the examiners for Scotland. No system of election than that which this executive body has adopted, can be more representative or popular, none can work with greater simplicity, and none probably can call forth and embrace more diversity of feeling and opinion; so that after dispassionate consideration, I am more than ever persuaded that a nomination of examiners proceeding from such an executive is on the one hand the only safeguard against inefficiency and corruption, whilst it is calculated, on the other, to secure the election of the fittest.

But not only is there this question of ignorance of the acquirements and capabilities, on the part of the Council, of the individual members comprising the Scotch Board, but there are other points to be considered not less vital, which would make any interference by the Council such as indicated by the Glasgow memorialists dangerous in the extreme. Pre eminently there is this to be remembered, that as the establishment at present exists, and as it has hitherto existed in Scotland, connected with the examinations, there is an amount of detail work—not examinations, and yet belonging to the examinations—which must ever necessitate the great majority of the Board being drawn from the centre in which the examinations are held. This we believe will hold good to a certain extent even with the London Board, but much more is it applicable to the Board here destitute of an equipped establishment of appliances, not to speak of officials, such as there is at command in Bloomsbury Square. On this detail work, as everyone conversant with examinations well knows, depends much of the efficiency and success of the examinations, and to speak of a Board composed of members drafted from all parts of the country is simply absurd if this work is not to be slurred or left altogether undone and the very purposes of the examinations imperilled. Probably, however, the greatest absurdity of all is in the very supposition that a Board could be so constituted in Scotland—that is, with its members drafted in from all parts of the country. Only those who, like the executive here, have tried and found how limited are the sources from which men of known ability, with the inclination and time at their disposal to devote themselves to the irksome and thankless task of examinations, can know how absurd much of the Glasgow memorial truly is. Peculiarly absurd if the Board is to be completely revolutionized as to its members every two or three years; and to all their other hardships to have added the crowning absurdity of travelling throughout the country—we presume carrying their appliances with them like an itinerating mountebank, going to the assistants because the niggardly pittance received by them from their masters will not permit them to go to the examiners.

There are one or two other points which I would have liked to have taken up, but I have already, I am afraid, exceeded the limits allowable. I will, therefore, in the meantime, close with the intention of taking up the subject of the scarcity of assistants in another letter.

SCOTUS.

Sir,—With all due reverence for the wisdom of the Glasgow memorialists I cannot help holding that the alleged scarcity of assistants is almost wholly caused by the conduct of the masters, and that the Board of Examiners has got little to do with it, properly speaking. I should say that the scarcity is owing to the fact that assistants are underpaid and overwrought. The chief encouragement to most men to enter any business is the pecuniary one, and in this respect an assistant's inducement is infinitesimally small. Our trade is not keeping step with others in the march towards shortening of the hours of toil, and increase of remuneration.

It is really a psychological study to watch how thoroughly self-interest and the wished-for obesity of the money-bag can cause a body of presumably intelligent men to blink so hard at the real facts. I would suggest to some statistically inclined western druggist to devote a little of that time, previously given to the somewhat fossilizing occupation of memorial writing, to ascertain what the average wage of an assistant is, and I am much mistaken if his labour does not throw some light upon this dearth. The fact is that unskilled labour is often better paid.

Another most potent reason, especially in Glasgow, why men are unwilling to enter our ranks, or are keenly glad to quit them after having entered, is the monopoly which medical men make of the business, and the infinite number of "doctors' shops." The greatest hardship that a Glasgow druggist has to fight with is the fact that so many medical men make up their own prescriptions in shops palpably belonging to themselves; or worse still, under the bribe of a percentage upon their patronage they endeavour by every method piously to carry their prescriptions to the shrine of some particular druggist whose drugs are declared to be in a state of startling purity and newness, whilst hints are deftly given that all others are spurious.

This is a system which is a blot upon the medical profession, pharmacy, and on the independence of every honest man—a system which owl-like blinks at free-trade—a system also which causes many high-spirited young men to loathe the business and to quit it as soon as possible.

In conclusion, I hope that something may be done to stop the increasing number of "doctors' shops," and their degrading patronage of the druggist, that the masters will honestly endeavour to shut their shops at a human hour, and cease canting about their willingness to do so; that they will also share more justly and equitably their profits with those who help to make them; and then I may safely predict—without laying claim to be an oracle—that good men will easily be found.

PH. C.

Glasgow.

*** In reference to this subject Mr. James M. Fairlie also writes to say that if "*Scotus*" would send his name to him he might be induced to reply to the one point which "*Scotus*" embodies in so many queries, but that he shall treat all such anonymous communications with the silent contempt they deserve.

Mr. James McCann thinks the true explanation of the scarcity of assistants in Glasgow is to be found in the fact that the salaries offered to them after a four or five years' apprenticeship are only £45 for the first year, £50 for the second, £55 for the third, and £60 for the further term of their natural or unnatural lives, unless they are fortunate enough, after twelve years' experience, to reach the enviable position of first-at-the-counter, when they will be able to draw the sum of £80 yearly; and during all their time they will be expected to work about 90 hours per week. The average salary is estimated by Mr. McCann to be about half that received by a tailor, carpenter, bottle maker, painter, or even a sanitary or poor-law assistant inspector.

The Irish Pharmacy Question.

Sir,—I have read with interest the draft Bill proposed by the Chemists and Druggists' Society of Ireland for the regulation of pharmacy, etc., in this country, and would wish through your columns to call the attention of English pharmacists to one or two strange facts regarding the Council of the proposed Pharmaceutical Society of Ireland, as named therein.

In the first place, among the twenty-four names there is not the name of any one person who is actually at present engaged in pharmacy. The apothecaries who conduct the large medical establishments (some of which are inferior to none in the three kingdoms) in Dublin, Belfast, Cork, Limerick, etc., and whose interests would be seriously affected by the proposed changes, have been altogether ignored. It certainly seems a very strange proceeding indeed to appoint persons to make rules to regulate pharmacy and carefully exclude those who best understand the matter and are practically engaged therein.

Again, whoever framed the list seems to have forgotten that there were two such towns in this country as Belfast and Derry. Why the druggists of these towns (the most flourishing in the country) should be overlooked is to me an enigma.

The first six gentlemen on the list are medical men; of these the last two are apothecaries practising medicine, the representatives of the Apothecaries' Hall, and the most active members of that body in preventing the separation of medical practice from pharmacy in this country by the simple method of allowing the Irish apothecary of the future to be examined in matters merely relating to pharmaceutical science, as urged on the Directors of the Hall by a large number of the apothecaries themselves.

The other gentlemen, with the exception of Mr. Tichborne, are C. and D.'s (chemists and druggists, I presume, so called), and as there is no provision in the proposed Bill for their registration as pharmaceutical chemists, they would have to pass an examination before or possibly be rejected by examiners appointed by themselves. Perhaps they might examine and gives certificates to each other. They may be very estimable gentlemen, but, surely it would be well before appointing them, that something should be known of their attainments, beyond the fact that they keep open shop for the sale of drugs, patent medicines, colza and other oils, lamps, etc., etc., and call themselves chemists and druggists; perhaps the former on the *lucus a non lucendo* principle.

As I do not believe in anonymous letters I beg to sign myself,

HENRY WHITAKER,
Lic. Apothecary.

33, *High Street, Belfast,*
April 15, 1875.

Japanese Peppermint Oil.

Sir,—In the Journal for April 17, there appears (as part of the proceedings of the North British Branch of the Pharmaceutical Society) a paper on "Solid and Liquid Japanese Oil of Peppermint," by John Mackay. The subject being one in which I have taken some interest, and Mr. Mackay acknowledging his indebtedness to a note by myself which appeared in the Journal for November 7, 1874, I would ask your permission to draw attention to one or two points which Mr. Mackay, in transcribing, has represented somewhat erroneously, possibly through a want of perspicuity on my part.

1. Mr. Mackay says, "Dr. Attfield refers to peppermint camphor under the name of menthene, believing it to be the hydrocarbon found more or less in all varieties of peppermint oil," and again "the result of his (Dumas') examination corresponded with that of Oppenheim and Attfield." In the first place, Dr. Attfield does not "refer to peppermint camphor under the name of menthene, believing it to be," etc., and in the second, Dr. Attfield (no disparagement to him) has never worked upon or examined peppermint camphor. In my note the first passage of the two given above runs thus: "Oppenheim called the subject of his experiments *camphor* or *stearopten of peppermint oil*, and also *menthol*. In Dr. Attfield's 'Manual,' peppermint camphor is styled, more systematically, I think, hydrous menthene,—menthene ($C_{10}H_{18}$) being the hydrocarbon which is known to be common to several, if not all, varieties of peppermint oil." What Dr. Attfield does is simply to choose from half a dozen names which are given to this body indiscriminately, the one which seems to him best to describe its constitution. I am glad to follow so good an authority in this. The last statement in the extract is my own, being added as merely explanatory of the systematic name.

2. Mr. Mackay says "menthol, a solid Chinese oil of peppermint, resembles in all its properties the solid portion of Japanese oil," thus restricting the name menthol to one particular solid, whereas it is a general term applied to the characteristic body of all oils of mint, whatever its physical condition or from whatever source.

3. Mr. Mackay says, "Nor can it be doubted that chemically, this menthol closely resembles, nay, is in all respects the same as the peppermint camphor obtained from our own or American oil [The latter differs from it considerably in physical properties.—J. M.], and that in fact both may be named a monatomic alcohol; menthylic alcohol, or hydrate of menthyl, being as already stated represented by $C_{10}H_{18} + H_2O$." The formula given is the constitutional one for hydrous menthene; menthylic alcohol or hydrate of menthyl would not be correctly represented by it, but by $C_{10}H_{19}HO$.

The amount of error in the statements above adverted to may seem trifling and scarcely worthy the notice here bestowed upon it; this notice may, however, prevent much misconception in the future. Further, it would not be conducive to that sound instruction, for the success of which Mr. Mackay, in common with all true pharmacists, is so much concerned, for statements not in accord with historical or scientific teaching to remain supported by his name.

To conclude, Mr. Mackay seems to give me the undeserved credit of having presented the specimens of solid and liquid oil to our museum. The crystallized oil was presented by Messrs. Cyriax and Farries: the liquid oil, quite independently, by another firm.

JOHN MOSS.

300, *Holborn.*

The Resin of Aloes.

Sir,—Your columns last week contained a long and elaborate paper on Aloes, by Dr. Craig of Edinburgh. As my name appears several times in the course of that communication, I must ask to be allowed to say at once that Dr. Craig gives me credit for statements about the activity of resin of aloes, which he may be right in characterizing as very absurd, but for which I cannot hold myself responsible.

Had Dr. Craig taken the trouble to ascertain correctly what my statements in connection with this question have been, he would have found that I have never expressed any opinion whatever regarding the physiological action of that substance.

The only expression of opinion to which I have ever committed myself definitely, is to be found in the proceedings of the Pharmaceutical Conference for 1870, and runs as follows :—

"Until new facts suggest a different conclusion, I hold that the soluble, brown, uncrystallizable substance which constitutes a considerable proportion of all aloes, is the part to which the purgative power is due."

The substance referred to here, was formerly called aloetin or aloesin and is none other than the changed aloin of Dr. Craig. So that the direct evidence, which was wanting, of the correctness of this view is now opportunely supplied by the experiments of Dr. Craig himself.

WILLIAM A. TILDEN.

Shanklin, Isle of Wight,
April 20, 1875.

THE PHARMACOPŒIA DOSES.

Sir,—Mr. Cope's communication on the discrepancy of doses indicated in the Pharmacopœia for drugs and their preparations opens an important inquiry; but I do not think that he always appreciates correctly the cause of the apparent inconsistency. It does not follow that the pharmaceutical preparations of any given drug shall "contain its medicinal properties in an equally active condition," and therefore it does not follow that the doses should be susceptible of calculation by the rule of three. I have been more inclined to invert the reasoning adopted by Mr. Cope; and assuming the accepted dose to be the test of the efficacy of the preparation, it has appeared to me that the therapeutical value of the various processes might be to some extent measured by the relation between the dose and the percentage of the original drug.

To take an example from Mr. Cope's list: The product of extract from a given quantity of rhubarb may be as one to three; but the medicinal activity of extract of rhubarb prepared by the Pharmacopœia process is not greatly in excess of that of the powder, and it seems, therefore, inexpedient to perpetuate the formula. I may mention on the authority of the late Henry Deane, that when carefully prepared *in vacuo* the activity of extract of rhubarb corresponds very nearly with its percentage product. Syrup senna is an example of a wide range of dose (1 to 4 fluid drachms), and there is a corresponding uncertainty in the preparation as commonly met with. It is quite possible to prepare syrup senna in the Pharmacopœial proportions, but varying the *modus operandi*, which shall represent the active properties of the full quantity of senna employed. I doubt the possibility of doing this by the Pharmacopœial process, and it is not uncommon to find this useful domestic medicine almost inert.

The doses of the preparations of Peruvian bark are suggestive when regarded from the point of view proposed above. Besides the tincture (which, like all other tinctures except those of opium, belladonna, nux vomica, and a few other potential drugs it is better to exclude from the comparison of doses) there are three Pharmacopœial preparations of cinchona to which the following doses are attached, the dose of the powder being stated as 10-60 grains, viz. :—

Decoction Cinchona	. 1-2 fl. oz.	corresponding to Cinch. Bark	27-54
*Infusion ,,	. 1-2 ,,		22-44
Fluid Ext. ,,	. 10♏-30♏		50-150

If the foregoing table of doses is founded, as I believe it to be, on trustworthy observation and experience, modern pharmacy has little to boast of in connection with cinchona. The doses point to the old-fashioned decoction and infusion (the first changed for the worse by being strained cold, and both seldom used), as the most efficient preparations of cinchona. But they are bulky and inconvenient and practically the only pharmaceutical preparation which we can offer to the medical profession as a compendium of the virtues of the bark is the fluid extract, which medical experience estimates at one-third the value of the bark employed in its preparation!

Fluid extract of cinchona, when carefully prepared, may be made so as to produce an indifferent imitation of the cold infusion from which it is originally derived. It lays no claim to more than this, and how far it usually falls short, let those say who buy the article commonly offered and have observed how unlike the turbid mixture of fluid extract and water is to a freshly made cold infusion of cinchona.

Dr. De Vrij was right when he startled the last Conference with the vigorous declaration that "there is at the present time no good pharmaceutical preparation of cinchona," but his suggestion of an alcoholic extract scarcely appeared to be a satisfactory way of getting rid of the reproach.

RICHARD W. GILES.

* NOTE.—The decoction being ordered to be made up to measure while the infusion is not, the bark standard of these two preparations approximates so nearly, that the dose may be considered practically the same. The bark standard for fluid extract is taken higher than the Pharmacopœial formula which most operators would consider to be underestimated.

H. A. Millen.—Apply to the Secretary for a copy of the pamphlet entitled 'Hints to Apprentices.'

Election of Council.—We have received a letter from Mr. W. B. Clark, of Leicester, in which he states that it was with great surprise that he learned he had been nominated for the Council of the Pharmaceutical Society, and that it only was out of regard for the pressing requests of his friends that he allowed his name to remain upon the list.

"*Spero.*"—The treatment to be applied for the purpose you mention would depend on the nature of the substance operated upon. No general rule can be laid down.

"*Alpha.*"—There does not appear to be anything in the Pharmacy Act to prevent the use of the words in question, subject to the limitation of that Act.

H. E. G.—A formula for peppermint cordial will be found in vol. i. of the present series of this Journal, p. 497, or in any good book of recipes.

"*Excelsior.*"—Attending the lectures would not disqualify for the Bell Scholarship, but the passing of the Minor examination would cause your name to be removed from the list of Registered Apprentices and Students of the Society, who alone are eligible.

"*Curio.*"—You will find the information you require in the 16th section of the Pharmacy Act, 1864.

C. G. Rideal.—No.

H. W. J.—(1) Apply at Stationers' Hall. (2) Probably the deposit is due to the formation of a basic citrate.

"*Salicin.*"—You will find the information respecting salicylic acid in the *Pharmaceutical Journal* for November 28 last, p. 421.

J. Day.—Several formulæ for coloured solutions for window carboys have already appeared in the present series of this Journal.

"*Alpha.*"—Candidates for the office of dispenser in Her Majesty's Naval Hospitals must make a written application to the Director-General of the Medical Department of the Navy. See *Pharmaceutical Journal*, November 9, 1872, p. 364, or the Calendar of the Pharmaceutical Society.

"*Migrator.*"—The information has been asked for more than once in the Notes and Queries column, without, however, eliciting any reply. See Mr. Hustwick's "Australian Jottings," on p. 161 of the present volume.

J. W. Short.—(1) We believe not. Dr. Scoresby-Jackson's Note-Book of Materia Medica, published by Maclachan and Stewart, of Edinburgh. (2) Write to one of the Professors at 17, Bloomsbury Square.

We have received reports of meetings of the Manchester Chemists' Association, the Wolverhampton Chemists and Druggists' Association, and the Sheffield Pharmaceutical and Chemical Association, from the respective Secretaries, but are compelled to postpone their publication until next week.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Barnes, Mr. Pocklington, Mr. Bennett, Mr. W. Robson, jun., Mr. Lomas, Dr. Spencer, Mr. Thresh, Mr. Alison, Mr. Ekins, Mr. Harvey, Mr. Short, Mr. Lewis. H. E. G., A. A., W. W., Q. E. D., H. W. J., Muricidaue, Alpha.

THE ALKALOID AND ACTIVE PRINCIPLE OF JABORANDI.

BY A. W. GERRARD,

Teacher of Pharmacy to University College Hospital.

Having, at the instigation of Dr. Ringer, performed a considerable amount of pharmaceutical work upon jaborandi, I was enabled to make some observations which I considered of value in undertaking a search for the principle to which this plant owes its useful and peculiar activity.

During the early part of Dr. Ringer's therapeutic investigations the bark of the stem was found upon administration to give results equal to that of the leaf; to the bark therefore I directed my attention in seeking for the active constituent. My reason for chosing the bark in preference to the leaf was principally the fact of its containing but a very small proportion of chlorophyll, which in the leaf is very abundant and troublesome to get rid of; experiments I had previously made upon the leaf partly failed on account of its presence, but this obstacle I have since overcome.

One thousand grains of bark, exhausted with 84 per cent. alcohol and the tincture evaporated, yielded 54 grains of soft extract, having primarily an astringent and bitter taste, in a few minutes developing upon the tongue a peculiar feeling of numbness and pungent heat of a persistent character. Two and a half grains were administered and produced the usual diaphoretic and sialogogue effects. The remainder of the extract was set aside till next day, when I found it had separated into two portions, one of a pale brown colour and bitter nauseous astringent taste, the other of a heavy green colour somewhat aromatic and very pungent to the palate. The pale coloured portion I found to be soluble, and the dark portion insoluble in water. To the bulk of the extract distilled water was now added, and the whole was well stirred with a glass rod. It was then thrown upon a filter, and the contents of the filter washed. The green colouring matter and acrid resin remained upon the filter. The filtrate was of a clear reddish brown colour and slightly bitter astringent taste. Two grains of the acrid green resin were administered without any result, and the dose was increased to four grains without effect. Recourse was then had to the filtrate, a dose proportionate to one drachm of the bark being administered. In fifteen minutes the full effects of the drug were produced. This result was therefore conclusive that the active principle was soluble in water, and had to be sought for in the watery portion of my substance. To three small portions of the solution I now added the usual alkaloidal reagents, viz., phosphomolybdic acid, phosphomolybdate of soda, iodohydrargyrate of potassium, and ammonia, all of which gave precipitates, the ammoniacal one being soluble in excess. The remaining solution was now evaporated to a small bulk, and after ammonia had been added in slight excess, divided into three portions. One was treated and shaken with chloroform, another with ether, the remaining one with benzol. All three of them emulsified more or less, and were set aside twenty-four hours to separate. The chloroform, upon removal and evaporation, yielded a small portion of soft pale coloured residue, having a slight bitter taste and faint aromatic odour. Half a grain was administered and gave the full effects of the drug. The ether solution treated in the foregoing manner yielded less, but it had a more aromatic fruity odour; half a grain was administered with the desired result. The benzol solution yielded a small quantity of substance similar to the others, but not in sufficient quantity for administration.

The portion of the active principle which remained was only sufficient for a verification of its alkaloid reactions. I have, however, more of it now ready, upon which I intend working chemically. From the preceding it may therefore be concluded that the resultant principle I obtained was an alkaloid which, at Mr. Holmes's suggestion, I will call pilocarpine. Whether it can be obtained in a crystalline form is matter for further experiments; but judging from its soft character, this is somewhat doubtful.

As a digest of the means I have previously described for its preparation and a consideration of its properties I find it may be easily obtained by the following process:—

Prepare a soft extract either of leaf or bark with 50 per cent. alcohol. Digest this with water, filter and wash. Evaporate the filtrate to a soft extract, cautiously add ammonia in slight excess, shake well with chloroform, separate the chloroform solution and allow it to evaporate; the residue is the alkaloid pilocarpine with probably a small amount of impurity.

Besides the alkaloid, jaborandi contains an acrid resin before mentioned, tannic acid, volatile oil, and chlorophyll. The acrid resin is soluble in ether, and possesses properties which indicate it to be the substance by which the effects of its external application are produced. All of the doses given were administered under the direction and supervision of Dr. Ringer.

THE ANTISEPTIC ACTION OF SALICYLIC ACID.*

BY DR. RICHARD GODEFFROY.

Salicylic or spiroylic acid, is an acid of the group of so-called aromatic componds, and is represented by the formula $C_6H_4 \left\{ \begin{matrix} OH \\ COOH. \end{matrix} \right.$ It occurs in the leaves of *Spiræa Ulmaria* (hence one of its names), also, combined with methyl, as one of the chief constituents of oil of winter-green (*Gaultheria procumbens*), and of the essential oil of *Monotropa Hypopithys.*

Salicylic acid may be prepared in different ways. It is obtained by the oxidation of salicin, a nitrogenous body contained in willow bark (cortex salicis); and by the oxidation of saligenin. It is also produced by the heating of oil of gaultheria with potassium hydrate, and the decomposition of the resulting potassium salicylate by means of hydrochloric acid. But it is more simply obtained by the treatment of sodium carbolate with carbonic acid; sodium salicylate is thereby formed, which being decomposed by hydrochloric acid, yields sodium chloride and a thick paste of precipitated salicylic acid. By repeated recrystallizations from hot water, the salicylic acid can be almost perfectly purified.

Prepared in this manner, salicylic acid forms odourless and colourless, or sometimes yellowish, four-sided prisms of somewhat sweetish acid taste.

* Abstract of a paper read before the Austrian Pharmaceutical Society, and published in the 'Zeitschrift des allgemeinen österreichischen Apotheker-Vereines,' April 20, 1875.

It melts at 150° C. and sublimes when carefully heated, without decomposition. Heated rapidly beyond the melting point it is decomposed into carbolic and carbonic acids. In cold water, salicylic acid is only slightly soluble, but it is freely soluble in boiling water, alcohol, ether and glycerine.

Salicylic acid may from its composition be considered to be an oxidation product of benzoic acid, since it contains exactly one atom of oxygen more than benzoic acid, as is shown by the following formulæ:—

$$C_6H_5\,COOH \qquad\qquad C_6H_4\left\{\begin{array}{l}OH\\COOH.\end{array}\right.$$

Benzoic Acid. Salicylic Acid.

Three such isomeric acids, formed by the oxidation of benzoic acid are now known: (1) oxybenzoic acid; (2) salicylic acid; (3) paraoxybenzoic acid. Salicylic acid and its salts differ from the other two by giving a splendid violet colour with solution of ferric chloride. Oxybenzoic acid is obtained by the action of nitric acid in a boiling solution of amidobenzoic acid; paraoxybenzoic acid by the fusing of anisic acid, paracresol, and certain resins, such as benzoin, aloes, etc., with caustic potash. But it is more remarkable that it is formed also by the fixation of carbonic acid on potassium carbolate, in a manner analogous to the formation of salicylic acid by the fixation of carbonic acid on sodium carbolate.

The knowledge that salicylic acid could be readily formed from carbonic and carbolic acids, and that by heat it could be split up again into those two acids, led to the expectation that, similarly to carbolic acid, it would retard if it did not prevent fermentative and putrefactive processes, and act generally as an antiseptic. In this direction Professor Kolbe, of Leipzig, especially has made experiments which have demonstrated that in salicylic acid has been discovered an important and valuable antiseptic. Without smell or notable taste, and not poisonous, in antiseptic power it does not come short, but in many cases even surpasses carbolic acid. Several of these experiments have been described in a former number of this Journal.*

Knopp also has investigated the action of salicylic acid upon vegetation and found that it exercises a very perceptible influence upon the vegetative activity of the chlorophyll cells of the higher orders of plants, and the chromule cells of the lower orders, so long as free acid remains in the solution. But this action disappears as soon as the greater part of the acid becomes saturated by the ammonia which is formed by the resulting decomposition of the albuminous compounds. This agrees with the observations of Kolbe, that the antiseptic action of salicylic acid is not shared by its salts, nor by its isomers oxybenzoic and paraoxybenzoic acids.

Dr. Godeffroy has made, in the laboratory of the Vienna Pharmaceutical School, a series of experiments, chiefly in the direction of the antiseptic action of salicylic acid upon syrups, the results of which essentially confirm those of other authors. The following are some of the details:—

Fifty grams of syrupus mororum were diluted with 50 grams of water and exposed in an open vessel at a temperature of 18° to 22° C. On the other hand, 50 grams of the same syrup and 50 grams of water containing 0·024 gram of salicylic acid were exposed in another vessel at the same temperature; and finally, 50 grams of the syrup and 50 grams of water containing 0·04 gram of salicylic acid were also left to stand in an open vessel. After eight days the mulberry juice diluted with water containing no salicylic acid was completely sour, whilst that diluted with water containing 0·024 gram of acid first became sour after twenty-four days, and the syrup exposed with 0·04 gram of acid on the 8th March had not become sour at the time of writing (20th April).

Fifty grams of syrupus emulsivus [syrupus amygdalarum] were diluted with 50 grams of water containing 0·0475 gram of salicylic acid, and exposed in an open vessel at a temperature of 18° to 22° C. Other portions of similar strength were mixed with 0·11, 0·238, and 0·36 gram of acid respectively, and the whole were exposed in open vessels, together with one portion containing no salicylic acid, on the 8th March. The portion of diluted syrup containing no salicylic acid became sour in four days, that containing 0·0475 gram became sour in ten days; the other portions had not become sour at the time of writing.

Thirty grams of syrupus fœniculi were mixed with 30 grams of water, 0·113 gram of salicylic acid added, and exposed in an open vessel at a temperature of 18° to 22° C. On the thirtieth day it was still completely fresh and good, whilst a similar mixture without salicylic acid became sour in eight days.

Thirty grams of syrupus menthæ were mixed with 30 grams of water and exposed in an open vessel at a temperature of 18° to 22° C. On the tenth day this mixture was sour, whilst a similarly prepared mixture of syrup and water, to which 0·113 gram of salicylic acid had been added, remained quite fresh on the thirtieth day.

The experiments on syrups are still being carried on in the author's laboratory, and he hopes to be able to lay down a general rule for the addition of salicylic acid.

In order to compare the strength of the antifermentative property of salicylic acid with that of carbolic acid, Dr. Godeffroy also made the following further experiments:—

One gram of fresh yeast from a brewhouse was mixed with 13 grams of flour and 10 grams of water into a paste. In five minutes the dough began to swell and in ten minutes had finished rising. This took place more rapidly still in a drying closet at 20° to 30° C.

Other portions of dough were now made in a similar manner, to which varying quantities of salicylic acid and carbolic acid were added with the following results:—

To 13 grams of flour, 10 grams of water and 1 gram of yeast was added:—	gram.	Results.
Salicylic Acid	0·113	Did not swell at all, even after standing for some time at an elevated temperature.
" "	0·056	Did not swell.
" "	0·028	Swelled after 14 hours.
" "	0·014	Swelled after 1 hour.
Carbolic Acid	0·2	Did not swell.
" "	0·15	Swelled after 12 hours.
" "	0·1	Swelled after 1 hour.
" "	0·05	Swelled after 5 minutes.

* *Pharmaceutical Journal*, November 28, 1874, p. 421.

From these experiments the author deduces that 1 gram of salicylic acid is capable of hindering the fermentative action of—

18 grams of yeast	. . . .	Entirely.
36 ,, ,,	. . . .	Fourteen hours.
72 ,, ,,	. . . .	One hour.

On the other hand, that one gram of carbolic acid is capable of hindering the fermentative action of—

5 grams of yeast	. . . . .	Entirely.
7 ,, ,,	. . . . .	Twelve hours.
10 ,, ,,	. . . . .	One hour.

From this it would appear that salicylic acid is more than three times as powerful in its antifermentative action as carbolic acid.

THE ACTIVE PRINCIPLES OF THE OFFICINAL VERATRUMS.*

A Chemico-Physiological Study.

BY CHARLES L. MITCHELL.

Part II.—Chemical.

(*Continued from page* 848.)

The alcoholic solution of resin, previously set aside, was now agitated with successive portions of benzin until freed from oily matter, and then acidulated with 4 fluid ounces of acetic acid, and precipitated in 2 gallons of water. The resin precipitated was separated, and again treated as before. Both acid liquors were mixed, concentrated, precipitated with lime, and the alkaloid extracted in the usual manner. Yield, 100 grains. It contained no jervia.

The resin when separated and dried weighed 320 grains, and corresponded with the resins of veratrum viride and veratrum album; it was quite inert. When freshly precipitated it is slightly soluble in acids, and freely soluble in the alkalies and their carbonates. The benzin washings gave a yield of 4 ounces of oily matter, having a dark green colour.

Several experiments were now tried with the purpose of devising a formula for the manufacture of veratria which would yield as large a percentage, and cost less than the preceding formula. The following was at length adopted:—

℞ Ground Sabadilla Seeds . any convenient quantity.

Exhaust the seeds with q. s. of a menstruum composed of—water, 1 gallon; acid mur., 1 fluid ounce; and evaporate the liquid to a syrupy consistence. To this add milk of lime in slight excess, separate the precipitate, and wash slightly with distilled water, drain and dry. Mix this with a little animal charcoal, powder and exhaust with boiling alcohol. Evaporate the alcoholic solution to dryness, dissolve the residue in dilute sulphuric acid, decolorize with pure animal charcoal, and precipitate with a slight excess of sol. soda. The precipitate when washed and dried will be a fair article of veratria. If it be wanted perfectly pure it may be obtained by dissolving the crude veratria in ether, agitating the ethereal solution with dilute sulphuric acid, and precipitating with an alkali. By this means I have obtained a yield of pure veratria, averaging 225 grains to the avoirdupois pound, and at a very small cost. The ether and alcohol used in this operation may both be recovered by distillation, thus materially lessening the expense.

Although my results with sabadillia were not perfectly conclusive, owing to the small quantity at my disposal, yet I feel almost positive that it is not identical with jervia. I may be able at some future time to settle the matter. This concludes the chemical portion of my paper.

Part III.—Physiological.

Samples of veratroidia, jervia (verat. vir.), veratralbia, and jervia (verat. alb.), were furnished to Dr. H. C. Wood, Jun., who, after fully experimenting with them, forwards the following report:—

"Dear Sir,—In reply to your recent note, I have to thank you for the alkaloids which you so kindly placed at my disposal, and to state that I have performed a large number of experiments with those obtained from veratrum viride, and a few with those prepared from veratrum album. The veratrum viride alkaloids were two in number; one which you labelled *veratroidia*, and a second marked *jervia*. The first of these is undoubtedly the same substance as the material furnished me some years since by Mr. Bullock, under the same name.

"As the result of nearly twenty experiments, I have no hesitation in saying, also, *that your jervia is the viridia of Bullock*. There is absolutely no difference whatever in the symptoms produced; the same general weakness, absence of vomiting or purging, lowering of arterial pressure, and slowing of the pulse, profuse salivation, and finally convulsions, occur in either case. The character of the convulsions caused by viridia is, as I long since called attention to, very peculiar and very constant; I find that 'jervia' produces precisely the same form of convulsions, and am fully convinced of the identity of the two alkaloids.

"In regard to the alkaloids of veratrum album, I am not able to speak so positively. The 'jervia' was only in sufficient quantity for a single experiment, and this was somewhat invalidated by the fact that the drug was dissolved in a very large quantity of alcohol. The jervia of veratrum album appears, however, to be the same as the jervia of veratrum viride.

"The 'veratralbia' I have experimented with to some extent upon frogs; its action is seemingly distinct from that of veratroidia, and, indeed, resembles more closely that of veratria. It is much more powerful than any sample of veratroidia I have ever seen, and acts much more intensely upon the muscles, appearing to be as truly and specially a muscle poisoner as is veratria. I have supplied one or two young men, whom I believe to be in every way competent, with the veratralbia, and expect that you will get, in a few days, a more definite and detailed report from them as to its physiological action."

For a more detailed account of the foregoing experiments on the veratrum viride alkaloids, I refer the reader to a paper by Dr. Wood, now in course of preparation.

These experiments settle pretty clearly the disputed point of the existence of viridia, and prove that jervia is not, according to Dr. Peugnet, a feeble spinal excitant, but, on the contrary, a powerful cardiac sedative and spinal depressant. Peugnet's theory that Bullock's viridia was a mixture, is not only not borne out, but positively disproved by his own experiments. I can give no explanation as to the wide difference between the chemical reactions of jervia (or viridia) as observed by Mr. Bullock and by myself, and can only refer the reader to the negative results of the close examination to which the root was subjected.

Dr. Peugnet's resinoid was next to be examined. The alkaloid had been previously separated from it, and was now tested, as was also the exhausted resin.

Exp. No. 1. (Made with exhausted resin from Dr. Peugnet's resinoid.) Male pigeon. 1.50 P.M., injected ½ grain hypodermically; 2.25, no action; injected 2 grains more, rather quiet; 4.30, has vomited slightly, quiet and rather depressed. Next morning, pigeon was as usual.

The vomiting was very probably caused by the resin not being perfectly free from alkaloid, as in experiment No. 6 the same result was noticed.

Exp. No. 2. (Alkaloid from Dr. Peugnet's resinoid.) Female pigeon. 5.15 P.M., injected hypodermically, with 2 min. sol. alkaloid (unknown strength); 5.20, vomiting; 5.30, very weak on feet, still vomits; 5.45, nearly paralysed, falls on one side, convulsions; 6, paralysed; left until the next morning it seemed to have partially re-

* Read before the American Pharmaceutical Association. Reprinted from the 'Transactions.'

covered; gave 5 m. of solution; 5 min., dead. Slight convulsions.

Autopsy. Heart hard, contracted, empty. Marked congestion and redness of mesenteric vessels.

Exp. No. 3. Was made on myself. Jan. 13th, 3 P.M., took $\frac{1}{8}$ grain exhausted resin of veratrum album; pulse 76. 1 hour. Pulse 80; no perceptible effect; took $\frac{1}{4}$ grain more. 1 hr. 30 m. Pulse 76; no effect; took $\frac{1}{2}$ grain. 2 hrs. 15 m. Pulse 78; took 1 grain; stomach feels mawkish and slightly nauseated. 3 hrs. Pulse 78; took 2 grains. 3 hrs. 30 m. Pulse 80; still slightly nauseated. 4 hrs. Pulse 80. Nausea still marked, relieved at times by eructations of wind. No other result was obtained, and nothing unusual was noticed, except a marked feeling of nausea and indigestion.

These experiments leave no doubt as to the inactivity of the resin of veratrum album when completely deprived of alkaloids. In addition to the few experiments made by Dr. Wood with veratralbia, a number of additional ones were made by both myself and Dr. John R. Haynes, to whom Dr. Wood had kindly referred my samples of alkaloid.

Exp. No. 4 (*J. R. H.*) *Veratralbia A.* May 2nd, 1874, 10 P.M. Full-grown pigeon. Weight, 13 ounces. Pulse 140, to beyond count when frightened (ear to side). Respirations, 58. Temperature, 110°; thermometer in rectum, 5 min. Injected hypodermically $\frac{1}{10}$th grain into thigh. Immediately on placing on table sat tremulously on whole length of legs; nodded; fell on side; gave two or three convulsive movements; emptied rectum. 3 min. Respiration, 116. $3\frac{1}{2}$ m. Heart-beat inaudible; marked opisthotonos; and death at 4 minutes after injection. Pupils unchanged throughout.

Post-mortem. 5 min. after death (temp., 107°). Heart hard, contracted, empty. Lungs, pinkish-white; not congested. Alimentary canal and apparatus normal. Brain and spinal cord rather anæmic. Rigor mortis not yet developed.

Exp. No. 5 (*J. R. H.*) *Veratralbia B.* May 3rd, 3.15 P.M. Pigeon, weight $11\frac{1}{4}$ ounces. Heart-beat 176 to beyond count when agitated. Respirations, 48. Temperature, 110°. Injected into thigh $\frac{1}{10}$th grain. Flew from table across room; fell on floor and hopped on one leg to corners, at first holding up the leg which had received the injection; afterwards, dragging along as if paralysed. 3 min. Respirations very frequent; heart-beats inaudible; slight opisthotonos; and death in 4 min. after injection. Pupils contracted just before death, immediately afterwards dilated.

Post-mortem. 5 min. after death. Had defecated slightly. Temperature, 112°; slight rigor mortis. Heart; right auricle filled with dark blood; left auricle with red blood; ventricles nearly bloodless, hard and contracted. Lungs natural; not congested. Alimentary canal, normal. Brain and spinal cord anæmic.

These experiments were made with the veratralbias *A* and *B*, which had been carefully separated in order to ascertain whether, owing to their mode of extraction, there was any difference between them and show that they are identical.

(*To be continued.*)

THE PHYSIOLOGICAL ACTION OF THE CHINOLINE AND PYRIDINE BASES.*

BY JOHN G. M'KENDRICK AND JAMES DEWAR.

When either quinine, cinchonine, or strychnine is distilled with caustic potash, each of these substances yields two homologous series of bases, named the pyridine and chinoline series. Anderson and Greville Williams have shown that bases isomeric with these are also obtained by the destructive distillation of coal or from Dippel's oil. Greville Williams has also pointed out that chinoline obtained from coal-tar differs in some respects from that got from cinchonine. This suggested to the authors a research to ascertain (1) the physiological action of the various members of the series; (2) whether there was any difference in this respect between the members of the series obtained from cinchonine and those got from tar; and (3) whether, and if so, how, both as regards extent and character, the physiological action of these bases differed from that of the original alkaloidal bodies.

The bases in both series were separated from each other, as far as possible, by repeated fractional distillation. The substance first examined was chinoline (C_9H_7N) obtained from cinchonine. It was employed both as sulphate and hydrochlorate, dissolved in water, and introduced by subcutaneous injection into the animal. The strength of the solution employed in this and in all other instances was one part of the base to twenty parts of water. Its physiological action was tested on frogs, mice, rabbits, guineapigs, cats, dogs, and man; but as the effects were found to be similar in all of these instances, the majority of the observations were made on rabbits. The action of hydrochlorates of the bases distilling off at higher temperatures, including such bases as lepidine ($C_{10}H_9N$), dispoline ($C_{11}H_{11}N$), tetrahiroline ($C_{12}H_{13}N$), etc., was next studied by the same method. The pyridine series was then examined, beginning with pyridine (C_5H_5N) itself, and passing upwards to bases obtained at still higher boiling-points, such as picoline (C_6H_7N), lutidine (C_7H_9N), collidine ($C_8H_{11}N$), parvoline ($C_9H_{13}N$), etc. Lastly, the investigation was directed to the action of condensed bases, such as dipyridine ($C_{10}H_{10}N_2$), parapicoline ($C_{12}H_{14}N_2$), etc.; and the effects of these substances were compared with those produced by the members of the chinoline series and among themselves. So far as could be observed, there was no difference as regards physiological action between bases obtained from cinchonine and others got from tar.

The general conclusions arrived at were—

(1) That there is a marked gradation in the extent of physiological action of the members of the pyridine series of bases, but it remains of the same kind. The lethal dose, however, becomes reduced as we rise from the lower to the higher.

(2) The higher members of the pyridine series resemble, in physiological action, the lower members of the chinoline series, except that the former are more liable to cause death by asphyxia, and that the lethal dose of the pyridines is less than one half that of the chinolines.

(3) In proceeding from the lower to the higher members of the chinoline series, the physiological action changes in character, inasmuch as the lower members appear to act chiefly on the sensory centres of the encephalon and the reflex centres of the spinal cord, destroying the power of voluntary or reflex movement; while the higher act less on these centres, and chiefly on the motor centres, first as irritants, causing violent convulsions, and afterwards producing complete paralysis. At the same time, while the reflex activity of the centres in the spinal cord appears to be so far inactive as not to be excited by pinching or pricking, it may be readily roused to action by strychnine.

(4) On comparing the action of such bases as C_9H_7N (chinoline) with $C_9H_{13}N$ (parvoline), or $C_8H_{11}N$ (collidine) with $C_8H_{15}N$ (conia from hemlock), or $C_{10}H_{10}N_2$ (dipyridine) with $C_{10}H_{14}N_2$ (nicotine from tobacco), it was observed that, apart from differences in chemical structure, the physiological activity of the substance was greater in those bases containing the larger amount of hydrogen.

(5) Those artificial bases which approximately approach the percentage composition of natural bases are much weaker physiologically, so far as can be estimated by amount of dose, than the natural bases; but the kind of action is the same in both cases.

(6) When the bases of the pyridine series are doubled by condensation, producing dipyridine, parapicoline, etc.,

* Abstract of a paper read before the Royal Society.

they not only become more active physiologically, but the action differs in kind from that of the simple bases, and resembles the action of natural bases or alkaloids having an approximately similar chemical composition.

(7) All the substances examined in this research are remarkable for not possessing any specific paralytic action on the heart likely to cause syncope; but they destroy life, in lethal doses, either by exhaustive convulsions or by gradual paralysis of the centres of respiration, thus causing asphyxia.

(8) There is no immediate action on the sympathetic system of nerves, although there is probably a secondary action, because after large doses the vaso-motor centre, in common with other centres, becomes involved.

(9) There is no appreciable difference between the physiological action of the bases obtained from cinchona and those derived from tar.

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.*

BY J. BURDON SANDERSON, M.D., V.P.R.S.,

Jodrell Professor of Physiology in University College, etc.

Lecture III.

Specific Contagia.

In the last lecture, we entered on the consideration of the question, whether or not, in those cases in which fever is produced by a poison of septic origin, the organisms which associate their life and development with all putrefactive processes are concerned in the pathological phenomena which manifest themselves. It was shown, on the ground of experiment, that, although pyrogenic liquids in the crude state are septic, and, therefore, contain bacteria in greater or less numbers, it is possible to obtain from them a material of great activity, *leaving behind the microphytes.* In stating this fact, I pointed out that it would afford no ground for denying the influence of bacteria in the production of the morbific material; for, although they may not themselves constitute it, there is nothing in the fact observed which makes it less probable than before that they are concerned in those chemical changes of which its presence is one characteristic. At the close of the lecture, I drew special attention to a fact of great moment, namely, that, in my pellucid pyrogenic liquid, the active principle, although apparently in solution, is really particulate, for it can be separated by an appropriate mode of filtration (filtration through a "porous cell").

To-day we pass to a subject which must be kept apart from the other—that of the relation of microphytes to specific infections. The two questions are distinct by nature, and consequently the modes which have to be employed in their investigation are necessarily different. It is, therefore, desirable to keep them separate. In fever, we have to do with a process—an aggregate of functional disorders, all of which have their seat in the organism. In contagion, we have to account for its effect on ourselves, and also (what is more difficult) for its behaviour outside of us—the wonderful fact that it preserves itself for long periods, and is conveyed to immense distances quite independently of its ultimate destiny.

The doctrine that microphytes have to do with the process of contagion is based on two sorts of observations, viz., those relating to the physical characters of contagious liquids, and those relating to the existence of organisms of characteristic form in them. As regards the physical characters of contagious liquids, the fundamental fact is that contagium is *particulate.* I do not hesitate to use this word, for there is no other which answers the purpose. It stands for the general result of observations made by Chauveau as to the non-diffusibility of the infecting part of a great many contagious liquids, particularly those of small-pox, vaccine, glanders, the so-called small-pox of sheep, or sheep-pox. The method employed by Chauveau in these investigations is now so well known that I need only advert to it very shortly. As a link in the chain of evidence on which the notions we now entertain as to contagium are supported, it is too important to be omitted. The method, like that of which in last lecture we considered the application to the investigation of the fever poison, is one of mechanical analysis. A liquid known to be actively virulent is placed at the bottom of a small test-tube, which stands upright on a foot, or is otherwise supported in the same position, care being taken to avoid the slightest contact between the liquid and the sides. Water is then allowed to flow over the surface of the liquid until it forms a layer a few lines in thickness. The result is that, if the liquid remain absolutely still, diffusion takes place between the liquid and the water. The soluble salts pass into the water, along with a quantity of albumen: everything which is particulate remains below, everything that is diffusible rises. The process differs from that of diffusion through a membrane in this respect, that, whereas in the "diffusion cell" bodies which are very slightly diffusible, such, *e.g.*, as albumen, pass through the membrane in extremely small quantity, so that practically they may be said to remain behind, in the present case the only constituent which remains at the bottom consists of particles which, although they are small enough to pass readily through filtering paper and act so little on light that they do not render the liquid turbid, can yet be seen under the higher powers of the microscope. Hence, if the contagium is particulate, it will be found exclusively in the lower layer; if diffusible, it will be in the surface layer of water, albumen, and salts. Experiment showed, as regards all the contagia I have mentioned, that it remained below; and, therefore, was insoluble and indiffusible.

These experiments were made in 1868-9. I became acquainted with them when spending some time at Lyons in the latter year, and afterwards repeated them in London in their application to vaccine. I had previously (in 1866) made analogous experiments on the contagious liquid of Rinderpest, but by another and very inferior method. I had introduced a liquid of known contagiousness into an ordinary diffusion cell, and had observed that the active part did not pass through the parchment-paper septum. This is a bad method, because in this kind of diffusion the albuminous compounds, which are very slightly diffusible, are stopped by the septum; so that it might be objected that the toxic agent was contained in the albumen, not in the particles. Indeed, a blunder of this sort has been very recently promulgated by a French writer, M. Onimus.

On this inference as to the particulate nature of contagium, I founded in 1870 an *à priori* argument in favour of the probability of *contagium animatum*—that is to say, in favour of the doctrine that the property of contagiousness as manifested in contagious morbid products is associated with the presence in such products of particles *which possess a life which is not that of the tissues of the human or animal subject of disease.* If contagium be conveyed from place to place and maintain its activity in the form of particles, those particles must consist either of bits of protoplasm or of living organisms; for those are the only sorts of particles of which we have any indication in contagious liquids.

Now, considering that of all perishable things protoplasm is among the most perishable—so much so, that no living particle of our bodies can be abstracted from its place in the organism, even for five minutes, without dying and being disintegrated—it appeared to me quite out of the question to suppose, as Dr. Beale had suggested, that the particles could be of this nature, consistently with the astonishing power which they evidently possess of retaining their activity for such long periods, in spite

---

* Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal.*

of their being subjected to enormous varieties of moisture, temperature, and all other conditions. And considering that life—*i.e.*, organization—is the only condition whereby a body of chemically unstable composition is enabled to hold its own against such disintegrating agencies, I thought then, and I still think, that the only possible explanation of this fact of the persistence of contagium was to suppose its particles to be living. Then at once the question arose—"What sort of life is it that they possess?" Two facts help us to conclude in favour of the group of organisms I described in last lecture; first, they are the smallest and simplest of known organic forms; and, secondly, they possess the wonderful property of passing into a state of persistent inactivity or latent vitality, in which they perform no function, but can be at any moment wakened up into active function whenever they are brought under favourable circumstances. If I am asked what ground I have for the statement, that bacteroid microphytes possess the property of latent persistence, I will content myself with drawing your attention to the undisputed facts relating to the inoculation of "test-liquids." If I find that a particle of dust which has remained on the ceiling of the room for some time, when added to a solution of ammonic tartrate, determines an enormously active vegetation of bacteria in it, I find it difficult not to suppose that the particle of dust contains living material; and inasmuch as I know that, if I examined it under the highest powers, I should see nothing which I could recognize as vegetable by any vital manifestations which it would present to me, I am compelled to express the result of the experiment in some such terms as I have used. Particles are there, which, so long as the dust remains on the ceiling, undergo no change, manifest no process. You may object that I have no proof that the dust contains anything living. True; but I have proof that it contains that which produces life, and express this state of things; viz., the absence of manifestations of life, on the one hand, and, on the other, the fact that the stuff in question possesses the power of impregnating something else which before was barren, by saying that the dust possesses latent vitality.

I have now to run over, as briefly as possible, the cases in which observations have been made as to the presence of organisms in contagious products. As vaccine and small-pox have been already mentioned, I will refer to that subject first.

The earliest published observations as to the existence of microphytes in the infective liquids of vaccine and small-pox were those of Hallier and Keber (1868), both of which were made with bad instruments, and attracted less attention that they would otherwise have done from the speculations with which they were associated. My own description of the organisms of vaccine appeared in an appendix to the twelfth report of the medical officer of the Privy Council in 1870. About the same time, but quite independently, they were much more completely investigated by Cohn, the eminent professor of botany at Breslau. The description of Cohn agrees entirely with mine: a fact which I think important enough to mention, on account of its bearing on certain statements recently published by Dr. Beale, to which I must refer immediately.

Cohn has given to the organism seen in vaccine the designation of *Microsphæra vaccinæ*. In fresh vaccine, it consists, according to his description, of minute spheroids grouped in couples or isolated. If a preparation of lymph be observed under the microscope on the warm stage, these particles divide repeatedly, and thus resolve themselves into chaplets. By this fact, as well by their chemical reactions, they are easily recognized as micrococci. There is, I think, no particular reason to doubt the accuracy of the observation, discovered as it was in the first instance by observers working quite independently of each other, and in ignorance of each other's results. I was, therefore, rather surprised that, in a recent work on 'Disease Germs,' Dr. Beale should have criticized my very brief description of these organisms, and particularly the woodcuts with which it is illustrated, in such strong terms as he has employed. Be it remembered that I have not asserted that the particles in question are "disease-germs" at all. All that has been stated is, first, that they are independent organisms, and, secondly, that they are to be observed in fresh vaccine.*

Shortly before the appearance of Cohn's first paper, another Breslau observer—a pathologist and hospital physician, not a botanist—published a short communication founded on the microscopical examination of the skin in persons who had died of small-pox, in which he stated that he had found the lymphatic vessels of the cutis plugged with a granular mass which exhibited all the characters of micrococci. These lymphatic vessels were met with for the most part in the tissue of the corium underneath and around pustules in various stages of advancement. Here, in some cases, they occurred so constantly, that they could be found in every vertical section of the skin which comprised a pustule, though they were absent in others.

This statement being founded on a considerable number of cases is probably well worthy of confidence. It is to be noted with respect to it, that the appearances in question were observed only in cases which terminated early in the disease, *i.e.*, before the seventh day. In more advanced cases, the infiltration of the tissues and the consequent impletion with the cellular products of inflammation, rendered it impossible to make out with certainty whether the vegetations were present.

The two facts you have before you, viz., the existence of organisms in vaccine matter, and the occurrence of similar organisms (not ascertained to be identical with the other) in the lymphatics, suggest the probability of their having to do with the morbid process, but cannot be accepted as an adequate proof that they possess the property of reproducing or propagating the disease. For the establishment of such proof with respect to any contagium, it would have to be shown either that when deprived of its organisms, though otherwise unaltered, it is deprived of its activity; or that when the organisms are introduced alone, they manifest the contagious property of the liquid or tissue from which they were derived. An imperfect approach towards the first of these demonstrations was made in Chauveau's experimental investigations; for it was shown that many contagious liquids lose their activity when they are deprived of the suspended particles in which whatever organisms they contain are included. The second demonstration must, with our present means of observation, be regarded as impossible, on the ground that the bodies in question are so minute that there is not the slightest prospect of our being able to separate them in anything like purity.

---

* For the information of the reader, I transcribe the passage referred to. "The drawing given by Dr. Sanderson conveys no idea of the actual appearance of the matter represented. A few minute circles may be made to indicate very fairly the appearance of microscopic fungi; but they are no more like the particles of vaccine lymph, or any contagious poisons, or any kind of living matter known, than an oil-globule or an air-bubble is like a white blood-corpuscle or a pus-corpuscle. Such illustrations only help to retard investigation, and to convey erroneous ideas regarding the character of the matters referred to" ('Disease-Germs,' second edition, p. 237). There can be no doubt that my drawings are not like those of Dr. Beale; but that they give a true notion of the object represented, the reader may satisfy himself by comparing them with those of Professor Cohn: the resemblance between them is complete. No doubt, Dr. Beale, regarding us both as "blind leaders of the blind," would find both representations alike faulty. The explanation of the discrepancy is obvious. I had before me certain spheroidal bodies of extreme minuteness, which I represented in my woodcuts in the usual conventional way—*i.e.*, by what Dr. Beale calls "minute circles." Professor Cohn's figures are of the same character. Dr. Beale had before him "bioplasts" of various shapes and sizes, all admirably drawn (see 'Disease-Germs,' fig. 66). It could hardly be expected that the pictures should be like each other.

The Pharmaceutical Journal.

SATURDAY, MAY 1, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF VERMIN KILLERS.

SEVERAL correspondents writing recently on the sale of vermin killers appear to be under a misapprehension as to the actual requirements of the Pharmacy Act. In one instance, the writer of a letter, signed "A. A.," desired to be allowed to call attention to what he imagines to be an inaccuracy in the Act that has led to the practice of omitting to take the address of purchasers at the time of sale.

The inference that such an inaccuracy exists seems to have arisen from looking at the form given for registration in Schedule F, without at the same time considering the terms of the 17th section of the Act. In order to make this clear we reproduce the headings of the form as given in Schedule F:—

Date.
Name of Purchaser.
Name and Quantity of Poison sold.
Purpose for which it is required.
Signature of Purchaser.
Signature of Person introducing Purchaser.

In these headings our correspondent considers that no provision is made for registering the address of the purchaser, and he maintains that consequently this schedule is not drawn up in accordance with the 17th section of the Act, which provides that on every sale of articles in Part 1 of Schedule A, the sellers shall, before delivery, make or cause to be made an entry in a book to be kept for the purpose, stating *in the form set forth in Schedule F*, the date of the sale, *the name and address of the purchaser*, the name and quantity of the article sold, and the purpose for which it is stated by the purchaser to be required. This statement sets out so clearly what is to be done by the seller, and describes so fully the nature of the entries to be made in the first four columns of the form set forth in Schedule F, that it is only by omitting to read the 17th section of the Act the necessity for registering the address of the buyer can be overlooked.

Schedule F must not be regarded as specifying what details are to be registered but merely the form in which those details are to be registered. According to the 17th section, among those details the address as well as the name of the purchaser is specified, and they are clearly intended to be entered in the second column of the form given in Schedule F.

It might, perhaps, have been better if the heading of this second column had indicated the necessity of registering the address as well as the name of the purchaser; but even as it stands there is not the slightest ground for doubting that this is necessary. In order to obviate the possibility of such an oversight occurring we would suggest that there should be a foot-note printed on the forms of poison registers, pointing out that the address of the purchaser is to be entered with his name in the second column. It was only in regard to this particular that in the late Wolverhampton case there was any deviation from the requirements of the Act, and in that case the seller of the poison appears simply to have been misled by the heading of column two in the form just in the same way that our correspondent "A. A." has been.

We do not pretend to suggest that, if this requirement of the Act had been complied with in the Wolverhampton case it would have been of any avail in preventing the attempt at suicide. Possibly no thoroughly efficient means could be devised for preventing people so disposed from endeavouring to poison themselves, nor need we occupy ourselves with this question. Indeed, the object of the Pharmacy Act can scarcely be assumed to extend so far as this, but rather to aim at preventing the retail sale of poisonous articles indiscriminately by persons who have no special knowledge of their dangerous character.

This leads directly to the consideration of some questions put by another correspondent signing himself "MURICIDANE." What, he writes, is the value of obtaining the signature, name, and address of the purchaser, or of a witness known to both vendor and purchaser? Certainly this proceeding cannot be supposed to operate more than partially in preventing suicide, nor is it to be supposed that people will always be more careful in using poisons because they have signed their names in a book. But in the event of any accidental or intentional poisoning, the registration of the sale as required by the Act furnishes a ready means of tracing the person who is to blame. As regards the chemist, who is the only legitimate vendor of such articles, the registration is, however, of especial value in cases of poisoning, inasmuch as the production of the duly filled up register at once renders him blameless in the eye of the law.

This view of the matter is, we believe, sufficiently appreciated, and consequently there are many who would be inclined to concur with our correspondent "MURICIDANE," in thinking the poison regulations "a vexatious absurdity, giving trouble to chemists and allowing domestic pests to increase."

Another correspondent, signing himself "CRITIC," writes to say that previously to reading the report of the Wolverhampton cases, he was unaware that it was necessary to register the sale of the poison used in that instance, especially as it is openly sold without any such precaution by oilmen and grocers. In illustration of this, he refers to the case reported last week, in which the same poison was obtained from an oil-shop, and he very justly points out that this distinct infringement of the law was wholly disregarded, and that the Coroner's remarks as to the sale of such poison indicated a total misconception of the law.

The illegal sale of poisons is indeed the main complaint of all the writers who have addressed us on this subject, and certainly there seems to be much ground for the dissatisfaction with which chemists and druggists find themselves liable to restrictions in selling poisonous articles that can be obtained with greater facility from oilmen and grocers. As regards vermin-killers, especially, it is surprising that there should still be any uncertainty as to the conditions under which they are to be sold if they contain any of the poison in part 1 of Schedule A. At the time when it was decided that these preparations should be included in Part 1 of the poison schedule every endeavour was made to bring the fact within the cognizance of the entire trade, and a circular was sent with that object to every registered chemist and druggist in the kingdom. On that point, therefore, no doubt should exist. It is equally surprising that magistrates and coroners should so constantly ignore the illegality of the sale of poisons by persons not duly registered as chemists and druggists, and that while local authorities prosecute chemists and druggists, as in the Wolverhampton case, for a slight omission, they should altogether abstain from taking steps against persons who utterly set the law at defiance and disregard it entirely.

PHARMACY ACT FOR QUEBEC.

Two months since we were enabled to state that an Act for regulating the practice of pharmacy in the province of Quebec, in the Dominion of Canada, had been passed by the local Legislature. The Act is to come in force this day (May 1st), after which date it will be illegal for any but a "licentiate in pharmacy" under the Act either to sell certain poisons mentioned in the Schedule or to engage in the dispensing of prescriptions within the province. The poisons are: arsenic and preparations, prussic acid, tartar emetic, metallic cyanides, aconite and preparations, opium and preparations (except paregoric and syrup of poppies), essential oil of almonds (unless deprived of prussic acid), corrosive sublimate, cantharides, savin and its oil, ergot of rye and preparations, strychnine and all poisonous vegetable alkaloids and their salts. It will also be unlawful to keep or sell any of these "poisons," unless the covering be distinctly labelled on a black label with the word "poison" and the name and address of the seller. Further, "poison" is not to be sold to a person unknown to the seller, unless introduced by a person who is known, and an entry is to be made of every sale of a poison, setting forth the date of sale, name and address of purchaser, name and quantity of the article sold, and the purpose for which it is stated by the purchaser to be required. This entry is to be certified by the signature of the purchaser, and the person, if any, introducing him.

The Act makes it illegal for a "licentiate in pharmacy" to employ any unregistered "clerk" or "apprentice" in the sale of poisons or dispensing of medicines. Previous to being bound and becoming registered as a "certified apprentice" the youth must pass a "preliminary" examination in the English, French, and Latin languages, and arithmetic; he must also produce evidence of a good moral character. To become a "certified clerk," the "certified apprentice" must pass a "minor" examination; whilst to become a "licentiate in pharmacy" the "certified clerk" must pass a "major" examination, and produce evidence that he has served at least four years in a drug store and has attended two courses of lectures on materia medica, two courses on chemistry, and one on botany. The examination fees are to be two dollars for the "preliminary," five dollars for the "minor," and ten dollars for the "major;" one half being returned in the event of the candidate being unsuccessful. Besides these fees each "licentiate" will have to pay an annual fee of five dollars to the Pharmaceutical Association of Quebec, which is entrusted with the carrying out of the provisions of the Act; the "clerks" will have to pay an annual fee of three dollars, and the apprentice one of one dollar. Non-payment of these annual fees is to be followed by removal of the defaulter's name from the register, and his loss of privileges until it has been restored after payment of a fine.

SCHOOL OF PHARMACY.

It will be seen, by reference to the advertisement of the School of Pharmacy of the Pharmaceutical Society of Great Britain, that Professor Bentley will commence his course of Lectures and Demonstrations on Systematic and Practical Botany, at the Gardens of the Royal Botanic Society, in the Regent's Park, on Friday morning, May 14th, at eight o'clock. These Lectures will be continued on the succeeding Saturday and Friday mornings till the end of July.

DEATH OF AN HONORARY MEMBER.

At the sitting of the Royal Academy of Sciences of Vienna, on the 15th April, the President announced the loss to the Society that day, by death, of its General Secretary, Dr. Anton Schrotter. Dr. Schrotter was also one of the Honorary Members of the Pharmaceutical Society of Great Britain, having been elected in 1862.

It is announced that the gentlemen whom the Council of the Royal Society has decided to recommend for election as Fellows of the Royal Society, at the meeting in June next, are Messrs. W. Archer, J. R. Bennett, D. Brandis, J. Caird, J. Casey A. Dupré, J. Geikie, J. W. L. Glaisher, J. B. N. Hennessey, E. Klein, E. Ray Lankester, Nares, R. S. Newall, W. C. Roberts, and Major-General Scott.

Transactions of the Pharmaceutical Society.

BOTANICAL PRIZE FOR 1876.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom between the first day of May, 1875, and the first day of June, 1876; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Honour and Merit, will be given at the discretion of the Council. In the event of none of the collections possessing such an amount of merit as to warrant the Council in awarding Medals or Certificates, none will be given.

The collections to consist of British Flowering Plants and Ferns, obtained in a wild state, and arranged according to the Natural System; the collections to be accompanied by lists, arranged according to the same system, with the species numbered.

The collector to follow some work on British Botany (such as that of Babington, Hooker, or Bentham), and to state the work which he adopts. The name of each plant, its habitat and the date of collection, to be stated on the paper on which it is preserved.

Each collection to be accompanied by a note, containing a declaration, signed by the collector, and certified by his employer, or a Pharmaceutical Chemist to whom the collector is known, to the following effect:—The plants which accompany this note were collected by myself from wild plants, between the first day of May, 1875, and the first day of June, 1876, and were named and arranged without any assistance but that derived from books.

In estimating the merits of the collections, not only will the number of species be taken into account, but also their rarity or otherwise, and the manner in which they are preserved; and should a specimen be wrongly named, it will be erased from the list.

The collections to be forwarded to the Secretary of the Pharmaceutical Society, 17, Bloomsbury Square, on or before the first day of July, 1876, indorsed "Herbarium for Competition for the Botanical Prizes." After the announcement of the award, they will be retained one month, under the care of the Curator of the Museum, for the inspection of persons connected with the Society, and then returned to the collectors, if required.

No candidate will be allowed to compete, unless he be an Associate, Registered Apprentice, or Student of the Society, or if his age exceed twenty-one years.

NORTH BRITISH BRANCH, EDINBURGH.

The sixth and last scientific meeting of the present session took place in the Society's Rooms, 119a, George Street, on Tuesday evening, 27th April.

Mr. Gilmour, President, in the chair.

Dr. F. W. Moinet, Lecturer on Materia Medica, read a paper, of which the following is an abstract:—

There has been a tendency I am sorry to say, even amongst those of the medical profession, to speak lightly of therapeutics or the value of medicine in the treatment of disease. Hence the reason of my choosing, as the subject of my lecture this evening, the curative power of medicine,—to try and show you that drugs in the physician's hands are powerful agents for good or evil to his patients, as he uses them with knowledge or abuses them through ignorance. But although ignorance in the physician is no doubt, in some cases, the cause of the failure of a medicine to restore a patient to health, or to alleviate the symptoms of disease and allow nature to work a cure, either on account of an unsuitable drug being administered or from the physician having failed fully to appreciate the symptoms and trace them to their cause, still, I am happy to say, I do not believe that ignorance in the physician is to blame so much for want of faith in our healing art, as is the fact that the science of therapeutics is, so to speak, still in its infancy, and that too much is expected by the public from the administration of drugs. Keeping the first of these facts well in mind, and knowing thoroughly how far we can depend on drugs in the treatment of disease and for the alleviation of suffering, will prevent frequent disappointment both to ourselves and patients, and save often unnecessary blame being thrown on the physician. For a physician who has unreasonable confidence in the power of remedies does as much in an honest way to bring our science into derision as the quack who, without faith himself, tries to persuade the ignorant public that his nostrums and specifics can cure every disease under the sun, from toothache to consumption. Not less injury does the physician who ought to know better, but who sneers at drugs and yet uses them, content to take credit to himself when successful, but ready to blame the medicine if the result is not in accordance with his expectations, forgetting that the action of a drug is certain, whereas his reasoning as to the nature of the disease and the selection of the remedy may be, and often is, fallacious on account of the difficulties in many cases of making a correct diagnosis, and an imperfect knowledge of their mode of action. I have said that the science of therapeutics is still in its infancy, and so it is. Although drugs have been administered from time immemorial for the cure of disease with a spell muttered over them, or still later on the more rational grounds of their ascertained effects from former experiences and experiments, it is only very lately that it has been founded on a proper basis of physiology and chemistry; and as these sciences are in anything but a mature condition themselves, is it too much to expect that one so dependent on them should be more advanced? Considering, however, the progress that has been made of late years I think we are entitled to expect quite as brilliant a future for therapeutics as we do for any other branch of medicinal study. But the problems of therapeutics are not easily solved either by a careless or random experience. This we constantly see in the fate of vaunted new remedies which act wonders, or at least are said to, but which so seldom bear out their good character under the test of experience or some newer rival appearing, showing, as your President remarked in his able opening lecture, "That sound theory should be the outcome of proper observation and deduction, and then the object of careful and proper experiment;" in plain words, that the cart should not be placed before the horse.

After showing the difficulties in the way of solving therapeutical problems on account of the varying constitution of individuals and of diseases on the one hand and of medicines on the other, Dr. Moinet went on to show that prescribing must therefore never degenerate into a matter of routine, but each case must be studied on its own merits, otherwise treatment would be purely haphazard, and so oftener wrong than right. He continued, Another point which I need hardly mention, perhaps, but which affects nearly the reputation of therapeutics, is to make a correct diagnosis before prescribing, to discover what the disease or disorder really is—a matter not always of very easy accomplishment. So that you see the difficulties are not few in the way of administering remedies appropriate to the disease, which should make us very careful before judging rashly of the failure of a medicine when the failure may be our own. In which case, naturally, the unfortunate prescription gets the blame, and the science of therapeutics is the scapegoat.

This, however, might be prevented if we have the first quantity of the problem known by the disease, by the physician recognizing just how much or how little to expect from his prescription; and, in any case. I think it but right that he should not indulge his patients' hopes by over-valuing its powers. At the same time he must be careful not to deprecate it, for faith is an important adjuvant to any remedy, and its absence will even counteract the benefit of some. In want of attention to these points and also want of perseverance either in doctor or patient might be found the cause of many failures. But the one to which I particularly wish to draw your attention is, how far we can depend upon and how much expect from the curative power of medicine. Ignorance of this being the chief reason in my mind, although not by any means the only one, for the little estimation that therapeutics are held in by some both in and out of our profession.

Dr. Moinet then went on to explain the curative power of nature. The healing of a wound is a natural and spontaneous act, as is also the meeting of the ends of a fractured bone. But the surgeon can bring together the edges of a wound with sutures and keep the ends of a fractured bone in apposition by means of splints and other appliances, so as to put the parts in a more favourable condition for nature to act her part. In the same way and for the same reason the physician administers his drugs in various diseases and disorders, being quite aware at the same time that in many cases nature of herself would be sufficient to work a cure. But he interposes, and wisely, I think, to assist her, and so in many cases to prevent further mischief, hasten the cure, preserve the patient's strength and alleviate pain, which in some cases means to save life. Take a case of typhus or scarlet fever. The physician uses means; they need not all be drugs, but as tending to the cure are no less remedies by which he assists nature in the elimination of the poison, keeps down the temperature, soothes restlessness and delirium by appropriate medicines, and so in acting in concert with and assisting nature, he saves the patient's strength, mayhap shortens the fever's course, prevents the occurrence of sequelæ or complications which of themselves are often fatal, and in this way frequently preserves life and always alleviates pain and suffering. In thus assisting nature you save your patient's life, and what more can you do or expect from a drug, whether you call it the effect of the medicine, which it undoubtedly is, or its power of assisting nature?

Dr. Moinet then explained the specific or elective action of drugs. This specific action, however, he said, does not mean, as some imagine it does, that drugs are infallible remedies, as they are too frequently vaunted to be, but simply that they act upon the diseased part directly and beneficially when properly chosen and suitably administered. But you must not confound this specific action of a few remedies, and which is only applicable to some cases, with the principle of homœopathy, viz., "*Similia similibus curantur.*" After reviewing the doctrines of homœopathy, Dr. Moinet said that being irrational in theory they must be wrong in practice. The dogma "*Similia similibus curantur,*" known and recognized in all ages as possessing a certain limited value, has most signally failed when propounded as an exclusive principle for the selection of remedies. It is one of those dangerous fallacies, especially to the ignorant, having a basis of partial truth; but to rest upon this one imperfect law a foundation of a system of therapeutics is practically as absurd as to try and cure all diseases by one medicine.

Dr. Moinet then showed the use of medicine in chronic and incurable disease, how often it is able to prolong life and to restore, even if not permanently, a useful degree of vigour. The greatest dangers of typhoid fever, dysentery, and some forms of cardiac and renal dropsy are greatly diminished by the use of medicine. By the same means and in the same diseases the natural process of cure is often expedited, for whatever limits pathological changes must shorten and simplify the steps which lead back to health. In many diseases the secondary lesions cause the danger to life, and by acting on them when the primary lesion is incurable, we often can prolong life so much that the patient has time to die of some other disease. Independent, however, of their influence on diseased tissues, medicines are of infinite service in lessening the violence of symptoms or pain, for oftentimes, by their intensity alone, the powers of life become enfeebled and at last succumb.

After showing the reasons why in many cases diseases were and must necessarily be incurable, Dr. Moinet said: But if chemistry and pathology can discover the exact changes in medicine, then, if therapeutics can do nothing, there will be some reason for blame. But the part is not greater than the whole, and until the art of medicine has reached a higher state of development, the branch of therapeutics must attend her in her more lonely course. But this will not continue, for the great progress that has been lately made in material science gives us good grounds to hope for the future that the physician may practise his art by the light of pure science, with a confidence and certainty in no degree less than that of the physicist, and to attain this we must be content to work patiently and laboriously, both as pharmacist and physician, in search of truth, knowing that however little, if honest, our work will help to this end, although we may never live to see it. I hope I have shown you, although thus briefly, that while some diseases are necessarily incurable others are curable by drugs, which support, restrain, and remove impediments from nature's path, and thus life is prolonged or saved. You will see that medicines are not inert or feeble in the treatment of disease, or of doubtful service in the physician's hands; but that to avoid just reproach we must have definite and exact ideas of what they can do and what they cannot do, and not deceive either ourselves or others with vague or unreasonable hopes and expectations. And I think, and I trust you will agree with me when I venture to say, that the medical man or woman, as the case may be, who either through ignorance or otherwise neglects to make a proper use of the remedies we possess, does neither justice to his patient nor to the profession to which he belongs.

But, gentlemen, death is the natural termination of life. Still, I believe there is not one here who is such a fatalist but that when ill he would send for a physician, or in bodily danger that he knew of but would try to avoid it, and rightly. But the need of the physician and his drugs is not to avert the inevitable, but rather to avert the consequences of man's own ignorance and folly, but for which our profession were almost at an end. Hence we must always remember that there is a higher duty, not only of the physician, but also of individuals, viz., to prevent disease, for which purpose they must work in concert. The physician to show the way, the public to follow, and, if necessary, the State to enforce it.

A vote of thanks to Dr. Moinet for his interesting paper was proposed by the Chairman, and carried with acclamation.

The following valedictory remarks were then made by the President (Mr. Gilmour):—

"Gentlemen,—As you are aware, this meeting brings us to the close of another session, and according to a good and proper custom I have much pleasure in reviewing some of the work which has been accomplished by us in our scientific meetings during the past six months. Whether we look at this session in the communications which have been before us at these meetings, or in the large attendance (some evenings the hall being quite filled) and the great interest manifested in them, we have alike cause I feel assured to be satisfied. In no former session have the communications exceeded in interest those of the present, and I think I may also safely say that never before have the audiences been so uniformly large.

"The subjects brought before us have all been exceedingly practical in their nature, and in every case have been of more than mere passing interest to us. Where all have been good, it would be invidious to make distinctions, but I can scarcely help calling your attention to the number of papers which have been before us this session, containing invaluable results and conclusions in original research. First on the list in this class, was Dr. Stevenson Macadam's investigation on the action of aërated waters on lead, with more immediate reference to the presence of lead, or the possibility of its presence, in the aërated waters as commonly manufactured and sold, and we must all yet remember the interest which Dr. Macadam infused into his audience in the graphic way he described the various processes in which he investigated the subject and arrived at his conclusions, and the interesting experiments with which he accompanied his communication to us. Following this at another meeting was a most able and exhaustive analysis of chrysarobine, by Professor Attfield, communicated by Mr. Baildon, a paper which we think will be followed by more valuable results as attention is called to it through the pages of the *Pharmaceutical Journal* and other ways. Dr. Macadam was again next on the list with a concluding paper on his investigations on the composition of milk; and as Dr. Macadam has done, more probably to adjust a proper standard for the testing of milk than any other man in this country, this, of itself, was sufficient to guarantee the importance of the communication. Lastly, we had Dr. Craig with a series of exhaustive investigations on the action and effects of resin of aloes, a communication so lately before us that it must yet be fresh in the minds of all, and which appeared only the other week in the pages of the Journal, so that it is unnecessary I should at present refer to it further. Of the lecturers I need only remind you that we had an old friend in Mr. Sadler, who gave us a most interesting lecture on fungi, and I need not remind you that to-night we have a new friend in Dr. Moinet, whom I am sure from the value and interest of his paper we shall be glad soon to welcome back again with another on the same or a similar subject. Amongst the remaining contributors we were all more than pleased to welcome the presence both of Mr. Mackay and Mr. Baildon; the former finding still time amidst all his multifarious, and too often toilsome, duties for the Society in Scotland to share in these labours also; the latter, though ceasing, I am sorry to say, from some of the more active duties, still, however, manifesting his interest in these meetings both by his help and presence. It is fitting, I think, that notice should also be taken here of the many interesting and valuable contributions to the museum and library made during the session, both by the parent Society and private individuals. Of these none have been more princely in their nature or useful in their character than those presented by our old and warm friend, Mr. D. R. Brown. With probably a single exception, which I need not mention, there is not a man who by word and deed has done more for the Society in Scotland, and I am sure there is not a heart in all this meeting to-night but warms at the very mention of his name. Well do I remember years ago when advocating and scheming and labouring for a museum and library such as he thought was required by the Society, and such only as he would be content with, namely, one that would not be without one single specimen or book of reference which it was thought the student of science could by any human possibility at all require, he was sceptically told that such an institution would not be used or appreciated by one young man in a hundred. Well do I remember how impressed I was with the answer, 'That for the sake of that single man it was still required, and for his sake worth all that it would cost.' It was the answer of one who had all his life been a student, and one who, therefore, understood and sympathized with all a student's trials and difficulties. But I would be sorry indeed for many reasons to think that the real earnest hard-working students amongst us were so few in numbers as here indicated. I cannot think that the love of knowledge for its own sake, as well as for all the many advantages and inducements which it ever holds out to its possessor, can have so entirely lost its charm as to reduce the number of such students even to a minimum. I firmly believe, on the contrary, that ever as the standards drop from the hands of the pioneers of pharmacy as they have dropped by old age from the hands of Mr. Brown, or more sad still, by early death from the hands of Mr. Hanbury, so will there ever be a band of noble competitors, ready and eager to raise them again in emulation of the deeds of their predecessors, a band all the more able and all the more eager from that very help so generously accorded them by such men as Mr. Brown or Mr. Hanbury in their early student struggles. And one of the greatest incentives, I think, for every student next to such a kindly interest and sympathy felt in them by their elders in age and wisdom,—an interest I am glad to say often extending itself to active deeds,—is the incentive of noble example itself. Probably I should place this first, for whilst it is the heritage of all, it is peculiarly the heritage of the most friendless and poor; of him who, without help or sympathy is struggling bravely on through difficulties, through obscurity, it may be, as it has often been in the past, through poverty itself. It is, I have often thought, one of the grandest and most benignant traits of our common humanity, that wisdom in the sire does not necessarily, like many other qualities, indeed, I might say does not often, perpetuate itself in the son, and even though it did, that there is a time in the life of the child, both of philosopher and boor, of prince and peasant, in which they stand on the same level, and from which they must start to meet the same trials and difficulties, and, if they would, to overcome them by the same dogged courage and perseverance. Doubtless, in the struggle much is in favour of the high-born and the noble, but the elements of success are alike in both cases; external circumstances possessing not always the advantages imputed to them, the race here as in many other things not always being to the swift nor the battle to the strong. I make these observations at this time not without a motive. It is the last time which from this chair I shall have an opportunity of giving a word of advice to those who I am sure require it most, and for whom my sympathies are always most strongly excited—namely, those who are but beginning the struggle, or who are engaged, as it were, as yet in buckling on their armour. I may take it for granted, I think, that there is not a young man hearing me to-night who has not fixed a standard—be it high, or be it low—which he hopes to attain, and to which it may be even now he is striving to aspire. Well! I hope in every case it has been fixed high—the higher the better—and that he will ever keep it before his eyes with this assurance, that there is no path which other men have trodden, but in which if he choose he may not also follow; no standard reached by others which may not likewise be his own. If he could only make this thought his own, and let it penetrate all his actions and all his life, there is no height to which he could not reach, no difficulty which he could not overcome. And now, gentlemen, the last duty which I have to perform to-night is to thank you all for the kind indulgence and support which you have accorded me during the session in the various duties of the chair. It was not without many misgivings of shortcoming that I consented to take the chair, and though, on looking back over the work of the session, I am conscious of failures in many respects, I hope you will overlook them in the assurance that I have at least tried in every case to give you my best intention and my best effort."

Mr. Mackay proposed a very special vote of thanks to the retiring President, for the able and successful manner in which he had fulfilled the duties of the chair. On all occasions he had shown a deep interest in the affairs of the Society, and was always ready to render any assistance in his power to further the real business of the association. Mr. Mackay concluded his remarks by expressing the hope, that if requested, Mr. Gilmour would not object to occupying his present position for some time longer.

The Secretary then announced the arrangements for the summer classes on botany, materia medica, and chemistry.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The eighth meeting of this Association for the present session was held in the Council Room of the Church Institute, on Wednesday evening, February 24th. The President, Mr. F. Reynolds in the chair. After the preliminary business had been transacted,

Mr. Fairley, F.C.S., the Borough Analyst, read a paper on "Oxygen and its Compounds with Original Experiments." Many of the original experiments created a considerable amount of interest.

On the motion of Mr. Abbott, seconded by Mr. Longley, the usual vote of thanks was passed to Mr. Fairley.

The ninth meeting was held in the Science Lecture Room of the Mechanics' Institution, on Wednesday evening, March 10th. The President, Mr. F. Reynolds, in the chair.

A lecture on the "Chemistry of Carbon," was delivered by Mr. George Ward, F.C.S. The lecturer in commencing referred to the various modifications of carbon, and gave a brief description of the physical and chemical properties of each. The compounds of carbon with oxygen were then noticed and the chief properties of the monoxide and dioxide well illustrated by highly successful experiments. The preparation and properties of marsh gas and olefiant gas were next briefly noticed. Carbon was shown to be the essential element in that division of science described as organic chemistry—the supposed constitution of some organic compounds including alcohol, aldehyde, acetic acid, and ether, was clearly demonstrated by the use of glyptic formula, the tetrad functions of the carbon atoms in all these compounds being illustrated. The lecturer concluded by referring to the similar tetrad function of the element silicon, and the existence of compounds in the silicon series which were chemically quite analogous to the corresponding carbon compounds, enumerating the silicon chloroform and other substances as instances of the close analogy between the two series.

A vote of thanks to Mr. Ward for his very able lecture was, on the proposal of Mr. Childe, seconded by Mr. E. O. Brown, carried unanimously.

The tenth meeting was held on Wednesday evening, March 24, in one of the lecture rooms of the Yorkshire College of Science, for the convenience of the lecturer, A. W. Rücker, Esq., Professor of Physics in that College, who occupied the evening. "Some Physical Properties of Gases," the subject of his lecture, was handled in a masterly manner from the most recent stand point of scientific research.

The lecturer, after explaining the general principles of the molecular theory of the constitution of bodies, showed some experiments to prove that the motions of the molecules produce the phenomena of heat, and then passed on to a fuller account of the explanations which have been given on mechanical principles of some of the simpler thermal and physical properties of gases.

The pressure of gases and the production of heat by compression were explained by the aid of experiments, and diagrams were exhibited illustrating the changes in their velocities and directions of motion produced by the "encounter" of two of the constituent molecules of a gas; and an explanation having been given of the rapid equalization of pressure on all sides of the containing vessel when its equilibrium has been momentarily disturbed, the lecture concluded with a short account of the applications of the molecular theory to the phenomena of conduction and diffusion in gases.

The Chairman, Mr. F. Reynolds, having expressed the pleasure with which he had listened to the lecture and remarked upon the slightly increased attendance, called for a vote of thanks to the Professor, which was accorded by acclamation.

The eleventh and last ordinary meeting of the present session was held in the library, on Wednesday evening, April 14, the chair, as usual, being occupied by the President, Mr. F. Reynolds.

Mr. Edwin Yewdall delivered an address to students entitled "How shall I pass my Examination." He strongly advised them to rise early, and methodically divide their leisure hours for study. He then passed in review the various subjects comprised in the pharmaceutical examinations, offering a few practical suggestions on the study of each, and specially alluded to the value of microscopical investigations. A cordial vote of thanks was passed to Mr. Yewdall at the conclusion of his address.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The second monthly meeting of this Association for the present session was held at the rooms, Tudor Place, on the evening of Wednesday, the 14th inst., Mr. Maleham, the President, in the chair. The minutes of the previous meeting having been confirmed, the President said the business of the evening would be a debate on milk of sulphur. Mr. Ellinor, M.P.S., would open the discussion in the affirmative "That Lac Sulphuris is Sulphur Præcipitatum," and Mr. Ward, F.C.S., would be the leader in the negative.

Mr. Ellinor said—The question I have undertaken to defend is that lac sulphuris and sulphur præcipitatum, pharmacopœially, are simply different names for the same preparation, and not, as some allege, the names of different preparations. I feel a pleasure in defending this question, and hope that all present will take part in the discussion, and that whatever may be said will be taken in good part, it being understood that no personal feeling will be allowed to prevent a free discussion of the true facts. I purpose dealing first with the facts relating to this subject, and to leave the opinions for the after consideration. I will now introduce the historical facts.

"Lac Sulphuris Quercetani; Quercitan's Milk of Sulphur. ℞ Flowers of sulphur, ℥vj, sal regale, ℥xviij. Put so much water to the salt as will dissolve it, and over-top it six inches; put all into a wide mouthed glass in sand, so large that it may not be much above half full; boyl to dissolve the flowers, stirring them with a wooden spatula till the solution is red, filter whilst hot, and with sharp wine or spirit of vinegar, precipitate the milk, which edulcorate with water and dry."

"Lac Sulphuris Clossæi, Milk of Sulphur of Clossæus. Take powder of sulphur p. j, quick-lime p. ij; boyl them in an iron kettle in a pretty large quantity of water till it is red as blood; whilst hot, strain it; then, being cold, precipitate with hot piss; decant the humidity, and sweeten the precipitate by washing it ten or twelve times in hot water.

"From 'New London Dispensatory,' lib. iii, cap. xii, page 388–9, from the pen of Salmon, from his house at the *Blew* Balcony, by the ditch side, near *Holbourn* Bridge, London, March 10, 1684-5. Imprimatur Anton Saunders, Mart. 2, 1676."

I will now proceed to the P. L., 1721, of which I have here a copy for you to see, also I have here a copy of P. L., 1746.

Official name and process, P. L., 1721, page 137.

"Lac Sulphuris.—℞ Sulphuris partem unam; calcis vivæ vel salis tartari partes tres. Coque in aquæ fontanæ q.s.

ad solutionem sulphuris. Filtra calide; præcipita cum spiritu vitrioli; edulcora et sicca."

P. L., 1746, page 54. "Sulphur Præcipitatum.—℞ Flores sulphuris cum triplo calcis vivæ pondere coquantur in aqua ad solutionem sulphuris, et liquor per chartam coletur; deinde, spiritu vitrioli tenui addito, præcipitabitur pulvis, qui sæpius affusa aqua lavendus est, donec omnino insipidus fiat. Page 155 Index *nominum mutatorum* we find *nomina usitata* lac sulphuris, *nomina nova* sulphur præcipitatum.

P. L., 1787. Dr. Healde's translation, pages 111 and 112. "Sulphur Præcipitatum.—Take of sulphurated kali six ounces by weight, distilled water by weight one pound and a half, vitriolic acid diluted as much as may be sufficient; boil the sulphurated kali in the distilled water till dissolved, filter the liquor through paper, to which add the vitriolic acid; wash the precipitated powder by often pouring on water till it becomes insipid."

P. L., 1809. Dr. Healde's translation, page 106. "Sulphur Præcipitatum, P. L., 1787, P. L., 1745, Lac Sulphuris, 1720.—Take of sublimed sulphur a pound, fresh lime three pounds; boil the sulphur and lime together in water, then strain the solution through paper, and drop in as much muriatic acid as may be necessary to precipitate the sulphur; lastly, wash this by repeated affusions of water until it is tasteless."

P. B., 1867. The only change in this Pharmacopœia and P. L., 1809, is a nominal one, the name of the acid in P. L, 1809, being muriatic acid, and in the P. B., hydrochloric.

Pharmacopœial changes of name in hydrochloric acid—spiritus salis, P. L., 1721; spiritus salis marini Glauberi, P. L., 1746; acid. muriatic., P. L., 1788, 1809, 1824; acid. hydrochloric., P. L., 1836, 1851; P. B., 1864, 1867.

These extracts from the authorized Pharmacopœias and recognized translations of the same sufficiently demonstrate—

1. That *lac sulphuris*, milk of sulphur, was a Pharmacopœial name, 1721.
2. That lac sulphuris was nominally changed to sulphur præcipitatum *officially*, the process and articles used being identical, salt of tartar being omitted; and at page 155 Index nominum mutatorum, we find nomina usitata lac sulphuris, nomina nova *sulphur præcipitatum*, P. L., 1746.
3. That sulphurated kali was used instead of lime or salt tartar, P. L., 1787.
4. That lime and sulphur were again used precisely as before directed, and that muriatic acid was used for precipitating the sulphur, P. L., 1809.
5. That muriatic acid is now called hydrochloric acid no enlightened chemist and druggist will deny.
6. That the name sulphur præcipitatum has been retained in each succeeding Pharmacopœia since 1746 to 1867.
7. That the process has remained the same since P. L., 1809.
8. That the name sulphur præcipitatum superseded the name lac sulphuris before the process was changed.
9. That the name and process were both changed at the same time is not a fact, though it has been frequently asserted.
10. That it was the object of the compilers of the Pharmacopœias, prior to 1809, to get the sulphur in a pure state from the changes in the articles used in the process.
11. That washing the product of each Pharmacopœia was always directed, and never omitted.
12. That Clossæus' milk of sulphur would require a little washing, and that the process of making hot the urine might perhaps be pleasing to some, but such a mode of precipitating would require much washing.

To these I may add the following additional facts:—

1. That the greater part, if not the whole of the contaminated milk of sulphur sold is a bye product, and usually made at naphtha and benzol works from the gas tar products.
2. That it is illegal and very immoral to sell a bye product for a Pharmacopœia medicine, knowing the same to be contaminated with an article (sulphate of lime) which is so stable and difficult to dissolve or decompose that it must be hurtful to the human stomach when taken as a medicine.
3. That chemical manufacturers have to pay from 6*d.* to 1*s.* per ton for carting away sulphate of lime as rubbish.
4. That from 1, 2 and 3, we can easily understand the reason many wholesale houses push the sale of contaminated milk of sulphur.
5. That the label suggested by the legal advisers of Messrs. Hirst and Co., of Leeds—"Lac Sulphuris, Milk of Sulphur, not Precipitated Sulphur"—is simply a contradiction of a fact.
6. That I have had obtained for me on good authority information from manufacturers of contaminated lac sulphuris that it is nearly always obtained as a bye product, and *very* seldom made direct.
7. That Muspratt, in his 'Chemistry,' says manufacturers are guilty of substituting sulphuric for hydrochloric acid in making sulph. præcip. Attfield, and a number of others, write similar facts.
8. That such substitution (as in 7) increases the yield, if the sulphate of lime be not washed out.
9. That friends of contamination may beware "their sins will find them out." And I have great pleasure in producing for your examination the original Pharmacopœias from which I have quoted.
10. That by these remarks I prove the one great fact that lac sulphuris is not only superseded by sulphur præcipitatum, but that sulphur præcipitatum is lac sulphuris, and lac sulphuris is sulphur præcipitatum Pharmacopœially, officially, and legally.

Mr. Ward, in the negative, maintained that the arguments advanced by Mr. Ellinor were faulty in this respect, that he took the Pharmacopœial name and process of 1721, and assumed that they were synonymous with the preparation in the present British Pharmacopœia, whereas he denied that was so, and asserted that lac sulphuris of 1721 was one preparation, and the sulphur præcipitatum of the British Pharmacopœia was another. In support of his assertion he quoted the remarks made by several learned gentlemen, when the same subject was discussed in London. In elucidating his subject he had recourse to some amusing illustrations, and was supported by Messrs. Cocking, Doble, and Bradwall, Mr. Ellinor being supported by Messrs. Preston, Cubley, and Learoyd. After a very interesting and animated discussion, Mr. Ellinor replied to the general remarks. After which the opinion of the members present was taken, when the President announced that Mr. Ward had the majority of votes. A vote of thanks having been passed to the Pharmaceutical Conference for the 'Year-Book of Pharmacy,' a very agreeable meeting was concluded.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

An ordinary meeting of this Association was held on Wednesday evening, April 14th, Mr. W. Scott Brown, President, in the chair.

Mr. L. Siebold delivered the sixth lecture of his special course on "The Detection of Adulterations in Common Articles of Food and Drink." He stated that he had lately given his attention to a process for the estimation of foreign fats in butter, published by Mr. A. Angell and Mr. O. Hehner, and as the results he had obtained were exact enough for all practical purposes, he had much pleasure in recommending this process, the main features of which were the following:—Pure butter fat contains 85·8 (85·4 to 86·2) per cent. of insoluble and non-volatile fatty acids, whilst other fats, such as can be used for the adulteration of butter, contain 95·5 (95 to 96 per cent.), thus showing a difference of 9·7 per cent. A weighed quantity (about 3 grains) of the butter to be tested should be saponified with solution of KHO, the perfectly clear soap decomposed by dilute HCl, the separated fatty acids liquefied by heat, then collected on a moist filter, washed with boiling water, dried at 100° C., and weighed. Each per cent. found above 85·8 would indicate 10·36 per cent. of foreign fat in the fatty portion of the butter. Full particulars of this process would be found in the authors' pamphlet, which also contained an improved method for the determination of the fusing point of butter fat.

Cocoa.—As cocoa nibs contain about 50 per cent. of fat and about 3·4 (2·5 to 4·3) per cent. of mineral matter, the determination of the ash and of the fat, and the relation between the two results, would give an idea of the percentage of cocoa nibs contained in a sample of chocolate or other preparation of cocoa. Wanklyn recommends the cold aqueous extraction of the sample of mixed cocoa under examination, and the subsequent incineration of the dry extract. He found that good cocoa nibs yield 8·92 per cent. of dry extract, consisting of 6·76 per cent. of organic and 2 16 per cent. of mineral matter. The determination of the dry aqueous extract and of its ash would therefore throw additional light on the quantity of cocoa nibs present in the preparation. An adulteration with chicory might be detected by the deep colour which this substance imparts to cold water, as a cold aqueous infusion of pure cocoa is very pale in colour.

Mustard.—The lecturer stated that, as the fixed oil both in the white and the brown mustard amounted on an average to 36·5 per cent., the limits of variation being 34 and 37 per cent., the estimation of this oil by means of benzol or ether would indicate the presence or absence of adulterants. Wheat flour and other starchy farinas might be easily detected by iodine in the aqueous infusion of the mustard. For the detection of turmeric, a sample of the mustard should be treated with alcohol, filtered, and the filtrate mixed with solution of borax, which in the presence of turmeric would produce a red coloration. A more delicate and reliable mode of testing consisted in the immersion of a strip of filtering paper in the alcoholic filtrate during its evaporation on a water-bath, and its subsequent immersion in a strong aqueous solution of boracic acid. The paper after drying would then show a distinct red colour. Plaster of paris and other mineral adulterants might be easily detected by incineration, as genuine mustard never left more than 5 per cent. of ash. The presence of cayenne pepper could be recognized by the burning taste of the extract left on evaporation of an alcoholic tincture of the mustard. The addition of white mustard to brown mustard flour would cause a diminution of the volatile oil obtained by distillation; a genuine brown mustard should yield 1 per cent. of volatile oil.

Pickles and Vinegar.—Pickles should be tested for copper by incineration, and an examination of the ash according to the rules of qualitative analysis. The testing of vinegar had been described by the lecturer at one of the previous meetings. Since then he had noticed a new and thoroughly practical method for the detection of free mineral acids in vinegar, published by M. Strohl in the *Journal de Pharmacie et de Chimie.** It was based on the insolubility of calcium oxalate in dilute acetic acid, and its solubility in mineral acids. He, the lecturer, recommended the following mode of applying the test:—Two ounces of vinegar should be mixed with 1 fluid drachm of a saturated solution of calcium sulphate, and 25 drops of the ordinary test solution of ammonium oxalate. If the mixture appeared clear after a few minutes, mineral acids were present; if it was cloudy, they were absent, or amounted to less than 1 in 1000.

A few remarks on the detection of adulterations in pepper concluded the lecture.

* See *Pharmaceutical Journal*, October 3, 1874, p. 269.

The Chairman, in moving a vote of thanks to Mr. Siebold for his most interesting and instructive course of lectures, said the Association had been placed under great obligation to Mr. Siebold for having rendered such valuable services gratuitously throughout the session. The lectures had been a source of much gratification and information, and he sincerely regretted that they had now come to an end. It was unnecessary for him to repeat what Mr. Siebold and every one in the room knew to be his opinion as to the ability of the lecturer.

Mr. Benger said it gave him the greatest pleasure to second the resolution. When they remembered the length of time and the amount of thought and care bestowed by Mr. Siebold on these lectures—often when suffering from illness and worried by other pressing engagements—they must all feel very deeply indebted to him indeed. In Mr. Siebold's presence he could not, in good taste, say all he would like to say, but he might be allowed to congratulate the associates on their good fortune in having such a man to conduct the chemistry and materia medica classes. In him the scientific chemist, the practical pharmacist, and the experienced teacher were combined, and this combination exactly met the requirements of their school. Some of them might possibly remember the instructive story of a certain American cow that was accidentally, or ignorantly, fed on pine shavings instead of hay, and the mistake was only discovered by the milk-maid, who found that the cow gave turpentine instead of milk. An analogous discovery was too often made in the examination room of the Pharmaceutical Society, but he was convinced that Mr. Siebold's pupils would never be found in this abnormal condition.

The resolution having been carried with acclamation, Mr. Siebold briefly replied and the meeting terminated.

WOLVERHAMPTON CHEMISTS AND DRUGGISTS' ASSOCIATION.

The last monthly meeting of the present session in connection with the above Association was held on the 15th inst. at the Agricultural Hall. Mr. Fleeming, President, was in the chair. The minutes of the last meeting having been received and adopted, Mr. Barrett, the Junior Secretary, announced donations of books, etc., to the library and museum, of the *Pharmaceutical Journals*, the 'Calendar for 1875,' and the 'Library Catalogue' from the Pharmaceutical Society; a number of prescriptions, from Mr. Joseph Ince; 'Lessons in Elementary Chemistry,' and 'A Course of Practical Chemistry,' from Professor H. E. Roscoe; 'Adulterations Detected,' from Dr. Arthur Hill Hassall; 'Materia Medica and Therapeutics,' from Dr. C. D. F. Phillips, M.D., F.R.C.S.; 500 library labels, from Mr. Henry Silverlock; 'Antiseptics,' from Dr. A. E. Sansome; 'Dict,' 'Winter Cough,' and 'Reports on the Progress of Medicine in Different Parts of the World,' from Dr. Horace Dobell; Mr. John Clarkson Major, one guinea.

The hearty thanks of the Association were accorded to the donors.

The Senior Secretary (Mr. Brevitt) then read the report, which opened by stating that in accordance with a desire expressed at the last meeting, the secretaries had forwarded copies of two resolutions embodying the opinions of the members with respect to the Adulteration of Food Bill to the borough and county members, and that their communications had been very courteously acknowledged, and the secretaries had great pleasure in announcing that some alterations had already been made in the bill, which to some extent met the wishes of the members. The report continued as follows:—

"At a Council meeting held this evening, it has been determined to offer two prizes for competition to the students attending the classes on materia medica and botany. The examination papers will be drawn up by Mr. Stokes-Dewson, who will also report upon the respective merits of the answers to the Council, who will award the prizes.

"Our members will hear with regret of the death of Daniel Hanbury, a friend to this Association, as he was to all societies having for their object the education and advancement of the followers of Mother Pharmacy. His book and the cordial letter of congratulation he wrote on the establishment of our Association will, we are sure, be long treasured by our members and students as a memento of him. His loss will be felt by all English and continental pharmaceutists.

"You are probably aware that this is the last meeting of the session. The next monthly meeting will be held on October 14th, when an address to the students will be delivered, and a full programme issued for the session. It is premature to surmise what programme the Council may arrange, but, as the society has been so successfully commenced, it is, perhaps, not too much to expect:—(1) that a full course of lectures (occupying six months) will be delivered on all the subjects required for the Preliminary, Modified, Minor, and Major examinations of the Pharmaceutical Society; (2) that suitable rooms will be engaged for the sole use of the Association; (3) that the proposed library and museum, towards which much help has been promised and given, will be in full working order; (4) and as some help will doubtless be given by the Pharmaceutical Society, we may confidently hope that our Association will be able to offer greater advantages to members and associates than it has been able yet to do, owing to its somewhat hurried establishment. You will be glad to hear that our library is steadily increasing in extent. Your secretaries have taken care to bring the work of your Association before the authors of works on pharmacy and the allied sciences, and many kind letters and promises of help have been received. Our monthly meetings will, it is hoped, during the new session, assume a more important character, and the Council respectfully urge members and associates to prepare during the leisure summer months a subject to bring forward at these evening meetings. Several gentlemen have already promised papers,—amongst others, Mr. E. W. T. Jones, F.C.S., Mr. W. L. Scott, F.C.S., Mr. J. G. Morris, F.C.S., Mr. Brevitt, etc. During the summer months the associates will not be forgotten. It is proposed by the Council that a sort of lending library should be formed with the books we have already obtained, and that the cases of materia medica specimens and the herbarium should, under certain circumstances, be also lent to the students. The room in Darlington Street will be, as heretofore, open to students on Friday nights. It is hoped that some arrangements may be made with volunteer teachers for the holding of occasional classes during the summer months. The secretaries will be happy to receive the names of gentlemen thus volunteering their services. Should any business require the attention of the Council, or of the members of the Association, the secretaries have been empowered to call a special meeting of the Council or of the members. Although we have occasion to be pleased with the great success which has attended the establishment of the Association, we may confidently hope to receive greater encouragement in the session of 1875-6."

The Chairman said they might congratulate themselves upon the above very elaborate and able report, and might feel proud of their indefatigable secretaries, and he was sure they had all much pleasure in hearing and receiving the report.

Among the objects of interest exhibited, were Westphal's apparatus for ascertaining the density of fluids, by Mr. W. L. Scott, F.C.S., and Mr. Hancock's patent drug-mixing machine, by the inventor.

Mr. Stokes-Dewson then gave an address on drug adulterants. Amongst other drugs he mentioned senna, ipecacuanha, Opium, etc., and showed specimens of various spurious drugs, and described their appearance and effects as compared with the articles for which they were sometimes substituted. This paper gave rise to a lengthy discussion, in which several of the members took part.

Parliamentary and Law Proceedings.

Poisoning by Strychnine given in Mistake for Santonin.

Charge of Culpable Homicide against a Doctor's Assistant.

At the Glasgow Spring Circuit Court, on Thursday, April 22, Alexander Jamieson was placed at the bar on a charge of culpable homicide, in so far as on the 9th of March, while employed as an assistant in the dispensing of medicine and drugs in the shop of Dr. James Allan Smith, Springburn Road, Glasgow, he did give to John Parker a quantity of strychnine, and instructed him to administer it to a child, which Parker did, in the belief that the strychnine so supplied was a powder for destroying or expelling intestinal worms, and the child—Isabella Dott Pendrich Parker—who was between seven and eight years of age, immediately after taking it was seized with violent convulsions, and died from the effects of the powder.

The prisoner, a young man, pleaded not guilty, and was defended by Mr. M'Kechnie.

John Parker, engine-fitter, residing in Wellfield Place, Springburn, was the first witness called. He said—I am father of the deceased child. On the night of the 9th March the child was ailing from, as I thought, intestinal worms. A shopmate advised me to get a crystal powder. I went to Dr. Smith's shop and asked his assistant for "a dose of crystal powder for a girl about eight years of age." He brought out a "dusting" powder, and I told him that was not what I wanted, but a crystal powder for a child complaining of worms. After that he said, "That's a queer dose for a child eight years of age," and he then went to a press and took a bottle from a shelf without looking at it. There were other bottles on the shelf. He gave me some of the contents of the bottle. He told me to give my child the powder at night, when she had an empty stomach. He advised me to give her some senna next morning. The powder was not labelled. I gave the child the powder between nine and ten o'clock. I tasted it myself; it had a strong bitter taste, I think, but I was smoking at the time. The child, about four minutes after taking the powder, screamed violently. My wife called my attention to the screaming, and I went to the bedside. I set my daughter up on the bed, but she said, "Daddie, I can't stand." I saw at once there was something wrong. I sent for Dr. Smith, who gave her some mustard and water, and went to the shop to fetch something else. By the time he returned the child was dead. After the death I met the doctor coming up the stairs. He showed me a piece of paper, and said, "Is that anything like it?" I said, "I don't know." I thought he meant whether the paper was like that in which was the crystal powder. When the powder was given to the child I threw the paper in the fender, but when I saw that something was wrong I took it up again, and he had got the paper before he went to the shop. On his return he asked me if I could point out the bottle in the shop out of which the powder was taken. I went down to the shop and did so. The bottle now shown me is like that out of which the prisoner took the powder to give to me. When I was shown the crystal powder by Dr. Smith's sister, I saw it was different from that which I had received. The label on the bottle shown to me is the same as that which was on the bottle which I pointed out and handed to the doctor. When Dr. Smith saw the bottle he said, "What'n a' the world has he been thinkin' about?" He told me the best thing I could do was to go down to Jamieson's house and fetch him up. That was close upon twelve o'clock at night. I went and got Jamieson, and he went with me to Dr. Smith's house. In answer to Dr. Smith, Jamieson said the crystal powder was called santonin. The doctor afterwards asked Jamieson if he had sold me a powder, but I did not hear the answer. They all afterwards went to the shop, and the prisoner declared that the santonin was the powder he had given me. I declared it was not it, for there was a great difference in the powders. I tasted the powders, and the santonin had, as I thought, a sweetish taste. I went to the press and fetched the bottle out of which he took the powder for me. I tasted it and found it was bitter. After thinking a little the young man said, "Doctor, I give in." The doctor and the prisoner talked together. He asked me to meet him and Jamieson next morning so as to go before the Sheriff. I went home, but after that I went and told the police, and the prisoner was apprehended.

Cross-examined by Mr. M'Kechnie: I did not see the bottle when the prisoner was filling out the powder, as it was so small as to fill his hand. I think I should know the bottle again. (Shown the santonin bottle.) That's not it, the powder was not so fine. (Shown the strychnine bottle.) That's something like the powder that I got. I judged by the powder. I was able to pick out the bottle by the look of the powder and by the taste. I am not aware that at this time Jamieson knew that the child was dead.

Isabella Parker, wife of the preceding witness, corroborated the evidence of her husband. She said the girl was cramped all over after she took the powder. She gave the child some mustard and water according to the doctor's instructions, and soon after the girl died. The body was examined by Drs. Moore and Dunlop on the following Thursday.

Dr. Jas. Allan Smith deponed: The prisoner has been with me for about nine months as my assistant. I was aware Jamieson had been in the habit of dispensing medicines for some time previously. On the 9th of March, about ten o'clock at night, I was called to the house of Mrs. Parker, and I found there a child in violent convulsions. I thought first these were proceeding from some complaint, but on the second attack I saw at once it must have proceeded from poison. The whole body appeared to be in one spasm and bent back and the feet were inverted. I tried to make the child vomit, but was not successful. I went away to get some other medicine, when a messenger came and I hurried back, but found the child dead. When Parker went down with me to the shop he went to the press where the liquids were kept, and on being told that could not be the place he went to the other press and brought the bottle marked "santonin," and tasting it said that was not it. He looked again but could not find it. I took out about a score and laid them on the floor before him, and he picked out the strychnine. He opened the bottle and tasted it, saying that he recognized it by the taste. The bottle marked "poison" is the one. Witness then detailed the conversation between Jamieson and himself as to the powder. He told prisoner that the child had died, and the parents thought they must have got poison. Jamieson, after looking at both bottles, came to the conclusion that he must have made a mistake.

Cross-examined by Mr. M'Kechnie: I always found Jamieson careful in dispensing, and I have the highest opinion of his character. I am aware that he became a licentiate of the College of Surgeons in Edinburgh in January last. Medicines in daily use in my practice were not kept beside the poisons. When Jamieson was absent my sister took his place. The shop was shut at mealtimes.

Dr. Jas. Dunlop deponed that on the 11th March he made a *post-mortem* examination, along with Dr. Moore, of the body of the deceased girl. He read the report, which stated that he and Dr. Moore were of opinion that the appearances presented by the body of the deceased were compatible with those of poisoning by strychnine. He removed the stomach and its contents and a portion of the liver, sealed them up, and handed them over to the sheriff-officer.

By Lord Deas: There was no other cause of death, and strychnine was sufficient to cause death.

Dr. Samuel Johnston Moore corroborated the evidence of Dr. Dunlop as to the *post-mortem* examination.

By Lord Deas: We saw no cause for death, though all the appearances were compatible with poisoning from strychnine, and hence the necessity for analysis.

Dr. Maclagan, Edinburgh, deponed that he made an analysis of the two jars sent him. He made a report, which stated that in the stomach he found seven-tenths of a grain of strychnine; and in the liver there was also strychnine. The whole analysis was sufficient to show that the child must have swallowed a considerable quantity of that poison—sufficient to cause death. The samples of santonin and strychnine now shown him were very distinct the one from the other.

Cross-examined by Mr. M'Kechnie: There are far more than fifty active poisons. Almost all the drugs that are in use are poisons. It is very difficult to say what is not a poison. But there are not fifty poisons of the same activity as strychnine in ordinary use.

Lord Deas: If there are, I hope you won't tell.

The declaration of the prisoner stated that he believed he must have given strychnine to John Parker instead of santonin.

This closed the evidence for the prosecution.

For the defence,

Dr. Reid, Dumbarton Road, deponed that Jamieson was in his dispensary rather more than three years. He was careful and attentive during the time he was with him. He was aware of one case where the overweight of a powder out of one bottle was put on the counter and afterwards returned into the wrong bottle.

Dr. Macleod, Professor of Surgery in the University of Glasgow, deponed that Jamieson was a very careful student while under him for two years.

Dr. Cowan, Professor of Materia Medica in the University of Glasgow, deponed that Jamieson took second class honours in witness's class.

This closed the evidence.

The Advocate-Depute addressed the jury, and craved a verdict of guilty.

Mr. M'Kechnie, for the prisoner, said that it was not at all likely that a man practised in the dispensing of medicines would take out a bottle labelled "Strychnine, poison" for one labelled "Santonin," and he suggested whether it was not possible that the strychnine was in the bottle labelled "Santonin." The Crown had not proved whether the powder in the santonin bottle was pure, as it might have happened that the one powder got mixed with the other. Should such have been the case, was the prisoner to be held resposible for that? Because the Crown had not proved that the santonin powder was pure, he asked the jury to consider the present case not proven.

Lord Deas then summed up.

The jury retired at a quarter-past seven, and after an absence of ten minutes, they returned into court and gave the following verdict:—The jury, by a majority, find the panel guilty of manslaughter, but unanimously recommend him to the mercy of the Court.

Lord Deas, in passing sentence, said: It is very unfortunate that you stand in the position you now do, but it would be more unfortunate if the Court were to do anything that would indicate to persons in your position—for there is a numerous class of persons employed in druggists' and chemists' shops—that an offence of this kind, causing the death of a fellow-creature, was a light one. That is not so at all. It is a very serious offence. In your case it is very difficult to see any mitigating circumstances. Not only were the two powders different, but if you had only looked at the outside of the bottles you might have seen the difference. We are desirous to give effect to the recommendation of the jury, and will give effect to it, but after full consideration we cannot make the punishment merely nominal. It is impossible to make it less, if it is to have its proper effect in deterring other people, than imprisonment for three months.—*Glasgow Herald.*

Alleged Adulteration of Coffee.—Disputed Analysis.

At the Brackley Police Court, on April 14th, Mr. George Kennedy, grocer, of Grimsbury, was charged with selling a quarter of a pound of ground coffee, which had been adulterated. Defendant was represented by Mr. Crosby. Inspector Botterill gave evidence as to the purchase of the coffee. On the 1st inst. he received a certificate from Mr. Young, to whom he had submitted the coffee for analysis, as follows :—"Percentage of ash, 3·68 per cent. ; specific gravity of 10 per cent. decoction, 1·0068, equal to 16 per cent. soluble matter ; farina or starch, none ; sugar or saccharine ingredients, traces. Microscopic appearance most unsatisfactory. Remarks, adulterated with at least 20 per cent. of roasted acorns." Mr. Crosby said the coffee had been supplied to the defendant by Mr. R. Stevens, grocer, Banbury, who had instructed Mr. Beesley to analyse the sample left with the defendant. Mr. Thomas Beesley, analytical chemist, Banbury, said he had examined the coffee microscopically and chemically, and there was no adulteration present whatever. The case was adjourned, the coffee to be submitted to a third analyst.

The case was brought forward again at the Middleton Cheney Petty Sessions, on Monday, April 26th, before R. A. Cartwright, Esq., chairman, and Colonel Cartwright.

Mr. Crosby said that he appeared for George Kennedy, grocer, Grimsbury, and John Merivale, grocer, Middleton Cheney, who were summoned at the last Brackley meeting for selling adulterated coffee, and whose cases had been adjourned.

The Chairman said that George Kennedy was summoned to Brackley for selling adulterated coffee. Mr. Beesley's evidence having been taken, to the effect that the coffee was pure, it was agreed to submit the sample to Dr. Letheby, for analysis, and Dr. Letheby had reported that the coffee was perfectly pure. Dr. Letheby's certificate was as follows :—"In the matter of a sample of ground coffee from Brackley—I hereby certify I have carefully analysed chemically and microscopically a sample of ground coffee delivered to me on Saturday last, the 17th inst., by Charles Botterill, Inspector of Food, Brackley, and I find it to be pure and unadulterated coffee, in a rather finely ground condition. The sample was contained in a small rectangular canister, enclosed in brown paper, and securely tied and sealed with red wax, with the seal, Young, chemist and analyst, Leicester, and marked No. 35, 9 February, 1875, upon a printed label of Joseph Young, pharmaceutical and analytical chemist, Leicester. The wrapper, with seal unbroken, is enclosed—Henry Letheby, M.B., M.A., Professor of Chemistry in the College of London Hospital, and late Medical Officer of Health and Food Analyst for the City of London, 17, Sussex Place, Regent's Park, London, April 19, 1875." The Chairman continued, and said the Bench thought proper to dismiss the case. Mr. Crosby might send in the costs incurred in the case to Messrs. Weston and Barnes, and they would consider whether they should be paid.

Mr. Crosby : I may take it that my client leaves the court without a stain upon his character.

The Chairman : Having taken the opinion of such an eminent authority as Dr. Letheby, we say that Kennedy is perfectly free from the charge brought against him.

Mr. Crosby : Will you allow the costs in Merivale's case ?

The Chairman : We did not go into that case.

Mr. Crosby : But we did.

Mr. Barnes : Mr. Crosby will understand that there is no order as to costs to-day. If an order is made it will have to be taxed.

Mr. Crosby : There was a different certificate in Merivale's case, and Mr. Beesley made an analysis of Merivale's coffee.

The Chairman : We did not order the analysis.

Mr. Crosby : We did, so as to meet the charge.

Mr. Barnes : If you send in particulars, we will see if we can get the costs allowed.

The Chairman : All we say is, send in your costs in the first case. We dismiss the case against Kennedy, and withdraw the summons in the other.

The following is the report of Mr. Beesley, F.C.S., on the coffee in question :—

"Remarks on the certificate of Mr. Joseph Young, analyst for the county of Northampton, of his examination of Kennedy's coffee.

"(1) 'Ash—3·68 per cent.'

"I found 3·80 per cent., which is almost exactly that found by other chemists in ordinary "plantation coffee ;" but I do not attach much importance to the discrepancy, as the percentage varies somewhat with the heat applied.

"(2) 'Specific gravity of 10 per cent. decoction, 1006·8, equal to 16 per cent. of soluble matter.'

"I found the specific gravity of the decoction to be 1008·2, which was found by actual experiment to correspond to 20·1 per cent. of "soluble matter." Graham, Stenhouse, and Campbell in their "Chemical Report on the Mode of Detecting Vegetable Substances mixed with Coffee for the Purpose of Adulteration" (*Journal of the Chemical Society*, vol. 9, p. 39, 1857) give 1008·7 for a similar quality of coffee.

"The specific gravity of a decoction of roasted acorns is 1007·3—higher than the analyst's figures for the sample of Kennedy's coffee.

"(3) 'Farina or starch none.'

"This is a very important admission. Roasted coffee contains no starch, whilst roasted acorns contain abundance of it, which may be easily detected in the decolorized and cooled decoction by the use of iodine. This statement alone is sufficient to invalidate the analyst's conclusion.

"(4) 'Sugar or saccharine ingredients—traces.'

"Coffee, when roasted, hardly ever contains more than 1 per cent. of sugar. Roasted acorns contain 2·7 per cent. (Graham, Stenhouse, and Campbell and others). This is another confirmation of the genuineness of the sample upon which the analyst operated.

"(5) 'Microscopic appearances. — Most unsatisfactory.'

"The contrary of this is strictly true, as the coffee differs in no particulars from a sample of genuine coffee, which shows a collection of brownish-yellow angular cells containing transparent globules of oil, with a few large elongated cells with oblique markings, belonging to the testa or investing membrane. No starch granules occur ; but such granules are the chief ingredients of roasted acorns, and are seen in great numbers in a microscopic preparation of this substance, enlarged and agglutinated by heat into masses of the shape of a mulberry. These become coloured blue by the application of a little tincture of iodine. This test is so delicate that a thousandth part of acorns might be detected mixed with coffee. Not a trace is to be found in Kennedy's coffee, as indeed is admitted in a former part of the certificate.

"(6) 'Remarks—Adulterated with at least 20 per cent. of roasted acorns. Such admixture is prejudicial to health, and by reason of its powerful astringent properties is calculated to lead to injurious results.'

"I am not concerned to defend the use of roasted acorns, particularly as an adulterant ; but it may be remarked that in former times acorns supplied a chief article of food to the poorer classes in most European countries ; and that there is no evidence of the injurious effects of roasted acorns, known on the Continent as "acorn coffee," when used as a coffee substitute. It is probably no more, perhaps even less, objectionable than chicory."

Mr. Beesley has analysed a sample of coffee sent to him from Burton Latimer, near Kettering, in regard to which proceedings were being taken on Mr. Young's certificate.

His analysis was—Ash, 5 per cent.; specific gravity of decoction, 1008·6, equal to 21·4 per cent. of soluble matter; no starch; sugar traces; no appearance of adulteration, especially of acorns, under the microscope. We understand that the summons in this case has been withdrawn, and in all likelihood no further proceedings will be taken in the other cases which are pending. In the case at Daventry, where there was a conviction, an appeal has been made to the Quarter Sessions.

There was no explanation offered as to how the discrepancy in Mr. Young's analysis of Kennedy's coffee had been arrived at. It is said that the matter will be brought before Parliament through the Chamber of Trade.—*From the Grocer and the Banbury Guardian.*

Notes and Queries.

[430]. HORSLEY'S TEST FOR ALUM IN BREAD.—The tinct. of logwood should be made with 1 oz. of logwood and 1 pint of proof spirit, digested a week and filtered. The carbonate of ammonia solution, about 3 ozs. of the carbonate to a pint of water. I do not know whether the strength of either of these is the same as recommended by Mr. Horsley, but I find them to answer admirably. In examining a number of samples of bread, each piece should be put in a separate dish or beaker, with just sufficient of the dilute logwood and ammonia solution to cover them. (Equal parts logwood and solution, and 8 parts water.) Let them stay in the liquid five minutes, then drain and dry.—ENGLAND.

[436]. UNGUENTUM PAGENSTECHERI.—Dr. Anton von Waldheim, of Vienna, has kindly forwarded the following formula, in reply to the query of W.B.C.:—

℞. Hydrarg. Oxyd. Flav. . . grana quatuor.
Cold Cream. . . . . . drachmas duas.

We are also indebted for similar answers from G. F. (Vienna) and Mr. E. Hefford.

[438.] MICROSCOPIC EXAMINATION OF STARCHES.—Canada balsam is the best medium for mounting starches, and by using the polariscope the characteristic markings are very clearly defined, not rendered imperceptible as "Micro" supposes. A ¼ inch objective should be used with plenty of day light. I have found myself that the microscopic difference between Natal and Bermuda is but little, the size of the grains being the same; but the markings are brighter in the latter. A jelly made from an equal weight stands much longer from Bermuda than from Natal, but not sufficiently long to account for five times the price.—OCTAVIUS CORDER.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE GLASGOW MEMORIAL.

Sir,—Permit me once more to trespass on your space with a few additional explanations regarding the Glasgow memorial.

It appears from the minutes of the Glasgow Chemists and Druggists' Association, that the memorial, as submitted to the meeting of the trade, at which about sixty persons were present, did not contain the preamble objecting to the mode of appointing examiners in Scotland especially.

This is so far satisfactory, and corroborates what I stated in my previous letter. It would indeed have been difficult for any one having a spark of self-respect to retain an office to which, in the opinion of a large number of his brethren in trade, he had been "appointed by a mode unfair to the great body of qualified pharmaceutical chemists throughout the country, and detrimental in some respects to the interest of the young men who presented themselves from time to time for examination."

A committee of two or three members of council including myself, was appointed to superintend the memorial; no meeting of this committee, however, was ever called *ad hoc*, it being simply intimated on the ordinary notices that Memorial Committee was to meet fifteen minutes before the hour fixed for other business. A matter of such importance merited that, at least, one evening should have been allotted to discussion of its various clauses, instead of its being mixed up with price lists and other business.

At a meeting of our Council here yesterday, a motion made by me that the memorial be withdrawn had only three supporters out of eleven, the majority feeling themselves pledged to go on with it as it had been already presented, but all repudiated the insult to the examiners implied in the preamble.

As Messrs. Currie and Fairlie seem alone responsible for this preamble, it is for them to explain how they came to express themselves so as to be so thoroughly misunderstood. Mr. Fairlie adduces in support of his demand for frequent changes of examiners the case of two young men, who having failed twice in the Minor are now carrying on business on their own account under the protection of different surgeons, who are the nominal proprietors of their shops. These young men have assured Mr. Fairlie that they would not present themselves again before the same examiners, but that if there were a new board they might have courage to try once more.

I need scarcely point out the absurdity of this reason, or dilate on the advantages a candidate has in coming up more than once before the same examiners, advantages which themselves have formed a strong argument for frequent change in the *personnel* of examining boards.

I simply ask was it with a view to encourage or not to "estrange from the business" such men, that an attack was made on the mode of appointing examiners, especially in Scotland, ignoring the fact that the Council which nominates these examiners is elected by the suffrages of all the members of the Society in Scotland—that a demand was made for a board to sit in Glasgow, keeping out of sight the stronger claims and greater hardships of Aberdeen, a district which sends more candidates to Edinburgh than does the West of Scotland, and that the hitherto unavoidable necessity of having a large proportion of members, both of council and examining board, resident at the centre of action, has been attributed to selfishness and jealousy!

Peccavimus, peccavimus verumtamen miseremini nobis; there is some reason for a memorial, although the present one has erred. For my part I should be content if all this pother were to end in a return to the former system of crediting a candidate on his second examination with marks obtained in those departments in which he made a respectable appearance before.

As to the scarcity of assistants, that arises from the same causes which have been in operation according to my own observation for the past thirty years, and masters, examiners, and legislators would do well to bear in mind that druggists cannot be raised by conscription, and that if the trade is made too onerous or unremunerative the supply will fail entirely.

ALEX. KINNINMONT.

Sir,—In a previous letter I assumed that much of the discontent, at present manifesting itself in the west of Scotland, against the whole system of examinations, arose from an existing scarcity of assistants, which the druggists there in some way or another associated with, or directly imputed to the examinations. That this assumption was correct, is more than proved by the correspondence which has taken place in the Journal regarding this Glasgow memorial, and as the opinion that examinations and scarcity of assistants are cause and effect is not indigenous to the west of Scotland, and as moreover it is an opinion, which, if erroneous, is fraught with the most grave danger to the best interests of pharmacy, the present, I think, is not an unfitting time seriously to consider and review the whole subject. In doing so, I am aware that mere opinion, unsupported by data, is valuable only in so far as the individual has had the opportunity of extensive observation, and the ability to deduce therefrom sound and just conclusions, and it is therefore with no dogmatic spirit I wish to approach the subject, or seek to assert the extent of my observations, or the soundness of my opinions over all others, at least where these opinions are thus unsupported by facts. Granting then, in the meantime, that there is a scarcity of assistants, there is one point which it seems to me at the very outstart ought not only to be distinctly understood but demanded even as a *sine quâ non* to the consideration of the whole subject, namely, that although it can incontestably be proved that it is to the examinations a scarcity of assistants is more immediately imputable, it does not necessarily follow that therefore the examinations are to be condemned, or even held to be unwise or unjust in any degree whatever. Many conditions may obtain for example, apparently producing through the examinations a scarcity of assistants, and yet the examinations may have presumably nothing more to do with the scarcity than the reagent has to do with the presence of the poison which it detects. It discovers the poison to be there, it may even indicate to some extent through inference how it came there, but it does not itself produce it. In the same way, the examinations may discover that an inferior class of men are presenting themselves, but it does not produce this state of things, it only discovers it. The elements producing it may have been at work long before ever examinations existed, and the same state of things might have obtained at the present moment had they never existed. Not less important is another point closely allied to this which is too often forgotten or overlooked—namely, that although the examinations alone are producing this scarcity it does not necessarily prove that their standard should in any way be reduced, or that the exigencies of the case may not be met by means other than a reduction of the standard. The scarcity may simply be revealing the fact that the inducements held out for more or better men are disproportionate to the restrictions, or the learning required of them, without affecting in the least the entirely different question of the obligation of the Society as to these examinations, or the other questions as to the safety of the public or the requirements of Government. These last considerations, which are after all the only legitimate ones in regulating the standard, have too often been entirely overlooked, and the whole question prostituted into one of self interest or profit.

Keeping then these points in view I cannot but think that this question of the scarcity of assistants may be, and indeed for further reasons which I am about to consider ought to be settled without reference to the subject of examinations whatever; for apart from the possibility of this settling it without reference to them, I am firmly persuaded that they have had as yet (I will not speak as to what they may have in the future) little if anything to do with this scarcity.

In endeavouring to trace this scarcity to its true source it is necessary that I here for a moment resort to one of the principal channels from which the apprentices and, of course, assistants have been drawn in Scotland (I am speaking of Scotland entirely at present) in the past, and consider how far this channel is supplying them at present, or will continue to supply them for the future. It is a remarkable fact that in Scotland in the past the great majority of apprentices, especially in country towns—the great nurseries of our apprentices, have been drawn from the upper and even middle working-classes. The education which they received, generally a most liberal one for their station in life, under the excellent parochial system existing in Scotland, not only fitted them to a considerable degree for this position, but even inclined them to it as something higher and better than the mere round of manual labour which would probably otherwise have been their lot. This source might have continued sufficient until now, had not circumstances meanwhile somewhat altered the whole aspect of social matters. Within the last ten years, it is not too much to say that the whole aspect of affairs connected with the working classes has undergone an entire revolution. Not only are they receiving greater remuneration—it might be said in many cases double remuneration—for their labour, but their whole condition has been ameliorated. They have not only shorter hours of labour, but their very labour has to a great extent changed its nature, and is not now so degrading. In addition to this, manufactories have everywhere increased, and new industries have everywhere been opened up, demanding labour, intelligence, skill, education, and not only demanding them, but bribing them, if the expression may be allowed, with noble remuneration. I have in my mind at this moment, the condition of a sleepy little town (but the centre of a very large district), ten or twelve years ago, with only one large manufactory, at that time, in all its limits, employing in all only a few hundred hands. Since that time, one by one, its manufactories have increased, and new industries have sprung up, and now thousands are employed for every hundred formerly. It has literally swept the district of man, woman, and child, and so what was formerly a perfect hot-bed for apprentices is now converted into a modern Rama from which no fictitious sound of mourning and lamentation is now proceeding. This is by no means a fancy picture, or a solitary example. I could show the same operations going on less or more in every centre of labour. I could show how it is especially operating at the present moment in such centres as Glasgow under the very eyes of the memorialists: and what have they done to meet or remedy the evil? Let the correspondence which has appeared in the Journal about the remuneration, and the hours of labour, as well as this famous memorial, reply. I can well understand the bitterness with which some write, a bitterness which many more probably feel in silence when they think on what they are, and on what they might have been (and on what they now possibly can never be), had their lives only fallen to them in any other place than behind a Glagow druggist's counter, if these letters are a true indication, as I believe they are, of what the whole trade is there.

But not only have the circumstances which I have just indicated had the direct effect of limiting the supply of apprentices, and consequently of assistants, but they have had also an indirect, or what we may call a reflex action, but not less mischievous in its nature. Indeed it is much more mischievous and insidious because more difficulty to trace, and if we mistake not in it will be found the explanation of much of the outcry at present raised against examinations. This reflex action is shortly this, that this very scarcity is at the present time operating in producing altogether an inferior class of assistants. The very difficulty of getting them at all permitting no choice in the selecting, men are in consequence being drafted into the business who, neither by education or anything else, are fitted for the position. In this we have at once the explanation of the numbers who are rejected monthly at the examination, and to a great extent also of the unpopularity amongst a certain class of the examination itself. Never looking for a moment beyond the fact more immediately before their eyes of the percentage of rejections, never thinking that there may be circumstances beyond, which have operated in producing it, and waking at last to the, to them, terrible conviction that they will soon have left but one of two alternatives, no assistants, or proper remuneration with amelioration, it is not difficult to understand how examinations have become with them a species of war cry, or meetings and memorials a modified form of war dance.

With all these conditions operating so powerfully to prevent young men entering the business, it is not difficult to understand how they might also react on those who had already entered it by again withdrawing them, and thus produce another and equally fatal source of scarcity. In confirmation of this, I can give as the most powerful argument my own experience. Of all the assistants (upwards of a dozen, some of them having been many years at the business, none of them less than four or five, and all of them qualified by examination or other ways) who have passed through my own hands during the past eight or nine years, considerably more than one half at the present time have left the business for good. Comment on a fact such as this is, I think, unnecessary, and so I will let it speak for itself.

In drawing this series of letters to a close, I may be allowed to say that they never for a moment were intended either as an apology for, or vindication of the system of examinations as now adopted in London or Edinburgh, nor were they intended to champion the Scotch Board of Examiners. The latter can, and doubtless, when necessary, will speak for themselves, whilst the former in some points I do not approve, and have both by word and deed ere this tried to change. They have been prompted entirely by the wish to expose error and discover truth, and if they in any way succeed in this, either directly, or by drawing more attention to some of the points touched upon, it will be sufficient apology at once for inflicting them upon the public, and taking up so much of your valuable space.

SCOTUS.

P.S.—In reference to Mr. J. M. Fairlie's request that "Scotus" would send him his name, and he "might be induced to reply, etc.," "Scotus" has to say that there is no explanation which he can receive in private from Mr. Fairlie, which he may not as well receive in public. There has already been too much tortuous and underhand work in connection with this memorial for "Scotus" to be a party to any more, and he therefore calls upon Mr. Fairlie if he has any explanation whatever to give, to come forward openly and honestly and give it through the pages of the Journal in which he has been assailed. If they are matters of fact, which "Scotus" refers to, it can matter little whether Mr. Fairlie has his name or not, if they are not matters of fact, it is easy for Mr. Fairlie to deny them.

Sir,—As a number of druggists of my acquaintance cannot understand the meaning of that part of my letter to you on the 13th April treating on suggestion 2 of the Glasgow memorial, allow me to make the following explanation:—In my original letter, the following was the wording—"As regards suggestion 2, it appears the memorialists are thoroughly unacquainted with the manner in which examiners are appointed. "Poo'in'* and scartin'† has been termed Scotch wooin'," thus the memorialists may be misunderstood; meaning, not that the memorialists may be misunderstood because they knew nothing of the manner of appointing the examiners, but that snarling being considered equivalent to Scottish courtship, our English brethren might mistake this quiet hint on the part of the memorialists of the wish to become examiners, for a malicious attack on the Edinburgh examiners, giving as my reason for this conviction, that one of the memorialists had successfully pursued a similar course as regards the Edinburgh Council. Unfortunately the words ("Poo'in' and scartin' has been termed Scotch wooin'") were left out of your issue on the 17th (no doubt owing to the indistinctness of the writing), thereby changing the meaning of the sentence. I think that the memorialists, when they said that the manner in which the Scotch examiners were chosen was unfair, etc., merely meant that they were chosen non-Fairlie, thereby showing their keen conception for a joke, as I never believe Mr. Fairlie could condemn his own conduct as member of the Edinburgh Council. Mr. Frazer, in your issue of the 24th, seems annoyed because Mr. Mackay should have procured a copy of the memorial previous to himself, but who could have imagined anything more ridiculous than that Mr. Frazer went to London with the intention of presenting a memorial without first having obtained a copy of it in Glasgow.

I consider it was the duty of Mr. Mackay to procure a copy of the memorial as early as possible, out of justice to his Edinburgh brethren. Mr. Frazer's conduct on this occasion shows that he is determined to act under the power of a certain clique and support their ideas, whether he understands them or not, more especially when these cast discredit on his own conduct as member of the Edinburgh Council, and that he is not an independent acting member of the London Council, as I always presumed him to be.

Mr. Frazer also states in his letter that the subject has been discussed by the trade here for the previous six months. Allow me to say he is mistaken; the first motion regarding it only being brought before the Glasgow Chemists and Druggists' Association a few weeks ago.

I think it is time that this mania of saddling the examinations as the cause of scarcity of assistants was abandoned, more especially the absurd ideas that the manner in which the examiners are appointed have anything to do with preventing young men from entering the business. The examinations may drive some from the business, but they are those who should never have entered it. A case came under my notice where an employer railed on the examinations because his best counter hand had left for the oil trade; but he remained wilfully oblivious of the fact that his assistant received £120 per annum in the oil trade, with better future prospects, against £80 in the drug trade. Had the case been reversed, and the assistant been offered £120 in the drug trade instead of £80 in the oil trade, would the examinations have deterred him? I think not. I could adduce many similar instances, but refrain, it being a well known fact here that however degrading and demoralizing a business may be (and I can conceive of nothing more degrading and demoralizing than retailing hair oil and confections on Sundays for the benefit of the pockets of pious Christians) you can procure the men provided the remuneration is sufficient for their labour.

Mr. Fairlie states in his report of the last meeting of the Glasgow Chemists and Druggists' Association that Mr. M'Cann's motion to the effect that none but those who close their places of business at 8 P.M. should be eligible to hold office in the Association was lost by a large majority; but I may state that though the members voted against the motion they showed an amicable feeling towards it. One gentleman, though objecting to the motion, stated that the members had the power to elect for office-bearers whom they chose, and that they should only elect early closing men—which undoubtedly they did, leaving only the secretary, and if he had not been envious of position he would never have accepted it after the remarks at the meeting that none but early closing men ought to be office-bearers in a society one of whose main objects is early closing. As a large bulk of new blood is thus infused into the Council of the Glasgow Chemists and Druggists' Association, I am confident that they will treat that compilation of ignorance and calumny known as the Glasgow memorial in the manner it deserves.

I shall not again encroach on your space regarding this subject, as to lay plainer before the supporters of the Glasgow memorial the real cause of the scarcity of assistants would, to use a metaphorical phrase, be "casting pearls before swine."

April 26, 1875. ASSISTANT.

* Pulling. † Scratching.

Sir,—The letter of "Ph. C." in your last issue touches upon a subject that demands the careful attention of all engaged in the business, and which will form the matter of this communication. I allude to the system of medical men keeping open shops. These shops are invariably conducted by unqualified persons, and in direct violation of the Pharmacy Act.

Had this formed the subject of the Glasgow memorial it would have struck at the root of the evil, and the memorialists would have earned the best thanks of the trade. I have no hesitation in affirming that if this is to be tolerated the Pharmacy Act will, in Scotland, become a dead letter. No one will care to spend time and money in obtaining qualifications when businesses are carried on without them. It not only prevents many a young man from entering the business, but also many more remaining in it from attaining their just measure of success. The memorialists make a great mistake in connecting the scarcity of assistants with the examinations and the examiners. A higher rate of salaries must be given; but the question arises, How is this to be done whilst the vitals of the trade are surreptitiously sucked by members of another profession and the infliction tamely submitted to? I can say from personal experience that the examinations at Edinburgh are well conducted by excellent men. They are stringent, but no more so than they ought to be. Still, stringent examinations for the chemist, so long as the doctor has his open shop kept by an unexamined assistant or apprentice, cannot inspire young men with a liking for the trade, or with confidence in the pharmaceutical executive. On Glasgow, with its one hundred and twenty "doctors' shops" and its sixty chemists' shops, it is superfluous to comment. The Council must take up the subject—it cannot with false delicacy be glossed over or shelved. The time is now arrived for a full inquiry, and if action has to be taken the trade will unanimously support it.

April 26, 1875. A SCOTCH PH. CHEMIST.

THE SALARIES OF ASSISTANTS IN THE WEST OF SCOTLAND.

Sir,—Two words seem to be omitted from Mr. McCann's note, which may be better understood by English pharmacists when it is known that all, or a very great majority, of assistants in Scotland are "out-door assistants."

OBSERVER.

COMMUNICATIONS, LETTERS, etc., have been received from T. Jackson, P. Wells, O. Corder, Garside, W. Bird, F. B. Bingley, H. Gilman, S. Taylor, "Minor," "Competitor," X. L., T. D. F., A. P. S., E. J. B., J. B. L. M.

A NEW METHOD OF DETECTING AND ESTIMATING ALUM IN BREAD AND FLOUR.

BY J. C. THRESH.

There are several well-known processes now employed for the above purpose, but I think all who have employed them will acknowledge that a process combining accuracy with dispatch is still a desideratum. Some of the processes published give very inaccurate results, and others are extremely tedious or require great manipulative skill for their successful execution. For some time, I have given special attention to the subject, and I believe that my endeavours to discover a method giving accurate results and requiring but a tithe of the time required by other methods have been crowned with success.

The following details will enable any one to estimate the alum in bread or flour in a few hours, and as will be evident by a little contriving a dozen or so samples may be examined in a day:—

Take 1250 grains of bread (from middle of loaf) or flour, and char thoroughly in a platinum dish or on foil over a gas lamp. Powder the char and mix it with sufficient pure strong hydrochloric acid to make a thin cream. Boil gently for a few minutes, then add about 100 c.c. of water, and continue the ebullition a few minutes longer. Dilute to 150 c.c., stir well and filter off 120 c.c., which will contain the aluminia from 1000 grs. of the bread or flour. To this filtrate, add a slight excess of solution of ammonia, boil for a few seconds, then let the precipitate subside, and decant the supernatant fluid. Add boiling water to the sediment and again set aside to settle and decant the clear fluid. Pass the fluids through a small filter to collect any particles of the precipitate which may have been suspended therein, and throw the filtrate away. Now add to the partially washed precipitate about a gramme of pure caustic potash (or soda), warm and pass the solution through the same filter employed for the previously decanted fluids. Wash the filter with hot water to which a little KHO may be added, and proceed to precipitate the aluminia in the filtrate by adding a few drops of dilute phosphoric acid and excess of pure acetic acid. Heat the solution and precipitate to the boiling point, and then wash the latter by decantation and filtration. Finally dry, ignite, and weigh. The weight of the resulting $AlPO_4$ in grammes multiplied by 400 will give the amount of ammonia alum in grains present in one pound of the bread or flour.

The following six analyses prove the accuracy of the results obtained by this method:—

	Quantity of Alum added to 1lb. of bread or flour.	Amount of $AlPO_4$ obtained from 1000 grs. of the same.	Amount of Alum in 1lb. calculated therefrom.
Exp. 1.	2·8 grains.	·0065 grammes.	2·6 grains.
„ 2.	8·4 „	·02075 „	8·3 „
„ 3.	14·4 „	·036 „	14·4 „
		FLOUR.	
Exp. 1.	16·8 grains.	·041 grms.	16·4 grains.
„ 2.	5·6 „	·013 „	5·2 „
„ 3.*	10·2 „	·023 „	9·65 „

The flour experimented on did not contain a trace of aluminia in its composition, and the bread employed was made from the same flour. The alum was added to 1250 grs. of bread by making a standard solution and dropping from a carefully graduated burette certain noted quantities upon the bread previous to burning it. With the flour the alum was intimately mixed previous to charring. It is evident, therefore, that the temperature at which the bread or flour is burnt does not render the aluminia insoluble in strong hydrochloric acid, and it is equally evident that by precipitating the alumina as phosphate by addition of acetic acid, neither silica nor magnesium phosphate are co-precipitated with it.

Previous to adopting this process, I tried a modification of it, which consisted in using solution of potash instead of ammonia, but I found that the results were much too low. However, if the HCl employed to dissolve the salts from the char be almost entirely dissipated by evaporation on the water-bath, and the experiment then conducted according to this modification, the results are much more accurate, though still too low. Thus, two analyses by this method gave $AlPO_4$ representing 10 grs. and 5·2 grs., respectively, of alum to 1lb. of bread, whereas 11 grains and 6·15 grains had been added to the samples

Buxton, April 3rd, 1875.

* In this experiment, potash alum had been added, and to determine the quantity present in the lb. of flour the weight of the $AlPO_4$ (in grammes) is multiplied by 418·8.

VANILLA.

BY JOHN R. JACKSON,

Curator of the Museums, Royal Gardens, Kew.

Vanilla, now seldom, if ever, used in medicine, has an amount of interest attached to it owing to its natural affinities, early history, commercial value and uses, that may render some notes on the subject worth recording.

There has lately been issued from the French press a pamphlet of some fifty odd pages, devoted entirely to the consideration of the vanilla plant in all its bearings. Considering, however, that the author is a member of the Chamber of Agriculture of Reunion, a good deal of the book is devoted to vanilla as a product of that island. Nevertheless, it is a valuable addition to the literature of the subject. Its title is 'Étude sur la Vanille,' par A. Delteil.

How many, and what are the exact species of vanilla which furnish the commercial article, has always been a question amongst authors ever since that genus itself has been known. It will be well, however, to trace the history of the vanilla and then to point out the opinions of more recent writers. The plant being, as is well known, a member of the *Orchidaceæ*, was pretty fairly described by the old writers. Thus Pomet says, in his 'Compleat History of Druggs,' that the pods or cods of about half a foot long, of the thickness of a child's little finger, hung upon a plant of twelve or fifteen feet high, that climbs like a creeper; for which reason they grow most frequently upon walls or at the roots of trees, or else upon props or the like where they are supported. They have round stalks, disposed in knots like the sugar cane; from each knot there puts forth large thick leaves, about a finger's length, which are as green as the stalk, and fall off or wither away, as the great plantane does, after which come pods that are green at first, yellowish afterwards, and grow browner according as they ripen."

Originally a native of Eastern Mexico, it was in early times used by the natives to flavour their chocolate. It was brought to Europe by the Spaniards, but little seems to have been known about it or its uses till the middle or perhaps the latter part of the seventeenth century. Pomet says, however, that the "*Vanilla's* are much used in France for making up chocolate, and sometimes to perfume snuff,"—the former being at the present time one of its chief applications, but the latter, so far as we know, having quite died out. Many varieties of vanilla are known in commerce, but as of old, the Mexican sort is considered the best. At one time, *Vanilla aromatica*, Swartz, was supposed to be the plant from which most, if not all, the vanilla of commerce was procured. Pereira mentions five species as probably contributing "some of the vanilla of commerce," namely, *V. planifolia*, Andrews, *V. aromatica*, Swartz, *V. guianensis*, Splitberg, *V. palmarum*, Lindl., and *V. pompona*, Schiede. By some authors *V. sylvestris*, Schiede, and *V. sativa*, Schiede, have also been considered good species yielding some of the best Mexican vanilla. Dr. Pereira, however, considered them as varieties of *V. planifolia*. M. Delteil, in the pamphlet before alluded to, refers Mexican vanilla to the following species:—*V. sativa*, *sylvestris*, *planifolia*, and *pompona*; Guiana and Surinam to *V. guianensis*; Bahia to *V. palmarum*; and that from Brazil and Peru to *V. aromatica*. The most recent authority, however, and a very trustworthy one, namely, the 'Pharmacographia,' of Professor Flückiger and the late Mr. Hanbury, gives the botanical origin of vanilla simply as *V. planifolia*, Andrews, and refers to no other species. Though indigenous to Mexico, vanilla is cultivated, as will be seen from the foregoing remarks, in various parts of tropical America, and has been successfully introduced into the Mauritius and Reunion, from whence large quantities are annually imported. Java also grows vanilla to a considerable extent. To the cultivator it is a remunerative crop in situations where climate and atmospheric conditions are suited to it. It is very easy of cultivation by fastening shoots to the trees, into the bark of which they soon strike their roots, growing luxuriantly, bearing fruit when they are about three years old, and continuing to do for about forty years. Under natural conditions the flowers are impregnated by insect agency, but artificial fecundation is frequently resorted to,—indeed it is one of the principal points of consideration in M. Delteil's work.

The gathering and drying of the pods as described by Pomet differs in some respects from the descriptions of modern writers. "When they are ripe," he says, "the people of Mexico, those of Guatemala and St. Domingo, gather them, and hang them up by one end in the shade to dry; and when they are dry enough to keep, they rub them with oil to hinder them from drying too much, and prevent their breaking, and then they put them up in little bags of fifty, a hundred, or a hundred and fifty to bring them hither. Nevertheless, there are some who value their gain more than their conscience, who let them hang upon the stalks till over ripe, and receive from them a black fragrant balsam, that flows till the essential part of the *vanilla* is exhausted, and it can run no more; and then they gather the pods, and pack them up for sale as aforesaid." The plan now adopted is to gather the pods before they are quite ripe and to allow them to ripen by alternately wrapping them in cloths and exposing them open to a moderate degree of heat. This process is said to preserve or develop their full fragrance. When ready for exportation they are made up into bundles and wrapped in paper. What the "black fragrant balsam," of which Pomet speaks, could have been used for, we have no record; indeed, referring to it in another part of his article, he says, "As to the balsam, the Spaniards keep that, for we have none of it brought to us." His advice, with regard to the choice of vanilla holds good at the present time. On this point he says, "Choose such as are well fed, thick, long, new, heavy, not wrinkled, or rubbed with balsam, and which have not been kept moist, but of a good smell: and beware of those that are small and dry, and of little smell." The Mexicans in early times appear to have been very fond of the vanilla flavour in their chocolate, indeed, we are told that they were "mighty lovers of these plants."

With regard to the odorous principle of vanilla it is shown in the 'Pharmacographia,' that it is not contained in the fleshy exterior portion of the pod but in the interior alone. Its use is chiefly for flavouring chocolate and confectionery. It fetches a high price, and its imports are necessarily small when compared with other commodities.

LIQUOR SENNÆ.

BY PERCY WELLS, M.P.S.

In the *Pharmaceutical Journal* of the 24th April I notice there is still a want of a good and efficient preparation of senna.

The formula which I append has been used by me for a period of twenty-seven years, and in no single instance has the preparation been ever known to fail as an active but not griping purgative.

Mix 13 ozs. water, 3 ozs. rectified spirit, and 30 minims of liquor potassæ and pour it over 6 ozs. of small sifted Alexandrian senna. Keep the jar corked and stir once or twice daily for seven days, then submit to strong pressure and strain the liquor through fine muslin or calico. In about a week there will be a slight deposit, from which the clear liquid may be decanted and the residue can be filtered.

One part of this liquor mixed with three parts of water forms a preparation equal to infus. sennæ, P.L.

East Brixton, S. W., April 26th, 1875.

THE ACTIVE PRINCIPLES OF THE OFFICINAL VERATRUMS.*

A Chemico-Physiological Study.

BY CHARLES L. MITCHELL.

Part III.—Physiological.

(*Concluded from page* 868.)

Exp. No. 6. Small kitten. Veratralbia Injected $\frac{1}{150}$ grain; vomited in half an hour; appeared depressed; remained perfectly active; no paralysis; no change in pulse or respirations.

Exp. No. 7. Injected into vena cava descendens $\frac{1}{15}$ grain veratralbia. Before injection, pulse 160; respirations, 30. After $1\frac{1}{2}$ min., heart 112; two inspiratory gasps since injection. 3 min. Heart 90. 8 min. Auricles still beating; respiration has ceased entirely; ventricles of heart contract very slightly. Artificial respiration by means of blowpipe in trachea was commenced. A notable increase immediately occurred in the force of the contractions of the auricles and ventricles. Slight cardiac contractions for more than an hour. No post-mortem was made.

* Read before the American Pharmaceutical Association. Reprinted from the 'Transactions.'

Experiment No. 8 (*J. R. H.*). *Dog, weight* 14 *pounds.*

Time.	Heart.	Respiration.	Temp.	General Symptoms.
Before Injection.	104	28	101·2°	Injected in thigh $\frac{1}{20}$ gr. veratralbia
1½ min.	..	Very rapid, panting.	..	Ran across room, staggered, fell on side, got up and walked with difficulty when called.
3½ "	52	24	..	Vomited copiously; avoided operator.
10 "	44	12	..	Intense retching; seeks corner.
12 "	35	10	..	Loose stool; intense retching; lies on belly.
22 "	40	Interrupted. 18	..	Walks to corner when put on feet; pupils natural.
27 "	48	22	101·2	Salivation.
31 "	Regu'ar for two or three beats, then very irregular.		..	Walks when compelled; lies in any position in which placed; groans.
37 "	140	..	..	Paralysed; sprawls when put on feet.
39 "	176	9½	..	Retching.
45 "	..	..	..	Slightly more power; retching.
50 "	180	Very irregular.	..	Conjunctiva sensitive; pupils dilated.
55 "	Cannot be felt.	One convulsive gasp per minute.	96°	Pupils somewhat contracted.
57 "	..	..	..	Dead.

Autopsy. 3½ hrs. after death. Rigor mortis marked. Lungs congested with venous blood. All veins leading to and from heart distended with black blood; heart, left cavities filled, right cavities distended with black blood; liver very much congested, black; spleen, ditto; stomach, intensely congested, walls bathed with bloody mucus; small intestine filled with bloody mucus, walls softened and highly congested; kidneys congested; brain congested, red points appear on section; spinal cord but slightly congested.

Experiment No. 9 (*C. L. M.*). *Large Male Cat, weight* 16 *pounds.*

Time.	Heart.	Respiration.	Temp.	General Symptoms.
Before Injection.	120	36	102°	Injected 1·40th gr. veratralbia.
2 min.	110	38	..	Bites at wound; tries to hide in corner.
10 "	70	24	..	Nauseated.
12 "	..	Very rapid.	..	Vomiting.
20 "	50	20	..	Intense retching; tries to hide.
30 "	45	18	..	Loose stool, and then violent purging.
35 "	40	Interrupted.	..	Lies on belly; retching; salivated.
45 "	35	14	100°	Can hardly walk, lies in any position in which placed; cries.
50 "	50	22	..	Paralysed; sprawls when placed on feet.
60 "	100	Interrupted and very irregular.	..	Convulsions in which the rigidity lasts for several minutes.
80 "	130	10	..	Completely paralysed; groans.
100 "	180	6	99°	Slightly more power; retching.
120 "	200	One gasp per minute.	..	Pupils somewhat dilated.
140 "	..	Resp. ceased.	98°	Pupils contracted.
180 "	Heart, which had been beating much more slowly, stopped entirely.			

Autopsy. 5 min. after death. Marked muscular irritability; muscles shrinking and quivering when cut; lungs congested; veins and heart distended with thick black blood; liver engorged with blood and almost black; stomach intensely congested; small intestine filled with bloody mucus, much softened and congested; marked contraction and dryness of lower portion of large intestine.

Some seven or eight other experiments tried on dogs and cats gave the same general symptoms as noted in the foregoing experiments, the intensity of the gastro-intestinal inflammation varying with the length of time before death. The autopsy of those animals whose death was the slowest exhibited the most intense hyperæmia and gastro-intestinal irritation. These results bear out very closely the effects of veratrum album on the lower animals, described by Oulmont.

When a poisonous dose of veratralbia or one of its salts is injected into the tissues of a warm-blooded animal, the first symptom noticed is one of prostration and weakness, the animal manifesting a desire to be quiet. The pupils are normal, and it appears perfectly conscious. The next symptom is a marked quickening of the respirations, attended by an increasing uneasiness and nausea. The respirations gradually become more and more laboured, the nausea increases, and finally the most violent vomiting ensues. This continues at intervals, attended with profuse salivation, and often copious discharges from the bowels. Meanwhile the respirations become less and less frequent, and very irregular, the animal faintly moans and cries, and gradually becomes completely paralysed, losing all power of reflex action. The limbs are generally relaxed, although sometimes a slight disturbance will cause convulsions, in which they remain rigid and extended for several moments. These convulsions are often absent, and are, I think, to some extent regulated by both the animal and the size of the dose. I have noticed them much more in cats than in dogs. The paralysis continues, the respirations become more and more faint, until at length death closes the scene. During all these stages the animal retains consciousness. The heart continues to beat some time after cessation of respiration. The autopsy discloses marked congestion, and generally the most violent inflammation of the stomach and intestines. These symptoms are varied by the dose, a large amount causing almost instant convulsions, paralysis, and death, without any of the intestinal disturbances.

The question which immediately arises is, how does veratralbia produce death? Through the respiratory system, the heart or the brain? It is evident that it is not of cerebral origin. It must, therefore, be either through the respiratory or the circulatory systems. In experiments Nos. 7, 8, 9, the heart continued beating some time after the cessation of respiration. Death was caused by asphyxia, the result of a failure of the muscles of respiration. In very large doses there is just the reverse of this. The respirations are comparatively unaffected, while the action of the heart is almost immediately stopped (see experiments 4, 5), and death is probably caused by its suspension. After death the heart is found contracted, and in experiment No. 6 the auricles were found filled respectively with venous and arterial blood, while the ventricles were almost bloodless, hard, and contracted. That veratralbia acts as an arterial sedative is shown by the fall of the pulsations, and the temperature. One curious fact remains to be here noted. The arterial pressure gradually diminishes until a certain stage is attained, after which it gradually increases, and finally exceeds its pristine force, and then gradually falls, the pulsations continuing some time after respiration has ceased. That this is probably due to asphyxia is proved by the fact, that in experiment No. 7 artificial respiration produced an immediate quickening of the heart's action. Its effect on the alimentary canal is more difficult to explain but is probably due to a paralysis of the vaso-motor nerves.

Exp. No. 10. (*J. R. H.*) Divided the cord in the neck of two half-grown frogs, and into one injected $\frac{1}{100}$ grain of veratralbia.

Time.	Frog (with injection of Alkaloid.	Time.	Controlling Frog.
3m. 30s.	Acetic acid 36 per cent. causes no movement in other leg.	3m. 30s	Causes motion.
8m. 30s.	Apparent period of muscular excitation, muscles of posterior extremity deep red, and respond feebly to galvanic current.	8m. 30s	Muscles of posterior extremities respond actively.
12 min.	Muscles almost paralysed, respond still more feebly.	12 min.	Muscles almost white, respond freely.

Gastrocnemius nerve placed in sol. alkaloid (gr. iij to aq. f℥j), diminished action; action in $\frac{1}{2}$ minute; and complete paralysis in $\frac{1}{2}$ minute.

This experiment would tend to coincide with those of Dr. Wood, and to prove that veratralbia is both a muscle and a nerve poison, very much resembling veratria. I therefore conclude that veratralbia acts as,

I. A local irritant.

II. An irritant emetic and cathartic.

III. A direct depressant to the circulation.

IV. A powerful nerve and muscle poison, producing death by either paralysis of the respiratory nerves, or by a sudden paralysis and suspension of the action of the heart muscle. Its action on the nervous system has not been studied. It is probably a spinal motor depressant, like the other alkaloids of this group.

I therefore conclude in answer to my queries—

I. There exists no such alkaloid as viridia.

II. Bullock's viridia is identical with and probably was jervia.

III. There is a distinct alkaloid in veratrum album. differing from both veratroidia and veratria.

IV. The resin of veratrum album is in itself nearly inactive and owes whatever power it may possess to the presence of veratralbia.

V. The alkaloids do not exist in sufficient proportion to be profitably extracted.

VI. Jervia does not exist in veratrum sabadilla seeds.

VII. Jervia and sabadillia are probably not identical.

VIII. Couerbe's "Le Veratrin" is a mixture of resin and veratria.

IX. If the reader has carefully gone over my paper any answer to this question, further than "Yes," is unnecessary.

In conclusion, I desire to express my thanks and deep indebtedness to Dr. H. C. Wood, jun., for the physiological studies to which this paper owes so much of its value; and for counsel and advice in what was to me a novel and difficult line of research. My thanks are also due to Dr. Haynes for his valuable assistance.

THE DECOMPOSITION OF SOME SALTS BY WATER.*

BY M. DITTE.

In the first of two notes recently presented to the French Academy of Sciences, the author gives the result of an investigation into the action of water upon sulphate of mercury (HgO, SO_3). In contact with water at ordinary temperature the sulphate of binoxide of mercury immediately becomes coloured, subsulphate ($3HgO, SO_3$) is precipitated, and the water becomes strongly acid. The reaction continues upon the addition of the neutral salt until the proportion of sulphuric acid set free attains a certain limit, when the liquid no longer decomposes, but simply dissolves the sulphate until saturated.

By experiment, M. Ditte has found that at a temperature of 12° C. water which contains less than 67 grams of free sulphuric acid to the litre decomposes the neutral salt, takes up the acid set free, and becomes saturated with subsulphate. As soon as the water contains more than 67 grams of free sulphuric acid to the litre it loses all chemical action upon the neutral salt, and dissolves it without decomposition. The neutral salt is even reproduced if there be an excess of subsulphate; so that whatever may be the starting point the final result is a liquor containing 67 grams of acid to the litre, provided that the temperature remains the same. But the liquor which at 12° C. ceases to decompose the neutral salt, attacks it again and becomes coloured yellow if the temperature be raised. The presence of another acid in the liquor does not affect the phenomenon.

The second note of M. Ditte was relative to the action of water upon nitrate of bismuth, subnitrate of bismuth, and protochloride of antimony.

At the ordinary temperature crystals of nitrate of bismuth (BiO_3, $3NO_5$, $3HO$) are immediately decomposed by water, which becomes strongly acid. At the same time a white precipitate is formed which is always crystalline. The crystals correspond to the formula BiO_3, NO_5, with one, two, three, or four equivalents of water, according to the temperature. The decomposition ceases when the free acid reaches the proportion of 83 grams to the litre, after which the nitrate is simply dissolved. If now either water or nitric acid be added the composition of the liquor undergoes modification until this proportion of free acid is restored; the liquor yielding the acid to the subnitrate and reconstituting the neutral salts if the proportion be exceeded, or decomposing the neutral nitrate in solution if it be deficient. Successive additions of water to an acid solution of neutral nitrate determine the precipitation of subnitrate, the liquor always returning to the limit of acidity until all the neutral salt has disappeared.

If a limpid solution of neutral nitrate be heated there is formed a crystalline precipitate of subnitrate, which disappears upon cooling. The cause of this is that the proportion of free acid in a solution which is required in order that the neutral salt be not decomposed is augmented as the temperature is raised; when heated the dissolved neutral salt is decomposed, but upon cooling, the free nitric acid combines with the subnitrate resulting from the elevation of temperature and the precipitate disappears.

Subnitrate of bismuth (BiO_3, NO_5, HO) is also decomposed by water into free acid and a more basic amorphous salt. The decomposition is slight in the cold, but at 100° the decomposition goes on until the water contains about 4·5 grams of free acid to the litre. By exhausting this salt with water a new basic nitrate is formed ($2BiO_3$, NO_5). At a temperature of 100° C. a liquid containing less than 4·5 grams of free acid to the litre immediately attacks the subnitrate and becomes turbid. When the free acid exceeds 4·5 grams to the litre the liquor becomes clear; the acid in excess combining with the subsalt ($2BiO_3$, NO_5) formed, the nitrate (BiO_3, NO_5) reappears with its crystalline form and silvery lustre.

Thus the neutral salt treated with water gives at first the crystalline subnitrate (BiO_3, NO_5), which washed with hot or cold water is converted into a white powder that is a mixture of basic salts ($2BiO_3$, NO_5 and BiO_3, NO_5). After prolonged washing with water a fixed product is obtained which is $2BiO_3$, NO_5.

That which has been said respecting nitrate of bismuth applies also to chloride of antimony (Sb_2Cl_5). It is decomposed by water into a white precipitate of oxychloride (Sb_2O_2Cl) and free hydrochloric acid, until the liquor contains about 159 grams of free acid to the litre, after which it dissolves without decomposition. Any liquor that contains a proportion of free acid below this limit decomposes the protochloride into oxychloride and free acid; any liquor which contains more, on the contrary, produces protochloride. Oxychloride of antimony, like subnitrate of bismuth, is decomposed in its turn, especially at a temperature of 100° C.

* *Journal de Pharmacie et de Chimie*, for December, p. 448. The formulæ in this article are according to the old notation.

The Pharmaceutical Journal.

SATURDAY, MAY 8, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE BOTANICAL PRIZE.

LAST week, on Flora's own day, it fell to our lot to publish the official announcement respecting the Silver Medal which is offered by the Council of the Pharmaceutical Society for the best herbarium, collected, under certain conditions, in any part of the United Kingdom, between the first day of May, 1875, and the first day of June, 1876. From the necessity of the case there is a certain amount of monotony attending this and similar announcements, the form in which it is made varying but little from that which was drawn up by the late Mr. HENRY DEANE in 1856, and there is a probability that this monotony is not at all conducive to the multiplication of competitors for the prize. We are, therefore, glad of the opportunity afforded by the letter of a correspondent, printed at p. 903, to direct the attention of our young friends who are eligible to compete to some of the objects contemplated in the institution of the prize, and incidentally to correct some misapprehensions which, we think, are entertained by our correspondent.

Thirty years' continuous effort on the part of the Pharmaceutical Society has worked so great a revolution in opinion as to the nature and extent of the educational qualification desirable in the practising pharmacist, that it is difficult to realize now the circumstances with which, in its earlier years, the Society had to deal. In a day when the special fitness of the pharmaceutical chemist to fill the responsible post of public analyst is generally conceded, we are apt to forget that within a few months of the first herbarium prize being offered, and fifteen years after the establishment of the Society, the late JACOB BELL had to lament that in the chemical investigations connected with the PALMER and other poisoning cases, no pharmaceutical chemists were engaged, as would have been the case in France or Germany, because the only class of persons then competent to undertake such duties in this country were members of the medical profession. And we have it on record that "so little was botany formerly considered an essential branch of pharmaceutical education, that in the early examinations of the Society it was found necessary almost, if not entirely, to exclude it from the Minor examination, and although some of the questions had reference to the botanical characters of plants, it was understood that deficiency in the answers on this subject would not alone be a sufficient ground for the rejection of a candidate."

The prudent foresight of instituting a prize which should stimulate the apprentice to make practical acquaintance with British plants in their habitats, and to acquire sufficient knowledge of the rudiments of botany to enable him to classify and name them correctly, is evident. The young man who, after two or three years of delightful preliminary work, has acquired the skill, knowledge, and confidence that encourage him to send in his herbarium with a hope of success, will find that he has also gone through the best possible preparation for "recognizing the more important indigenous plants" and evidencing his general knowledge of the elementary structure of plants in his Minor examination. Moreover, he will have laid a foundation for the more intimate acquaintance with vegetable morphology and the principles of classification, required in the Major examination, in a practical manner which cannot be equalled by any amount of application to books alone.

Were any confirmation of this opinion required we need only refer to the statement made by Professor BENTLEY, whose name has now for so many years been closely associated with pharmaceutical botany, when announcing the award of the last herbarium prize, that nearly all his knowledge of plants had been acquired in the collection of plants during the early hours of the morning.

Under these circumstances we cannot agree with our correspondent that an apprentice is "necessarily incompetent to make such a collection;" such a conclusion is contradicted by the remembrance of the many excellent collections that have been sent in by apprentices in past years. In fact, one principal merit of the prize seems to us to be that it helps to counteract, so far as botany is concerned, that fatal tendency to put off all real study until the time of "preparing for the Minor." We quite agree with our correspondent that to a man preparing for the Major examination such a collection would be invaluable; but we think that to him its value should and would be sufficiently obvious without the added lustre of a silver medal.

There is one other point in our correspondent's letter, for giving us the opportunity of alluding to which we thank him. It is true that, according to a new regulation, the age of all future associates will necessarily exceed twenty-one years, and consequently they will be excluded from the competition. But this regulation has not been long in force, and there are a few associates who passed under the old regulation who are still under the prescribed age. It will therefore be necessary for the next year or two probably to retain the phrase "apprentices and associates" in the conditions.

A "YOUNG LION OF THE PRESS" ON DOCTORS AND CHEMISTS.

A really marvellous instance of the ignorance that is so often associated with the gushing declamation of the stump orator and the sensational article writing characteristic of certain newspapers has just been furnished by the *Daily Telegraph*, in its editorial comments on the trial for manslaughter at Glasgow reported in our last week's issue.

It will be remembered that the unfortunate young man who committed the mistake resulting in the death of a child and in his being sentenced to three months' imprisonment was not the assistant of a chemist and druggist, but was a licentiate of the College of Surgeons engaged in the employ of a medical practitioner keeping an open shop for the sale of drugs. Nevertheless, the article now referred to in the *Daily Telegraph* starts with the announcement that "if any proof were needed of the terrible danger to which we are continually exposed at the hands of ignorant or incompetent chemists' assistants we should find it in the details" of the case tried before Lord Deas at Glasgow. Hereupon follow a column and a half of remarks in which the positions of medical men, apothecaries, and chemists and druggists, in regard to dispensing medicines, are jumbled together in such a manner as to show that the writer was totally unacquainted with the subject he was attempting to discuss. At the conclusion, indeed, it is admitted that the Pharmaceutical Society discharges its important duties with an integrity and a care which give that Society a distinct claim upon the gratitude of the public; but this statement is mixed up with a reference to the functions of the Apothecaries' Company which shows that the services rendered to the public by the Society are very indistinctly appreciated by the writer.

A NEW THERMOMETRIC SCALE.

At the meeting of the Chemical Society on Thursday evening, Mr. John Williams read a paper in which he proposed a new thermometric scale. After specifying the several defects of the scales now in common use, he proceeded to describe the new one which he had devised. This is based upon the physical characters of mercury, which solidifies at a very low temperature and boils at a very high temperature. Mr. Williams therefore takes the interval between these two points and divides it into one thousand degrees, making his zero the solidifying point of mercury. According to this scale the melting point of ice is 100° and the boiling point of water 350°.

Among the advantages to be derived from such a scale may be mentioned the avoidance of fractions of degrees, since the degrees are very much smaller than those of either the Centigrade or Fahrenheit scales. Another advantage of the Milligrade scale, as it is termed by Mr. Williams, is the doing away with minus degrees while at the same time the indication of temperatures below the freezing point of water is sufficiently distinct, as all numbers below 100° of the Milligrade scale are between 0° and—40° of the Centigrade scale. These are certainly considerable advantages, but it remains to be seen whether they are sufficient to ensure the substitution of the Milligrade scale for those now in common use.

THE SALE OF POISONS.

In connection with the report at page 900 of the prosecution for the sale of poison, it may be as well to mention that the fine inflicted by the magistrate merely had reference to the illegal sale of poison without a label with the word "Poison." The sale of poison by an oil and colourman, however, involves a further infringement of the Pharmacy Act, and renders the vendor liable to prosecution under section 15. We may also call our readers' attention to the fact that at the late meeting of the Council of the Pharmaceutical Society the subject of the illegal sale of poisons was under consideration, with a view to the adoption of active measures for putting a stop to the practice which we referred to last week as being a source of much dissatisfaction among chemists and druggists.

THE ANNUAL DINNER.

We are requested to state that tickets for the Annual Dinner of the Members of the Pharmaceutical Society and their friends, which is to take place at Willis's Rooms, on the 18th inst., may be obtained on or before Friday next, the 14th inst., from any of the Stewards, a list of whom will be found in our advertising pages. After that date, tickets will be obtainable only by application to Mr. Richard Bremridge, 17, Bloomsbury Square.

THE SALE OF ARSENIC IN FRANCE.

It appears that the use of arsenious acid in the pulverulent form, for the medical treatment of domestic animals, has become somewhat prevalent in France, and that veterinarians frequently prescribe it in the pure state. But until recently pharmaciens were prohibited by law from vending arsenic and its compounds for veterinary practice unless combined with other substances according to a yet unpromulgated authorized formula. In order, therefore, to relieve the pharmaciens from their dilemma, the Minister of Agriculture and Commerce has just published a decree, providing that no arsenious acid intended for internal administration to domestic animals shall be sold unless it has been previously mixed with one per cent. of anhydrous sesquioxide of iron (colcothar), and one-half per cent. of powdered socotrine aloes. The three substances are to be rubbed up in a glass or porcelain mortar until they form a perfectly homogeneous mixture.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 5, 1875.

MR. THOMAS HYDE HILLS, PRESIDENT.
MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Baynes, Betty, Frazer, Greenish, Hampson, Owen, Radley, Robbins, Sandford, Savage, Sutton, and Williams.

The minutes of the previous meeting were read and confirmed.

Legacy from the late Mr. Daniel Hanbury.

The President read a letter which he had received from Mr. Thomas Hanbury, of Croydon, one of the executors of the late Mr. Daniel Hanbury, stating that he had forwarded to the Secretary a cheque for £90, being a legacy of £100, less £10 legacy duty, bequeathed to the Pharmaceutical Society by Mr. Daniel Hanbury "for the increase of the library." He then moved that the letter be entered on the minutes, and that the subject be referred to the Library, Museum, and Laboratory Committee for consideration on the first convenient opportunity. The President said that, with the consent of the Council, he would also write a letter to Mr. Thomas Hanbury, acknowledging the receipt and expressing their best thanks.

The motion was seconded by the Vice-President and carried unanimously.

The President also read a letter from Mr. Daniel Bell Hanbury, expressing the thanks of himself and family for the sympathy evinced by the Council in their bereavement.

Election of Honorary Members.

Professor Dragendorff, Professor of Pharmacognosy in the University of Dorpat, Russia,
and
Professor Von Trapp, Professor of Pharmacology, St. Petersburg,
were elected Honorary and Corresponding Members of the Society.

The following being duly registered as Pharmaceutical Chemists were respectively granted a diploma stamped with the seal of the Society:—

Blackwell, Josiah.
Broad, John Morris.
Harrington, Arthur.
Holt, George Alfred.
Lambert, William Henry.
Llewellyn, John.
Newhill, John William.
Worthington, William.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Blackwell, Josiah .... Birmingham.
Broad, John Morris .... London.
Feaver, John .... Brighton.
Gordon, John .... Glasgow.
Harrington, Arthur .... Needham Market.
Holt, George Alfred .... Rochdale.
Lambert, William Henry .... Hull.
Laugher, William .... West Bromwich.
Llewellyn, John .... Cowbridge.
Tocher, John .... Glasgow.
Worthington, William .... Preston.

Chemists and Druggists.

Blair, Rose Panton .... Perth.
Burn, David Haitly .... Arbroath.
Silvers, Francis Thirkettle .... London.

ASSOCIATES.

The following having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society:—

Minor.

Alfred, Thomas .... Stonehouse, Gloucestershire.
Anderson, David Smith .... Forfar.
Barlow, Frederick .... Longton.
Barnes, Francis Joshua .... Liverpool.
Baxter, John Newsome .... Wath-upon-Dearne.
Birrell, George .... London.
Broadbent, Sidney .... Littleborough.
Bryden, John .... Barrow-in-Furness.
Fisher, Sidney .... Liverpool.
Gatenby, Robert .... Bridlington.
Gibbs, Joseph .... Eastbourne.
Harrison, James .... Sunderland.
Harvey, William Sutton .... Margate.
Jones, Alfred .... Scarborough.
Jones, Matthew Henry .... London.
Knight, Alfred George .... Wincanton.
Lewis, Edward .... London.
Lindsay, Robert .... Peebles.
Longley, Joseph .... Sheffield.
Maitland, Pelham Christopher Stonehouse, Devon.
Rogers, William Sexton .... West Cowes.
Smith, John .... Clay Cross.
Smith, Thomas Henry .... Dewsbury.
Stamford, Frederick .... Beverley.
Steele, Samuel .... Plymouth.
Thorp, John .... Longsight.
Tully, John .... Rotherfield.
Vigis, Joseph Lewis .... Bath.
Watson, William .... Rochester.
White, Charles Edwin .... London.

Modified.

Althorp, Henry .... Peterborough.
Andrew, Ablett Ashworth .... Atherton.
Clement, John Radford .... Egremont.
Entwisle, John Bell .... Liverpool.
Evans, Daniel Ogilvie .... Farnworth.
Godolphin, George Frederick A. London.
Gowen, Albert .... Ringwood.
Hitchin, Robert .... Burnley.
Jackson, John .... Bradford.
Manthorp, Frederick William ... Colchester.
Pettinger, Elmer .... London.
Pettman, Richard .... Margate.
Pratt, Thomas Henry .... Newbury.
Ramsden, William .... Fallowfield.
Toone, John Alfred .... Cheltenham.
Westlake, John .... Sutton.
Wright, Arthur .... Lowestoft.

The following having passed their respective examinations were elected "Associates" of the Society:—

Minor.

Barrett, Josephus Teague .... Devenport.
Beale, James Hawkins T. .... Camden Town.
Berry, Henry Burton .... Gloucester.
Cant, Hemington .... Stratford.
Case, William .... Norwich.
Chadwick, George Nicholas .... Dewsbury.
Clegg, Edmund .... Manchester.
Cocker, Justus John .... Over Darwen.
Dodd, William Henry .... Fulham.
Ellis, Henry .... Rochdale.
Highmoor, George Samuel .... Leeds.
Illsley, Thomas Brown .... Belper.
Jones, Charles William .... Ashby de la Zouch.
Martin, Henry Stephen .... Brighton.
Pasmore, Walter Frank .... London.
Phillips, James Arthur .... Penge.
Royse, John Frederick .... Stockport.
Saville, George .... Wakefield
Sawyer, Henry .... Carlisle.
Senier, Alfred, jun. .... Finsbury Park.
Slater, Thomas, jun. .... Stone.
Spilsbury, James .... Stafford.
Vaughan, John .... Newtown.
Vernon, William Henry .... Boston.
Widdowson, William .... Nottingham.
Williams, William .... London.

Modified.

Hall, Frederic John ....Leamington.
Smith, Robert George ....Liverpool.

APPRENTICES.

The following having passed the Preliminary Examination were elected "Apprentices or Students" of the Society:—

Batty, Edward ... .Ilkley.
Blades, Arthur Mowbray.........Northwich.
Botwood, Charles Walker ......Great Bridge.
Butler, Christie Havelock ......Tooting.
Chapman, William Henry ......Birmingham.
Edmond, Francis Edward ......Scarborough.
Evans, Benjamin ....Liverpool.
Foster, Ferdinand Green.........Landport.
Holden, Austin Caley ....York.
Holland, Henry ....Leftwich.
Holloway, Robert..... ....Maidstone.
Jones, Joseph Humphrey ......Wolverhampton.
Llewellyn, Thomas .... Pembroke.
Lubbock, John William ....London.
McNeilage, Alexander ....Greenock.
Maconachie, Andrew Wyllie ...Glasgow.
Madden, Ronald George ....London.
Mason, Florus ....Broughton.
Millington, Walter Thomas ...Chester.
Mordue, William ....Haydon Bridge.
Ninnis, Thomas Martin ....Truro.
Parker, Charles Henry M. ......South Molton.
Pratt, William Edwin ....Newtown.
Pridmore, Walter Snape ....Hinckley.
Savory, John Field ....London.
Stone, Fredk. William Stanley Bristol.
Symington, Archibald ....Helensburgh.
Thomas, William Hendy.........Penryn.
Whitaker, Thomas ....London.
Whittaker, Joseph ....Salford.
Whyte, James Samson............Montrose.
Winpenny, Frank Walter ......Barnard Castle.
Womack, Frederick ....Bayswater.
Wright, John Charles ....Wolverhampton.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

LIBRARY, MUSEUM, AND LABORATORY.

The report of this Committee, which had held several meetings, was read. It comprised a recommendation that the following books be purchased for the library:—

'Buek's Index to De Candolle's Prodromus,' 'Manchester Science Lectures.'

The librarian had reported that the average attendance during the preceding month in the library had been during the day, 21; evening, 8; evening attendance in the conversation room, 5·3. The circulation of books had been 146 in town, and 66 to country, to 32 places. The curator had reported that the average attendance in the museum had been, in the morning, 17; evening, 5. The average of daily visitors had been 4. The catalogue was being proceeded with as rapidly as possible. Since the death of Mr. Daniel Hanbury, the proofs had been revised by Professor Bentley alone, but Mr. J. E. Howard had consented to revise that portion relating to the cinchona barks. Professor Bentley had reported that about 50 students had entered his class, the attendance being from 35 to 40 at the lectures and weekly examinations; 7 students had taken perpetual tickets. He stated his opinion that if students attended one course of lectures at Bloomsbury Square, and one on practical botany, they would have an opportunity of acquiring as much information as could have been obtained by attending a full course under the old system. Professor Redwood had reported that the number of entries in his class was about 50, and the attendance at lectures and weekly examinations from 35 to 40. Each course of lectures comprised the whole syllabus. The 'Historical Sketch of Pharmacy' he hoped to be able to complete during the autumn recess. Professor Attfield had reported that he had had 91 entries in the laboratory during the present session, 52 students now being at work. Mr. Greenish had presented a report, which he had prepared at the request of the Committee, on the microscopes belonging to the Society. The Committee had drawn up the annual report which was now presented to the Council.

The Council considered the report in detail, and having made a few verbal alterations agreed to the same.

The report of the Committee was then received and adopted.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts ordered to be paid.

HOUSE.

This Committee reported that it had considered several matters of detail in connection with the arrangements for the supply of gas to the various rooms, and for the prevention of fire. The report was received and adopted.

BENEVOLENT FUND.

This Committee presented a report recommending that the following grants be made:—

£15 to the widow of a registered chemist and druggist at Hull, with four children dependent upon her.

£10 to a registered chemist and druggist, aged 67, formerly a member of the Society.

£5 to the widow of a registered chemist and druggist, in business at various places for fourteen years. The applicant has seven children dependent upon her, and £20 was granted last year to assist in getting one of them into the London Orphan Asylum.

£10 to a registered chemist and druggist at Dover, aged 79, formerly for many years a member of the Society. The applicant had received a grant of £15 last year.

Several other applications had been considered by the Committee, and ordered to stand over for further information.

The report and recommendations were received and adopted, and the name of a registered chemist and druggist, formerly a member of the Society, was placed on the list of approved candidates for an annuity.

LAW AND PARLIAMENTARY.

The SECRETARY had reported to this Committee several cases of infringement of the Pharmacy Act in various places. The Committee recommended that the solicitor be instructed to select cases for prosecution, and to take proceedings if he found the evidence sufficient to ensure conviction.

Mr. BETTY thought the evidence in any case should be laid before the Committee before any action was taken by the solicitor.

Mr. HAMPSON said several glaring cases had been brought before the Committee. He believed that hitherto the Council had not been sufficiently alert in the prosecution of those persons who were infringing the Act of Parliament. It took a great deal of time and trouble to get the Act of Parliament, and now it was obtained it was the imperative duty of the Council, whenever it found the Act was being infringed, to immediately step forward and prosecute the offender. It had become notorious that, not only in London, but in Liverpool and many other places, there were hundreds of unregistered persons carrying on business, and if the Council was anxious to maintain the stability of the Society, it must not neglect this important duty. He had recently been conversing with a respectable member of the trade, and asking him to join the Society, but had met with the reply, "What did the Society do? It compelled young men to pass a stringent examination, and when they commenced business it did not protect them in their calling." If the Council hesitated to prosecute now it would bring discredit on the

Society. He should therefore urge on the Council to accede to the recommendation of the Committee.

Mr. WILLIAMS apprehended that the evidence which had come before the Committee would not be sufficient to prosecute upon, but would require to be gone over again by the solicitor. The Committee had received information from certain quarters of what was going on; the question now was whether the Council would ask for more definite proof of what had been stated, or at once place the matter in the hands of the solicitor, and thus probably save both expense and time.

Mr. SUTTON thought the Society would lose both time and influence by not insisting on its rights. He believed it had been too lax heretofore, and he did not believe in having laws unless they were carried out.

Mr. ROBBINS said the Committee had evidence before it that the practice complained of did exist, and it was on that evidence it was suggested that the solicitor should be instructed to proceed.

Mr. BETTY thought it would be well for the Committee to know the steps that were being taken as the cases went on.

The SECRETARY said the solicitor was always very cautious. In fact during the whole time he (the Secretary) had been connected with the Society, no case had broken down which had been taken into court.

The report of the Committee was then received and adopted.

PROPOSED ADDITION TO THE SCHEDULE OF POISONS.

A communication was read from Sir J. D. Astley, M.P for North Lincolnshire, calling attention to a practice prevalent in his own neighbourhood, of administering certain poisonous and powerful drugs to horses, to the serious damage of many valuable animals. He, therefore, intended to introduce a bill into parliament on the subject, and suggested to the Council that it should place in Part 1 of Schedule A to the Pharmacy Act, sulphuric acid, nitric acid, hydrochloric acid, sulphate of iron, sulphate of copper, and several other articles of a similar character.

Mr. HAMPSON thought the best policy in all cases was to give a straightforward answer; and if the Council considered this proposition was not a rational one to say so.

Mr. BAYNES and Mr. WILLIAMS said that it would be impossible to carry out such a proposal.

Mr. RADLEY sympathized to a great extent with Sir J. Astley, as it was becoming a very common practice to give poison to horses.

Mr. SANDFORD said the best way would be to send a courteous reply to Sir J. Astley to the effect that the Council was not able to accede to his suggestions. This view was concurred in, and the Secretary instructed accordingly.

SALE OF FOOD AND DRUGS BILL.

The report of the Special Committee appointed to watch this Bill was read. It included a memorial which had been drawn up and sent to the Local Government Board.

Mr. HAMPSON protested against the action of the Special Committee in drawing up a memorial dealing with the Bill generally, and especially with Dr. Lyon Playfair's amendment, when their instructions were distinctly limited to preparing a memorial with reference to the single point of a reduction of the penalties.

Mr. SANDFORD and nearly every other member of the Council expressed the opinion that the Committee had not gone beyond its instructions, or if it had not confined itself literally to those instructions, had acted entirely in accordance with the spirit of the Council. The report of the Committee was adopted.

PHARMACEUTICAL CHEMISTS AS PUBLIC ANALYSTS.

The PRESIDENT said he had had some correspondence with Mr. Rogerson, of Bradford, which had resulted in that gentleman sending a printed letter to each member of the Council. He would therefore ask the Secretary to read the correspondence. The following is the printed letter:—

"*To the Council of the Pharmaceutical Society.*

"Gentlemen,—In a letter to the President of the Pharmaceutical Society, I ventured to express the opinion that if the question of the appointment of chemists in business as public analysts were discussed by the Council on broad and general public grounds, apart from what might be assumed to be the particular interests of our Society in the matter, the weight of reasoning would be found greater in favour of Dr. Playfair's amendment, disqualifying traders in articles of food and drugs from holding the appointment of official analyst under the Adulteration Act. The President courteously replied that a letter setting forth this view of the subject should receive every consideration at the next meeting of the Council.

"Under these circumstances, I venture respectfully to ask the Council to weigh candidly the fairness or otherwise of the following considerations. It will scarcely be necessary to premise that I have no *personal* motive, but contend solely for a *principle.*

"It is believed, and indeed has in many instances been found in practice, that the effect of appointing as official analyst one member of a trading community is, in the eyes of a large portion of the public, an unquestionable and invidious guarantee of the purity of all articles sold by that analyst in his capacity as a trader. It is not easy, indeed, to escape this inference; for by such appointment the machinery for the local administration of the Act necessarily becomes associated in the mind of the public with a particular shop or store where articles of food and drugs can be purchased direct from the hand of the official analyst himself, which commodities, it is obvious, are practically exempted from the supervision to which those of the analyst's competitors in trade are liable. Consequently, it is held that the *official recognition* of a trader in articles of food and drugs as the local authority in all matters relating to the purity of those substances tends directly to the constant and unjust annoyance and loss of persons honourably carrying on a trade in the same articles, and in the same district, as the public analyst.

"It is evident that appointments of this class introduce a new and seriously invidious element into trade competition, and one which it should surely be the careful aim of a society like ours, in the interest of the great majority of its members and the trade generally, to prevent by every possible means.

"Again, in the event of the analyst's fellow tradesman, and perhaps immediate competitor, being fined on his certificate, the inevitable suspicion that the analyst had acted from private motives must receive considerable colour and support in the minds of the public from the fact of that functionary being himself an open trader in the articles brought to him for his official inspection. Indeed, according to ordinarily accepted ideas of fairness, it is difficult to see how the exercise of the arbitrary powers of public analyst by a *directly interested* person can, in any case, be respected.

"I venture to express the hope that in case nothing weightier than considerations of *expediency* can be advanced in defence of this anomaly, the important *principle* involved in Dr. Playfair's amendment may receive the cordial support of the Council.

"A distinguished member of our Society writes, in reference to this matter, 'Had the Council limited their action to representing that pharmaceutical chemists *not in business* were very suitable persons to fill the office of public analyst, they would have done well.' A petition to parliament, supporting Dr. Playfair's action was, with one exception, unhesitatingly signed by every member of our trade in this town before whom opportunity allowed it to be placed.

"I am, Gentlemen,

"Obediently yours,

"H. G. ROGERSON.

'*Bradford, May 3rd, 1875.*'

The PRESIDENT said he did not think this letter would alter the opinion which had been formed upon this subject, and he believed the Council was nearly unanimous.

Mr. HAMPSON said he would move a resolution—

"That this Council, having given further attention to the amendment of Dr. Lyon Playfair on Clause 9 of the Sale of Food and Drugs Bill, is of opinion that it is not advisable to oppose the amendment in question."

Notwithstanding the Council was in a measure committed to the opposite view to that found in the correspondence, and at the risk of being charged with inconsistency, he would make a few observations in its favour. He must admit that when he first considered this question he did so from a too contracted point of view, and he was led to the opinion which met with most favour round the Board, that it was advisable that pharmaceutical chemists *in business* should obtain the appointment of public analysts. Since then he had given the subject further and more deliberate consideration which had resulted in a totally altered view, and feeling that he had made a mistake in his judgment he thought it only fit and proper that he should acknowledge it, especially as he conceived the mistake made might lead to evil consequences. In judging of the question as to the advisability of appointing pharmaceutical chemists engaged in trade to the position of analyst, the first thing which struck him was this, that a pharmaceutical chemist in business would occupy, in case the proposed Bill become law, a position in which he would be exempt from the operation of the Act. The provisions of the proposed Bill empowered the local authorities to collect samples of drugs, and when they were collected, the collector was to state that they were for analysis. If he wished to be impartial he must call upon the analyst as well as the other chemists,—but what would be the effect? The analyst would simply receive the drug which he himself had sold, and analyse it himself. Such a prospective position is surely too absurd to contemplate. There is no provision in the last Act of Parliament, or in the one proposed for a state of things like this. The fact could not be gainsaid that the particular trader in question would become exempt from the operation of the law. Other and not less important objections could scarcely be better stated than in the correspondence which had been read. They could all see that where an appointment of this kind existed it placed the traders of the district in a very anomalous and delicate situation, because it raised the selected official individual to a more elevated position. His goods were, so to speak, advertised through the medium of police court reports, etc., etc., and the public at length concluded that he was the most select and best of traders in pure drugs. Conditions like these, inequitably produced, would operate unfairly towards neighbouring traders. Mr. Hampson said he should not, however, urge this objection so much as that relating to the inequality of the law to which he had already alluded. He could quite understand how the mistake of the Council had arisen, because he had made the mistake himself. There was no doubt that some pharmaceutical chemists were capable of occupying the position of analyst; that a great many men would be required to carry out the provisions of the new Act, and that it would be difficult for local authorities to find properly qualified men; but still the difficulty remained, that there was nothing in the Act to secure the appointment of efficient analysts. He hoped the question might be rediscussed in a careful and thoughtful manner. They were to some extent responsible for the result of legislation, and it was not too late, as the Bill was still in Committee, and likely to be brought up again shortly, to exert further influence in a different direction if they thought it advisable. He need only add that having come to the conclusion that he had made a mistake, he had written at once to Mr. Sclater-Booth saying he had altered his conviction.

Mr. FRAZER seconded the motion. He said his conclusion was come to on a broad principle of justice. In the neighbourhood of Edinburgh a member of parliament who held an interest to the extent of £35 a year in a small mail steamer was obliged to divest himself of that interest before he could become a member of parliament; and when Sir Sydney Waterlow was elected for a Scotch county he had to resign his seat because his firm supplied stationery to the Government. On the same principle public analysts should be entirely divested of any private interest, which they could not be when carrying on their ordinary businesses. He had written to Dr. Playfair as an old friend, referring him to a report in the Journal as expressing his sentiments on this matter. Mr. Frazer concluded by saying that he had great pleasure in seconding Mr. Hampson's motion.

Mr. SANDFORD said he was not at all prepared for such a motion and should move as an amendment—

"That Mr. Rogerson's letter be allowed to lie on the table."

It seemed to him that the Council could not alter the opinion it had expressed so frequently and for so long a time; for going back to 1872, he found that at that time a deputation waited on Mr. Stansfeld to urge upon him the desirability of appointing pharmaceutical chemists in business as public analysts. The report of the deputation concluded by stating that the President suggested that the objection that a chemist in business might have to analyse articles sold by his fellow tradesmen applied equally to medical men as officers of health, since they might be required to inspect and report upon property in which some of their best patients might be interested. That was a general consideration which applied to the appointment of all analysts. Of course a man might be liable to these influences, but he always understood that for such an appointment not only certain intellectual qualifications, but also a certain character for honesty and independence were required. As to the objection that a gentleman holding office should not derive all the honour and advantage it brought to him, he thought that that was very unsound. They might as well object to Mr. Squire being appointed Chemist to the Queen; and when Mr. Hampson said such an analyst would not be subject to the operation of the Act, he thought any analyst who sold an impure article would very soon lose his appointment. He thought they had committed themselves too far to go back, especially as, in his opinion, they had done so in the right direction.

Mr. WILLIAMS seconded the amendment. He had always spoken in favour of the appointment of pharmaceutical chemists as analysts, but this was in consequence of another opinion which he had also expressed strongly, that the analysts should not be local men, but should be publicly appointed, and should have certain departmental laboratories established throughout the country with a well-qualified staff of chemists to assist in conducting all the required examinations. But he must say so long as the law was as at present, and as long as local bodies had to appoint local men as analysts with small salaries and a great deal of work to do, pharmaceutical chemists ought not to be excluded from this honourable position, which he believed they would carry out honourably and properly. The analyst did not know whose sample it was he was analysing; the articles came to him marked and numbered, and he would not know where they came from. As to the argument produced by Mr. Frazer, he did not think that applied at all. A man was not allowed to be a member of parliament if he was a partner in a firm supplying goods to the Government, because as a member he would have interest which might influence his vote, and he might in various other ways obtain undue preference. But in the case of analysts all this was out of the question. He considered that pharmaceutical chemists had a right to look forward to these appointments and he believed they had in past times too much neglected to look after their own interest. A pure chemist, it was well known, was not quite capable of grappling with all the points involved in questions of pharmaceutical purity, because he was liable to be mistaken in various ways, whilst the pharmacist could make the necessary allowances and understand whether or not the article was unadulterated and sufficiently pure for the purposes of medicine, and, on the other hand, what constituted a real case of imposition and adulteration. He did, therefore, hope that it would not go out to the world that so long as local bodies had to appoint analysts, pharmaceutical chemists, of all other men, should be excluded.

The VICE-PRESIDENT said he had advocated the appointment of pharmaceutical chemists from the commencement, and had attended a deputation to the Local Government Board with reference to it some years ago, and he had not seen any reason to alter his opinion. He might further say that he thought this little trade jealousy which had sprung up at Bradford did not persuade the chemists throughout the country. Some little time ago, in the town of Canterbury, one of their pharmaceutical brethren was appointed by the Town Council as the public analyst. The Local Government Board refused to confirm the appointment, and it was referred back to the Town Council to appoint someone else. The Town Council, however, in his opinion, very properly replied that it had appointed a gentleman in whom it had the utmost confidence, both as to skill and integrity, and it declined to appoint anyone else. The result was this gentleman was appointed analyst to the city of Canterbury. This was about two years ago, and a fortnight since, being in Canterbury, he was in conversation with one of that gentleman's nearest neighbours, and whilst talking over various matters, this appointment cropped up, when his friend had the good sense and honesty to say that he believed his neighbour was the man of all others who ought to have been appointed, and that he himself, though he had been in the habit of doing some little analytical work, now found a great deal of pleasure in handing over such cases as came to him to his neighbour who paid more attention to it. He believed that would be the general feeling, and that if they were to exclude pharmaceutical chemists from these appointments and allowed medical men—because that was the channel in which the appointments would go—to monopolize them, they would not in any way improve the state of matters, and, in many cases, would have gentlemen appointed in whom they, as chemists, would not have so much confidence.

The PRESIDENT said he saw no reason whatever for altering the decision at which he had formerly arrived. He would not take away from pharmaceutical chemists any honour or emolument to which they were entitled; but, on the contrary, would do all he could to aid them in obtaining such rewards for their exertions.

Mr. GREENISH had always considered pharmaceutical chemists, if they possessed requisite medical, chemical, and microscopical knowledge, to be the best men who could be appointed public analysts, and had never seen reason to alter his opinion. He did not think they would be exempt from the operation of the Act, because their drugs could be analysed as well as those of any other person.

Mr. HAMPSON said he had not the least objection to any pharmaceutical chemist holding such an appointment, but he must make a broad distinction between a pharmaceutical chemist holding that appointment alone and being in business at the same time. He thought the training required by a pharmaceutical chemist, if supplemented by further training, was eminently fitted to make him a well qualified analyst, but he must still affirm, in reply to Mr. Sandford, that there were no provisions in the Act of Parliament which would enable that particular individual's chemicals and drugs to be analysed. Again, any man doing a large amount of analytical work must necessarily leave his business to other people, he could not be in the laboratory and in the shop at the same time. He did not think it was fair to put down this memorial to any feeling of jealousy, because before this correspondence took place he had some intimacy with the gentleman who had written the letter, and he was quite sure Mr. Rogerson was too large minded to have been misled by any local or petty motive of jealousy.

Mr. SANDFORD said an analyst was not supposed to know from whom the article submitted to him was brought, and therefore he might have a sample of his own rhubarb taken to him to report upon.

Mr. HAMPSON said the Bill provided that the person buying the article should state that he did so for the purpose of having it analysed, and he must again assert there was no provision in the present or proposed Act which would enable the authorities to take the sample away and have it analysed elsewhere. On the contrary, it was marked in the presence of the purchaser, otherwise the seller would not be able to identify his own article; in fact the Bill did not contemplate any such position.

Mr. FRAZER begged to say that he regretted very much being obliged to vote in favour of Mr. Rogerson's memorial, seeing where it came from, because of his great respect and regard for the public analyst in that town who was a member of the Council.

The amendment was then put with the following result:—

For.—Messrs. Bottle, Baynes, Betty, Greenish, Hills, Owen, Robbins, Radley, Sandford, and Williams.

Against.—Messrs. Hampson and Frazer.

The amendment was therefore carried, and was subsequently passed as a substantive resolution.

THE GLASGOW MEMORIAL.

Previous to Mr. Frazer bringing forward the motion of which he had given notice for referring this memorial to the Law and Parliamentary Committee,

The VICE-PRESIDENT moved and it was unanimously agreed to, that Mr. Frazer's name should be added to the Committee.

Mr. FRAZER then moved his resolution, and afterwards proceeded to read a long paper which he had prepared setting forth his reasons for so doing.

Mr. BETTY rose to order, and suggested that it would be establishing a very bad precedent if members of Council were allowed to read papers at the monthly meetings, instead of making their observations extempore, as had hitherto been the practice.

Mr. FRAZER said he should not bring forward the motion in any other manner, and after a short discussion the objection was waived, on the understanding that the reading of the paper should not be made a precedent. Mr. Frazer then proceeded with his paper stating that though he gave a general support to the memorial he must not be considered as endorsing all the views expressed in it. It had its origin, he believed, in the difficulty found in obtaining educated apprentices and well qualified assistants, and in the fact of many of both classes leaving the trade on account of the character and expense of the examinations. He then went at great length into the details of his own experience to show that this was really the case, gave the history of the memorial, dealt with the objections which had been raised to it, and expressed his concurrence in the recommendation that two opportunities of passing the examinations should be allowed for one fee, and that if candidates had passed in two subjects on the first occasion they should only be examined subsequently in those in which they had failed. In conclusion he said that as there had been quite enough changes of late, he did not wish to advocate any more at present, but if the difficulties now so generally felt continued, he hoped the subject would be fully and fairly considered.

At the conclusion of Mr. Frazer's paper,

Mr. BETTY suggested that in view of the approaching annual elections, which might change the constitution both of the Council and the Parliamentary Committee, the motion should stand over for a month, to which Mr. Frazer consented.

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1874-75.

	Committees held Once a Month or Oftener.		Committees held Occasionally.					Special Committees appointed to draw up Reports, etc.	Total Number of Attendances.
	Finance.	Library, Museum, and Laboratory.	House.	Benevolent Fund.	Law and Parliamentary.	Pharmaceutical Education.	General Purposes.		
Number of Committee Meetings held.	13	11	17	12	14	1	1		
Atherton (*Nottingham*)	*	*	*	7	4	1	1	0	13
Baynes (*Hull*)	*	*	*	*	4	1	0	0	5
Betty (*London*)	*	6	9	*	7	1	0	6	29
Bottle (*Dover*)	9	7	8	8	8	0	0	8	48
Brown (*Manchester*)	*	*	*	0	1	1	0	0	2
Frazer (*Glasgow*)	*	*	*	7	*	1	1	0	9
Greenish (*London*)	12	11	15	9	12	0	0	6	65
Hampson (*London*)	11	7	11	11	10	*	0	6	56
Hills (*London*)	0	10	12	5	13	1	1	9	51
Mackay (*Edinburgh*)	*	*	*	4	5	0	1	2	12
Owen (*London*)	9	*	*	8	9	*	1	0	27
Radley (*Sheffield*)	*	*	*	*	*	0	0	0	0
Rimmington (*Bradford*)	*	*	*	5	5	0	1	0	11
Robbins (*London*)	11	10	15	12	8	*	1	0	57
Sandford (*London*)	*	9	11	6	14	*	1	7	48
Savage (*Brighton*)	*	*	*	*	5	*	0	0	5
Schacht (*Clifton*)	*	*	*	*	2	1	1	3	7
Shaw (*Liverpool*)	*	*	*	*	*	0	0	0	0
Stoddart (*Bristol*)	*	*	*	*	*	0	0	0	0
Sutton (*Norwich*)	*	*	*	*	*	0	0	1	1
Williams (*London*)	*	7	12	*	12	*	1	4	36

* Not appointed on this Committee.

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1874-75.

Atherton, John Henry	10	Hampson, Robert	12	Sandford, George Webb	11
Baynes, James	10	Hills, Thomas Hyde	12	Savage, William Dawson	11
Betty, Samuel Chapman	12	Mackay, John	5	Schacht, George Frederick	8
Bottle, Alexander	10	Owen, John	11	Shaw, John	7
Brown, William Scott	3	Radley, William Valentine	11	Stoddart, William Walter	8
Frazer, Daniel	9	Rimmington, Felix Marsh	9	Sutton, Francis	8
Greenish, Thomas	11	Robbins, John	12	Williams, John	10

Number of Council Meetings during the year, 12.

Report of Examinations.

England and Wales.

		Candidates. Examined.	Passed.	Failed.
April 21.	Major	10	8	2
	Minor	15	9	6
,, 22.	,,	24	14	10
		— 39	— 23	— 16
,, 5.	Preliminary	188	92	96
	Total	237	123	114

Five Certificates Received in Lieu of the Preliminary Examination.

2 College of Preceptors.
1 Royal College of Surgeons.
1 University of Cambridge.
1 University of Durham.

Scotland.

		Candidates. Examined.	Passed.	Failed.
April 5.	Preliminary	34	22	12

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

The sixth meeting of the present session was held on Tuesday, March 16. The chair was taken by Dr. Pile.

Dr. Miller presented a specimen of very white glucose made from wheat, which had a sweet taste, free from any nauseous bitterness. It was stated to have been used as an excipient in pill masses, and in the preparation of syrup of the lacto-phosphates.

Dr. Miller also presented a specimen of cosmolin ointment, closely resembling cosmolin, which had been prepared from one part of paraffin and sixteen parts of lubricating oil; the oil being repeatedly filtered through animal charcoal, and formed into an ointment with the paraffin, by the aid of a water-bath.

In presenting a sample of nearly white salicylic acid, prepared in Berlin, Professor Maisch remarked that the antiseptic properties of this acid might be depended upon only so long as it is in a free state, and until neutralized by the ammonia gradually generated in vegetable infusions. This he thought might explain why oil of gaultheria—salicylate of methyl—is not more effective in preventing fermentation. Mr. Heinitsh said that oil of gaultheria was much used in the United States for the preservation of cider, and appeared to accomplish that object. Mr. Eberle said that oil of mustard was one of the best agents for that purpose, a property which Mr. Lemberger attributed to the sulphur contained in it; but Professor Maisch thought that this could hardly be the case, since the sulphur was present as allyl-sulphocyanide. Mr. Wellcome called attention to the use of phosphate of sodium to increase the solubility of salicylic acid.

Examination of Quinine Sugar-coated Pills.

Mr. Trimble described the result of an examination of seven samples of quinine pills, obtained from prominent manufacturers in Philadelphia. The process followed was to dissolve the number of pills which represents five grains of quinine sulphate in about a fluid drachm of water, acidulated with a few drops of hydrochloric acid. From this solution the quinine was precipitated by ammonia, and the whole was agitated with successive small quantities of ether, which were removed each time by means of a pipette to a weighed watch glass. On evaporation the quinine was left as a gummy mass, which was dried at a moderate temperature and weighed, and the amount of crystallized sulphur calculated. Five samples yielded nearly the full amount claimed for them; a sixth yielded only about 70 per cent. of the quantity represented; while one, the seventh, was found to contain cinchonine hydrochlorate, with a little quinidine, but no quinine. The latter pills were identified by Mr. Trimble as probably being a portion of a large quantity of sugar-coated pills which had been made by a manufacturer who had been supplied with cinchonine hydrochlorate under the name of "French quinine," and had so used a considerable quantity before discovering the fraud. The pills were then thrown upon the hands of the firm supplying the "French quinine," and through various channels had come into the market. The author said there could be little doubt that the several parties dealing in these pills were fully aware of their composition, and he considered that the fact of their continuing to sell them to the trade and the public was disgraceful to themselves and humiliating to the conscientious pharmacist. He was also of opinion that the use of sugar-coated pills had many evident disadvantages, and that the only remedy for the objections to them, as well as other products obtained from the manufacturers, was in the persistent vigilance of the pharmacist.

Dr. Miller read a paper entitled "Official and Officinal," in which he disputed the proposition contained in a foot-note in Attfield's 'Chemistry,' to the effect that the term "official" is more correct than "officinal," when applied to articles contained in the Pharmacopœia. His principal objections were that the two words were both derived from the same root, and the distinction was therefore arbitrary, and that the term 'officinal' has become well established, and its signification is well understood by all pharmacists.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture V.

(*Continued from page 840.*)

On the secondary action of Alcohol on the animal functions, and on the physical deteriorations of structure incident to its excessive use.

Ales.

The practice of adulteration the least hurtful is carried on in ales; that at all events is my experience of the ales sold in London, and I speak from a practical knowledge of the facts. A few years ago a well-known statist asked me to undertake for him a research on the ales sold in London, with a view to the detection of the adulterations in them. For many weeks this gentlemen himself collected beers and ales from different retail houses in the most diverse parts of this metropolis, and neither trouble nor expense was spared in the examination of these samples, in order to arrive at correct results as to the composition of the fluids thus retailed. I may state at once that I did not in any one instance find a truly dangerous adulteration. I found that to many samples common salt had been added, and to some sugar; but the grand adulteration was water, by which the consumer was, if I may so express it, fraudulently benefited and the Government proportionately defrauded. If this aqueous adulteration were not carried on, our registrars of deaths and collectors of revenues would both show heavier totals.

There is a prevailing notion that to malt liquor, bitter substances, such as strychnine, or narcotic substances, such as cocculus indicus, are added. Neumann says that in his time, that is just one hundred years ago, clary, cocculus indicus, and Bohemian rosemary were added to malt liquors in order to increase their intoxicating powers, and he states that the last named substance, Bohemian rosemary, produced a raving intoxication. I know it is also urged, in this day, that there is no known application for

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts*.

the quantity of cocculus indicus that is sold except it be for the adulteration of malt liquors. I will not dispute the matter, but I content myself with stating that I have never detected any foreign body of the kind, and that in the whole of my experience of the effect of malt liquors on man I have never known a symptom produced indicative of the effects of such substances.

The stronger ales and stouts are injurious mainly from the alcohol they contain. Those which have not ceased fermenting, and from which gas is escaping, produce a persistent dyspepsia in those who indulge in them, a dyspepsia attended with flatulency, painful distention of the stomach, and with loss of proper muscular power of the stomach, by which deficiency the trituration of food is impeded and rendered imperfect. At the same time the action of the gastric fluids upon the food is made less effective. There is at the present time in the market a substance used as an addition to ales, which is called *saccharina*. It is sold in the form of the ordinary sugar loaf. It is made by the action of diluted sulphuric acid upon starchy matter, and it is in fact a grape sugar. It gives to the ale body and sweetness. It is in itself a fattening food, and as it is the same as that form of sugar which is found in those who suffer from the disease called diabetes, and which produces the symptoms of that disease, it cannot be taken in quantity without some indirect risk of danger.

Wines.

The evils arising from wines, apart from those which are due to the natural ethylic alcohol they should contain, are derived from several sources. The wine that has not ceased to ferment, and when uncorked is found to be charged with gas, is often as injurious as beer in which the fermentation has not ended. It produces a fermenting process within the body, and gives rise to those phenomena of dyspepsia to which allusion has already been made. Wine that has once been acid and has been treated with lime in order that the acidity may be neutralized, is open to the objection of an excess of salts of lime. It has been urged against wines treated in this manner that they lead to calculous disease when they are taken in quantity for long periods. I must answer to this suggestion that I have not had experience of the slightest evidence that would support it, nor do I think there is sufficient of such wine consumed to warrant any conclusion of the kind. Wine if adulterated with amylic alcohol is unquestionably dangerous, owing to those physiological effects produced by the adulterant to which I specially directed your attention at the second lecture of this course. Wines that are beaded are injurious owing to the foreign mixture for beading that has been added to them, and which I shall describe in due course.

Some substances that form in natural wines exert an effect on the animal body when they are taken into it. These substances are principally aldehyde and acetic acid. Aldehyde when it is present in wine communicates to it a natural bouquet. You will find on the table a pure specimen of aldehyde, and you will also find specimens of natural wines, kindly lent to me by Mr. Denman, in which this change of alcohol by oxidation has taken place. In the year 1848 the late Sir James Simpson, of Edinburgh, discovered that aldehyde would produce anæsthetic sleep when its vapour was inhaled, and I have since submitted it to experiment with the view of testing its action on the living body. I find it is a rapidly intoxicating agent, sharp to the nerves of sense, and acting with greater rapidity than alcohol, and with a less prolonged effect, for it is soluble in water, and is so volatile that it boils at 72° F. It is therefore quickly diffused and quickly eliminated from the body. The action of aldehyde upon the living body has been as yet insufficiently studied. It has a close relation to the narcotic action of alcohol, and the symptoms it produces are so similar I am inclined to believe that the narcotism which follows the administration of alcoholic spirit is partly due to its production.

The presence of acetic acid in wines is on the whole not injurious, if the wine in other respects be free of adulteration. The tendency of this acid itself is to promote the digestion of albuminous foods, and I have sometimes observed in persons, whose digestive power is feeble, signs of improvement under its use. In saying this I do not however wish to convey that therefore a rough acid wine should be taken for indigestion, for the acid in such instances may be administered without the wine and perhaps with greater advantage. I only wish to record that acidity of wine, in which fermentation has ceased, is not a source of additional injury. The astringent acid of some wines—called tannic—has been advanced as useful in the cases of certain persons who suffer from laxity of body and who require astringent remedies. It would be wrong to dispute that there may be in wines a virtue of this kind; but it is not peculiar to wine. It can be secured when it is wanted without wine at all, and in a more certain way. This remark holds equally good in respect to what may be favourably spoken of the saline substances which some wines naturally present. I mean to say that the saline constituents can be administered with more certain and therefore with better effect, independently of wine.

Spirits.

Into the different spirits commonly sold, several substances are introduced which exert more or less of baneful influence on the body that receives them. The addition of amylic alcohol has already been condemned and need not again be mentioned, and I omit intentionally, for the sake of brevity, a great number of other added substances which do not seem to me to be active for evil, though they were possibly better left out of the animal organism. After these are withdrawn there remain many other agents which cannot fairly be omitted from our consideration. There is oil of juniper, and oil of bitter almonds, potassa, alum, nitric acid, oil of vitriol or sulphuric acid, and butyric acid. In even small quantities every one of these agents is injurious to the body if it be taken for any long continued period of time. The oil of juniper is an active diuretic, and thereby is injurious to the excreting power of one of the most important of the vital organs. The oil of bitter almonds contains, unless it be specially purified, hydrocyanic or prussic acid, and exerts then in small and often repeated quantities a prejudicial influence on the nervous functions. Potassa causes a dry and caustic action upon the mucous membrane of the mouth, throat, and stomach, for the production of which action it is actually added systematically, that it may give the peculiar sharpness called "biting the palate."

(*To be continued.*)

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Sale of Food and Drugs Bill.

The consideration of this Bill in Committee was resumed on Thursday at Clause 6, in which some verbal amendments were inserted, and the Clause, as amended, was agreed to. On Clause 7,

Mr. Brown moved to add at the end:—"or, if he shall supply such article from any box or other receptacle which is clearly marked in such a way as to signify that the article is mixed, and is so placed that the purchaser may be able to read what is marked thereon." His object was to remove the necessity of wrapping up small quantities of an article in a paper marked "mixed," as that would entail in the case of small sales over the counter a good deal of unnecessary trouble on the seller.

Mr. Bristowe pointed out that the clause as it stood was very good, and that the amendment, if adopted, would open the door to fraud.

After a short conversation the amendment was negatived.

Mr. Sandford moved the addition of the words,—"and stating the nature of the mixture," with a view that purchasers should know what they were buying.

Mr. Mundella thought the amendment would tend to the manufacture of inferior goods.

Mr. Sclater-Booth also opposed the amendment. No information of value would be given by it to the purchaser, who would know nothing as to the quality of the materials used.

The amendment was negatived.

Clauses 7 and 8 were agreed to. On Clause 9,

Mr. Sandford said one of the grievances complained of to the Committee was the incompetency of the local analysts, and the right hon. gentleman had not tried to remedy this grievance in the Bill. In many small boroughs, also, analysts were appointed on the express understanding that they would not carry out the Act, and some members of the Town Councils were the chief offenders. It would conduce both to economy and efficiency if analysts were appointed by the county, and he therefore proposed that, "in England, the magistrates for each county shall, as soon as possible after the passing of this Act, appoint for each county one or more persons possessing competent knowledge, skill, and experience, as analysts of all articles of food, or drugs sold within such county."

Sir H. Peek protested against the appointment of analysts for the purposes of the Bill, on the ground that analyses would be much more efficiently conducted at the Laboratory at Somerset House than by persons who were selected at haphazard, and for whose skill there was no security. Under the present system great injustice was frequently done.

Mr. Sclater-Booth thought it was unadvisable that all analyses should be conducted at a central establishment like Somerset House, and therefore could not accept the suggestion of the hon. baronet, the member for Mid-Surrey. He defended the action of the boroughs, which he thought were quite as vigilant to prevent adulteration as the counties were.

Mr. Pell coincided in the views of the hon. baronet the member for Mid-Surrey with regard to analysts and to the injustice of the existing system. County or borough magistrates knew very little indeed of the subject. He was a farmer, and would like to have his manure analysed, but he would not ask a country analyst to analyse it.

Mr. Wykeham Martin said that he thought borough magistrates were quite as competent as county magistrates to appoint analysts.

Dr. Playfair said there could be no doubt that many incompetent men had been appointed analysts. Parliament, in laying down the system of analysis, provided no safeguards that the analysts should be competent. Even this Bill contained no proper security that the analysts should be competent. But he would say one word for the analysts who had been appointed under all the difficulties of the present system, and suddenly called upon to make analyses without preparation. Before the Adulteration Act was passed Dr. Hassell made 2,000 analyses of articles and found that 76 per cent. of them were adulterated. Since the Act was passed he had made 17,000 analyses and only 26 per cent. of the articles were found adulterated. Much as we might lament the ignorance on the part of analysts suddenly called upon, as a whole the work had been performed to the satisfaction and for the benefit of the public. He could not support the amendment of the hon. gentleman, because he thought London and large boroughs were quite able to find efficient analysts.

Mr. Hardcastle said if there were a large number of analysts, it was probable that they would all be very inadequately paid; but if there were one superior analyst, they could afford to pay him well for his work. Practically, these analysts were placed in the position of judges, for on their decision rather than on the decision of magistrates rested the question whether or not those persons who were accused of adulteration should be subjected to a penalty. He felt it his duty to support the amendment, although he thought the city of London was competent to appoint its own analyst.

Mr. Evans hoped that some provision would be introduced to avoid for the future such gross injustice as had been inflicted on those tradesmen who through the incompetence of analysts had been groundlessly accused of adulteration. He believed the best course to adopt would be to appoint for the work of analysis a competent authority.

Mr. Alderman Cotton said although the right hon. gentleman the member for the University of Edinburgh might treat the faults of analysts very lightly, their faults might ruin the reputation of innocent tradesmen.

Mr. Cawley said it would be inconsistent with previous legislation to leave the appointment of analysts with the county magistrates, who would have to go to the large towns and cities for the persons to be appointed.

Mr. C. P. Villiers thought there was a great deal to be said in justification of the amendment. It appeared that only 24 boroughs out of 171 had appointed analysts, whereas the county magistrates had appointed analysts in 30 cases out of 54. There must be some reasons why the towns and boroughs did not appoint analysts. At present nothing could be more capricious than the operation of the existing law. It had been two years in operation, yet while in some places the law against adulteration was rigorously enforced, in others no analysts were appointed, and the law became a dead letter. The consequence was that the unscrupulous traders sent their adulterated goods to the latter places, and enormous injury was inflicted on the community. The analysts had been condemned, but had they had a fair trial? They did not exist in sufficient numbers at first, but during the last two years a sufficient number of competent analysts had come forward. The House ought to remember that wherever analysts had been appointed great public advantage had accrued. Nothing could be more ridiculous than the statements sometimes made in the House that there was now no adulteration of food. There never was a time when on sanitary grounds an effective measure was more required. For fifty years such an Act had been demanded, and in 1860 an Act was passed, but no analysts were appointed, because the appointment was placed in the hands of those who took care not to appoint them. The Act of 1872 was passed by something like an accident. The present Bill was in his opinion no improvement on the Act of 1872, because it would diminish the protection of the consumer and offer facilities to the traders who practised adulteration. He hoped that the Committee would receive an assurance that the Bill would not be merely permissive, but that the word "may" in regard to the appointment of an analyst would be changed to "shall appoint an analyst."

Mr. Sclater-Booth thought the right hon. gentleman could have given very little attention to the language of the Bill. The difficulty was to insist on the appointment of analysts, when they were told that a sufficient number of competent persons could not be found. The Bill, however, extended the facilities for the joint appointment of analysts by boroughs and counties. There was, unfortunately, no School of Analytical Chemistry in this country, but in a subsequent clause it would be proposed to refer the analyses in certain cases to the Board of Inland Revenue, the effect of which might be that plenty of competent analysts would be found in a few years. When it was stated that county magistrates might be relied upon to carry out the Act he would remind the Committee that the magistrates of two Midland counties had appointed an analyst who was thoroughly incompetent. There were many difficulties in the way of working the Act in counties, while in several boroughs it was very well worked. The hon. member for Edinburgh had borne testimony to the general diminution of adulteration, and he believed that if powers were given to the Board of Inland Revenue still greater improvements might be made.

Mr. Henley thought it would be very invidious and almost unconstitutional to say that boroughs having Quarter Sessions which were competent to try criminals were not to be trusted to appoint analysts. It appeared that these learned pundits were not infallible, for more than one analyst had made a great mistake which other learned pundits had corrected. He should be sorry to see any change made in the direction of the amendment.

Sir W. Fraser objected to the appointment of an analyst being confided to the London Vestries.

Mr. Cole believed that the Vestries, which included men in all positions in life, would be the very best bodies to make such an appointment. His only objection to the clause was that it was not made compulsory.

The amendment was then withdrawn, and

Mr. Sandford moved the postponement of the clause, expressing his concurrence in the view which had been submitted to the Committee by the hon. member for Mid-Surrey, that it would be more satisfactory that things should be sent up to Somerset House to be analysed.

Mr. Barclay hoped the clause would be postponed. He thought it would be most satisfactory that the analysts at Somerset House should be employed on all occasions, and that their decisions should be final and binding on all the parties.

After some further discussion

Mr. Sclater-Booth observed that the clause was necessary to the carrying out the object which the Government had in view in introducing the Bill.

The amendment was negatived.

Mr. Pell moved an amendment, the effect of which would be, if adopted, to limit the operation of the clause to boroughs containing, "according to the last published census, for the time being, a population of 25,000 and upwards."

Mr. Backhouse supported the amendment.

Mr. Sclater-Booth thought that trivial matters of this character should be left to the discretion of the local authorities, instead of being made the subjects of Acts of Parliament.

After some further conversation, the amendment was withdrawn.

Dr. Playfair moved to insert the words, "Provided that such analysts be not engaged in the trade of buying or selling any article of food or drugs." He thought it was undesirable that men should be appointed to analyse in a public capacity the goods of others with whom they might be competing in trade.

Mr. Cole argued that if chemists and druggists were excluded there would be many localities deprived altogether of the services of an analyst.

Mr. Sclater-Booth approved the intention of the right hon. gentleman, and stated that as a general rule the Local Government Board deprecated the appointment of men engaged in trade, but that in point of fact some of the most competent local analysts were persons so engaged, and, on the whole, he was of opinion that the amendment would operate injuriously.

Mr. W. E. Forster supported the amendment, and Mr. Pease and Cawley opposed it.

Dr. Playfair said the men they wanted were competent professional analysts—not manufacturers.

Colonel Barttelot supported the amendment as an independent member. It was not right that persons who dealt in particular articles should be called in to analyse them. They should appoint men who were properly qualified to do the duty cast on them.

Mr. Wykeham Martin pointed out that in some counties a medical man in private practice was the analyst.

Mr. Sclater-Booth believed that when a sample of an article went to be analysed it was sent marked in cipher, without the analyst knowing from whom it was obtained. Those gentlemen who had already been appointed could not well now be disestablished. Although it might not be a matter on which it could rely, he assured the Committee that he would endeavour to see that proper persons were appointed for those duties.

Sir A. Lusk supported the amendment.

Mr. Cawley suggested that the amendment should be confined to the special trade in which a person might be engaged.

Mr. Sandford also recommended that it should be modified so as only to exclude a man who sold the articles in question within the district for which he was appointed as analyst.

After some conversation the amendment was withdrawn, Mr. Sclater-Booth stating that he would introduce some words on the report to meet the views of the right hon. gentleman.

The Clause as amended then was agreed to, as was also Clause 10.

On Clauses 11 and 12 amendments were proposed by Dr. Cameron and Dr. Playfair. After a brief conversation the first amendment was withdrawn, the second negatived, and the clauses added to the Bill.

Clauses down to Clause 20 having been agreed to,

Progress was reported, and the House resumed.

Conviction under the Pharmacy Act, 1868.

Mr. William Valentine Aldridge, of 8, Islington Green, oil and colourman, was summoned before the magistrate sitting at the Clerkenwell Police Court, on Thursday, May 6, for an offence under the 17th section of the Pharmacy Act, 1868, by having sold a packet of oxalic acid (a poison) without affixing thereto the word poison, the name of the article, and the name and address of the seller.

Mr. Flux appeared on behalf of the Pharmaceutical Society and stated the case.

Mr. Ward deposed that on the 25th March he applied at the shop of the accused for a small quantity of oxalic acid. The shopman took a common piece of paper, made a twist, and then took from a drawer some oxalic acid in his hands and poured it into the paper, screwed it up, and handed it to the witness without label or warning of any sort.

Professor Attfield proved having analysed the contents of the packet, and that they consisted of somewhat impure oxalic acid.

The defendant did not deny the charge, and in answer to the magistrate said that he had been a trader many years, and had sold a large quantity of oxalic acid, chiefly to dyers and shoemakers, but that he gave orders that the name of the article should be written on every packet. He had not intended to infringe any Act of Parliament.

The magistrate said that the statement virtually amounted to a plea of guilty. He was of opinion that there existed necessity for great caution in the sale of such a poisonous substance, because it might get into the hands of a child or other ignorant person, and being in appearance something like crystallized sugar, might be eaten. The law regulating the sale of poisons must be respected, and he should fine the defendant half the full penalty, or 50*s.*, and costs.

Prosecutions under the Adulteration Act.

Charge of Selling Adulterated Scammony.

Mr. Francis Hallam, chemist and druggist, of High Street, Burton-on-Trent, was charged on Tuesday, April 27, before the magistrates sitting at the Burton Police Court with having sold as unadulterated a quantity of adulterated powdered scammony. Mr. Briggs, of Derby, appeared for the defendant. John G. Horder, district inspector under the Adulteration Act, deposed that he purchased a shilling's worth of scammony on February 11 from the defendant, and handed a portion of it to Mr. W. L. Scott, county analyst, for analysis. He told the defendant for what purpose he had purchased it. On

March 5th Mr. Scott forwarded him a certificate which stated that the scammony was adulterated to the extent of 26·98 per cent.—of which nearly 17½ per cent. was flour and the remainder was foreign mineral manner chiefly argillaceous and silicious. It was injurious to health.

Mr. Briggs, in the first place, argued that the analyst himself ought to have been present so that an opportunity would have been afforded of examining him as to his method for detecting adulteration, but he did not press this point. He then proceeded to argue that the argillaceous and siliceous matters were natural impurities contained in the scammony, and that the flour was intermixed in the manipulation of the article, preparatory to sending it to England, in order to prevent the pieces adhering to each other. He quoted several authorities to show that if there were 70 per cent. of the genuine resin present the whole could be considered as unadulterated, and to bear out explanation of the alleged adulterants. He further stated that Mr. Horder had only purchased Aleppo scammony, which was the poorest kind.

The Bench consulted, and Mr. Horder told the magistrates that if they had any doubt about the article being adulterated he would ask them to adjourn the case so that the clerk of the peace for the county, who had ordered the proceedings to be taken might be represented.

The Chairman said they had no doubt about the case at all, as they had decided to dismiss it, believing that the scammony was not adulterated beyond what was natural and necessary.—*Burton Chronicle.*

Poisoning by a Vermin Killer.

An inquest has been held at Boston, Lincolnshire, before Walter Clegg, Esq., coroner, on the body of Kate Jebb, 32 years of age, who died from the effects of poison. The following evidence was adduced :—

Sarah Johnson, a little girl who waited on the deceased, said her mistress sent her to Mr. Lewin's shop about nine o'clock on Saturday evening for a pennyworth of laudanum. She handed the bottle to the deceased, and shortly after saw her take the bottle from her mouth. After this she requested the child to fetch a second pennyworth. The child took the bottle, but instead of going direct to the chemist's again she went home and told her mother what had occurred, and the latter would not let her go the errand on which she was sent. The child retured to the house and told deceased her mother would not let her fetch the laudanum. Deceased then requested her to fetch some vermin killer to poison the rats—a thing she had been talking about all the week. The child on her return gave the packet of poison to the deceased, who told her to lock the door, take the key to a neighbour, and then go home.

Mr. Lewin, chemist, deposed to seeing the last witness come to his shop on Saturday night for a 3*d.* packet of vermin killer. It was his own make, of a light blue colour, and contained strychnine. The witness said there were no restrictions on the sale of vermin killer.

Peter Holland, a young man who lodged in the house, deposed to finding the deceased groaning and retching. He ran at once to fetch Dr. Arthur Tuxford.

John Jebb, husband of the deceased, deposed to her being subject to great excitement at certain periods, and to her being unusually excited on Saturday afternoon and evening. He left her at home a little before nine in the evening. He returned about ten, and finding the door locked went into the town again. On returning a second time a little after eleven he found Dr. Tuxford in the house attending to the deceased, who was very bad. Witness knew no reason for deceased destroying herself.

Dr. Arthur Tuxford deposed that he found the deceased sitting up dressed in bed. She asked why he had come. He told her he had heard she had taken poison, and asked her what she had taken. She replied, "I shall not tell you, because I want to die." She was very excited, her pulse was very rapid, and she had great difficulty in breathing. He immediately administered a powerful emetic, and sent for a stomach pump. She vomited a lot of bluish-looking mixture, and said, "It's too late; you can do me no good; I took that (pointing to some papers on the floor) an hour and a half ago, and oh! do let me die." He applied the pump, and administered a draught of hydrate of chloral, applied hot water to her legs, body, and feet, counter-irritants to her heart, and cold to her spine. Opisthotonos set in a few minutes afterwards and continued till death ensued. Verdict, temporary insanity.—*Stamford Mercury.*

BOOKS, PAMPHLETS, ETC., RECEIVED.

Free Phosphorus in Medicine, with Special Reference to its use in Neuralgia: A Contribution to Materia Medica and Therapeutics. By J. Ashburton Thompson. London: H. K. Lewis. 1874. From the Publisher.

The Science of Disinfection. By John Dougall, M.D. Glasgow: J. Maclehose. 1875. From the Author.

Laboratory Notes. By Charles R. C. Tichborne, Ph.D., F.C.S. From the Author.

Typhoid Fever; its Cause and Prevention. By E. Duncan, M.D. Glasgow: J. Maclehose. From the Publisher.

Notes and Queries.

[435]. CEMENT FOR COMPOSITION MORTARS.—I have pleasure in informing "Vinegar," in answer to his query in the *Pharmaceutical Journal*, that I have found the following cement answer the purpose he mentions remarkably well :—

Hydrarg. Subchlor.	
Pulv. Acaciæ	partes æquales.
Mucilaginis	q. s.

C. Ekins, *Bristol.*

Another correspondent writes that Kay's Coaguline will answer the purpose.

[440]. UNFERMENTED GINGER BEER.—"*Good Templar*" asks for a recipe for making Ginger Beer without a machine (unfermented).

THE BOILING OF SULPHURIC ACID.—In a paper recently read before the French Academy of Sciences (*Comptes Rendus*, lxxx. 473), M. Bobierre stated that the ebullition of sulphuric acid may be conducted as regularly as that of water, if a suitable quantity of platinum be introduced with it into the retort. The method adopted by the author is to place in a retort of 580 centimetres' capacity at least 12 grams of platinum foil; then to add 320 cubic centimetres of sulphuric acid, and heat gradually over a gas furnace.

NOTE ON CHLORAL HYDRATE.—M. Oré states (*Journ. de Pharm.*, May, p. 426) that a very small quantity of carbonate of soda is sufficient to remove the acidity of chloral hydrate in solution and to render it alkaline. There is a slight disengagement of carbonic acid and some chloride of sodium is formed. Comparative experiments have shown that whilst chloral hydrate retards the coagulation of blood, chloral hydrate thus rendered alkaline by carbonate of soda entirely prevents it. The addition of the soda does not at all interfere with the anæsthetic properties of the chloral.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Glasgow Memorial.

Sir,—Our attention has been called to the following statement in to-day's Journal in the letter signed "Assistant," viz.:—

"Who could have imagined anything more ridiculous than that Mr. Frazer went to London with the intention of presenting a memorial without first obtaining a copy of it in Glasgow?" As the parties who had charge of the memorial we cannot allow such a statement to pass unheeded. Mr. Frazer was asked to support the prayer of the memorial at the Council Board, which he agreed to do, but he was never asked to present it. The document was sent by us direct to the Secretary of the Society at Bloomsbury Square, for presentation to the Council, and if we understand forms aright, neither Mr. Frazer nor any other member of Council was entitled to see it until it had been received by the President, and read by him, or, as is usual with official communications, by the clerk or Secretary, in presence of the Council. How a different course has seemingly been adopted in this case our much respected President or Secretary of the Society should be able to explain.

John Currie, Ex-President,
J. M. Fairlie, Secretary,
G. C. and D. A.

Glasgow, May 1, 1875.

Sir,—"Scotus" has misunderstood the purport of my request for his name. The argument "Scotus" gives for me to reply to his personal remarks is just the one I would be disposed to make in favour of "Scotus" signing his name to his communications openly. Your readers must judge who is doing things in the most "tortuous or underhand way," the one who makes an attack in the dark, or the one who is called upon in his official capacity to sign a document, and is prepared to defend his conduct in doing so. I therefore decline correspondence with irresponsible parties.

While writing I may express how sorry I am for his own sake that Mr. Kinninmont should introduce into his letters garbled, and in some cases simply hearsay statements. "Those who live in glass houses should not throw stones;" and I fear your various correspondents are doing this to knock their own heads.

J. M. Fairlie.

Endrich Place, Glasgow,
May 1, 1875.

Sir,—Having passed my Major Examination in Scotland I feel I should like to say a few words respecting the Glasgow memorial. I for one do not think that the examinations prevent young men from remaining in the business. I have heard many young men remark that it is the remuneration and not the examination that they object to, as even when they have passed the Minor the salaries they receive will not allow of their going in for the Major.

As an instance of the salaries which are offered in some places I may mention that when I had passed my Major I tried to obtain a situation in Edinburgh, and was offered 50*l*. a year to manage a business, and live out of the house. You can imagine my disgust at such a proposal, as the money would not have done more than pay for my board and lodging. Instead therefore of trying further in that city I came straight to London, where I got 55*l*. in the house as senior assistant, without any trouble.

As regards the Edinburgh Board of Examiners I am of opinion that a more efficient, straightforward, and upright set of gentlemen never sat as examiners, and I am sure that none but men who have been unluckily plucked will say anything else. When I was up for examination the only grumblers were men who had been up before.

Harry Hyne.

130, *Seymour Place,*
Bryanston Square.

Sir,—We must, of course, accept the declaration of Messrs. Currie and Fairlie, that in the Glasgow memorial no insult is intended to the Edinburgh Board of Examiners. But it is, to say the least, very difficult to reconcile that statement with the words and apparent meaning of the memorial. It appears, moreover, from Mr. Kinninmont's last letter, that these two gentlemen are entirely responsible for the objectionable nature of the words employed in the preamble of the memorial. Nevertheless, I would not be inclined to be too hard on these gentlemen, as they may have a conception of a perfect Board of Examiners "in the dim vista of the future," and, consequently, may be endeavouring their utmost, to bring about that state of Elysium. The memorialists seem to think that the examinations are the cause of the scarcity of assistants. I agree with them in that opinion, but I will give the reason why such is the case. In the first place, we will grant, for sake of argument, that there are plenty of apprentices in the market. Well then, in the natural course of things plenty of assistants will be found; but is the course of things in this trade natural? I emphatically say "no." Young men are told that they have an examination to pass before they can open shop. This examination requires study, without which all is in vain, and for study they require books and time. And now I come to what qualifies my assent to the memorial. The money for the purchase—mere purchase, I say—of books is wanting; the time for study is wanting. Is it natural, I ask, therefore, is it fair, that a young man be asked to give time which he has not for study, and money which he does not possess for the requisite books? What more would be required to complete the utter inability of any young man to pass. But I have assumed that there are plenty of apprentices; now this is not so—at least in the district in which I reside, the South of Scotland—and the scarcity is not confined to the drug trade. I have known employers advertise for three, four, and six months before getting an apprentice, and even then there was no choice. This is owing to the large inducements offered in the shape of long pay and short hours by other trades, which are thinned by emigration. Very soon, however, there must be a change, and masters will have to offer better remuneration and shorter hours of labour. In disposing of the apprentice difficulty—and it seems to me that this is all—I have disposed of the lack of assistants.

With regard to doctors keeping open shop, which hinders profits and consequently higher wages, doubtless this will soon right itself, and the intelligent public will be able to discriminate between the man who seeks to degrade his profession for the purpose of hindering another from rising, and the man who pursues his calling honestly and industriously.

Concerning the Examining Boards as now constituted there is no doubt but that a great improvement has taken place within the last few years, and although there may be room for still more, nevertheless, the system appears to one who has not yet ventured before the examiners, and to outsiders generally, to be as perfect and honest and impartial as possible under the circumstances.

Therefore I sincerely trust that the Council will not give too much weight to the memorial, and if it is discussed, that it will not give effect to the suggestions which seem to me ill-timed and out of place.

In conclusion, I regret that any display of feeling should have entered into the correspondence, as it seems that some have the idea that the Glasgow druggists are in a state of jealousy towards their brethren in the east. We are bound, however, to accept their distinct assurances to the contrary.

A Young Scot.

May 3, 1875.

Sir,—In reference to the scarcity of assistants in Glasgow and West of Scotland being due to the effect of the examinations of the Society upon young men in the trade as represented in the memorial of that city, my views entirely coincide with those communicated to you in the letter of "Ph. C.," and published in the Journal for April 10. Like him, I believe the reasons assigned by the Glasgow chemists are quite erroneous. The most probable explanation of the dearth of assistants, not only in Glasgow but in Edinburgh and other places, is the insufficient recompense for the necessary outlay of time and money, not exclusively for the "Minor," but in order to acquire a fair knowledge of the line of occupation we pursue; and the preference often given to unqualified men, provided they have a prepossessing appearance and accept a lower remuneration than the registered student will demand.

Edinburgh has not so marked a want in that respect, on account of its educational advantages and other facilities, so that many are willing to reside there for a year or two that they may pass their examination and then remove to a place with greater inducements in a pecuniary sense.

As regards the places for conducting the examinations I do not think any change on the present mode of procedure would be conducive to the interests of the Society or the private advantages of the individuals concerned.

Moreover, I believe a Branch was established in Edinburgh for the convenience of "North Britons," and not for the inhabitants of special towns; and what place could be more suitable than Scotia's capital itself, so long renowned for science, art, and literature, leaving Glasgow to continue its famed mercantile pursuits?

Further, I should think Dublin, Erin's capital, has greater claim for a centre than Glasgow has.

J. B. L. M.

The Sale of Vermin Killers.

Sir,—It appears to me somewhat remarkable that both the writer of the article on the sale of vermin killers and your correspondent "A. A." should have overlooked Section V. of the Pharmacy Act Amendment Act, 1869, which enacts that "Schedule (F) of the recited Act is hereby altered by substituting for the second column headed Name of Purchaser, a column headed Name and Address of Purchaser."

I fear that there are many who are only too ready to be guided by the printed poison books without troubling to ascertain if they are quite correct. I do not remember ever having seen a printed "Poison Book" with a column for the address.

With regard to the necessity of registering vermin killers I think there need be no doubt arsenic and strychnine are placed in Schedule A, and we know that these are the poisons generally contained in them.

In conclusion, I would suggest that some of the surplus energy of the Council might quite as appropriately be devoted to this subject as to the consideration of a universal pharmacopœia or any other equally utopian scheme.

I would venture to suggest for their consideration, the advisability of paying the local secretaries a salary, in return for which they should be deputed to see that the Pharmacy Act is properly carried out, and to institute proceedings when necessary. A. P. S.

[*** "A. P. S." is quite correct as to the fact that the registration of the purchaser's address is specifically directed by the Amendment Act he refers to. Our remarks last week were simply directed to showing that according to the original Pharmacy Act this is distinctly necessary.—Ed. Pharm. Journ.]

The Botanical Prize.

Sir,—As the conditions for the botanical prize are again brought before our notice, I take the opportunity of giving you my ideas on the subject. I noticed last year when the prize was awarded that only one collection had been sent in. This is hardly surprising considering the conditions that are laid down for competitors. It is only open to apprentices and associates who must be under twenty-one years of age. Now, as an associate must be over twenty-one, according to present regulations, I fail to see that he is eligible, and, as a rule, apprentices do not commence to study botany, etc., until they are preparing for the Minor; they are necessarily incompetent to make such a collection. To the associate who is preparing for the Major examination, and consequently studying systematic botany, such a collection would be invaluable. Why, therefore, should he be shut out?

A Would-be Competitor.

"Resin of Aloes."

Sir,—In reply to Dr. Tilden's letter contained in your Journal of 24th ult., I beg to state that I regret very much if I have misrepresented his views. Permit me to say, however, that the substance referred to by him as "the soluble, brown, uncrystallizable substance which constitutes a considerable portion of all aloes," and which he asserts "is none other than the changed aloin of Dr. Craig," is not the substance with which I experimented. So far from his view being correct about the identity of the two substances, the changed aloin I employed was originally crystallized aloin, which had afterwards undergone change by exposure to the air in a damp state.

If Dr. Tilden will read again what he said at the Conference in 1870, he will find that in addition to the opinion quoted by him in his letters as "the only expression of opinion to which he had ever committed himself definitely," he uses these words:—"The active constituent of aloes is still unknown;" again, "The purgative property is not due to aloin;" and again in the postscript, "All existing facts point to the conclusion that the various kinds of aloes do not owe their purgative action to the crystallizable aloin they may contain." The opinion, quoted by Dr. Tilden, must be read in the light of what goes before, and certainly I never imagined that he referred to "aloetin" in the opinion he quoted, seeing he had in that very paper from which he quotes described aloetin "as a mixture of anhydrous aloin, which is capable in the presence of water of recovering its crystalline condition and the brown oxidized substance referred to further on."

The reference in these words could not be to the postscript, which had then no existence, and I naturally thought that he referred to the resin, which is "a brown oxidized substance, referred to further on." I knew that he believed that the purgative property was not due to aloin; and I also knew that if all the aloin be extracted from aloes there is no "brown uncrystallizable substance which constitutes a considerable proportion of all aloes," except the resin, left, so far as I am aware, to which he could refer. I adopted this conclusion all the more readily that in 1872 Dr. Tilden, in an able paper, mentions as the "proximate constituents" of aloes only three—1, aloin and products of its decomposition and change; 2, resinoid matter; and 3, accidental ingredients; wisely omitting all mention of "aloetin" as a proximate constituent of aloes.

William Craig.

Edinburgh, May 4, 1875.

Is Saxifragra Tridactylites an Insect-Devouring Plant?

Sir,—The carnivorous proclivities of our British Droseraceæ and Pinguiculeæ have already been noticed in this Journal. These plants, like animals fed on abnormal food, present a different appearance to the "lighter feeding" species; the striking deficiency of (active) chlorophyll and their wan squalid leaves, not relieved as in the Pinguicula, or as in the Drosera somewhat brightened by the thick besetment of viscid red glands, mark them as distinct from ordinary plants. Possibly to these Saxifragra tridactylites may be added. The peculiar clammy feel of the plant, similar to Drosera, first led me to notice it more closely, and I then saw how each plant had one or more dead insects adhering to it. Some dozens of plants have since been submitted to examination, and in almost every instance the *débris* of some insect was attached to the leaves. Viewed under a two-inch objective the glands presented a very similar appearance to those of Drosera and secreted a viscid fluid on being irritated. The leaves compared with other plants are but sparingly supplied with chlorophyll though their slightly green colour is intensified on immersing in hot water. A small midge placed on the leaf had great difficulty in freeing itself from the clammy glands, and at last was held by them.

Experiments are wanting to ascertain if the insects are assimilated by the plant or if it is only a mechanical attachment. If the affirmative be proved it will extend the plant carnivora to another order and from a uliginal to a glareal or rupestral growth. The affinities between the Droseraceæ and Saxifragaceæ would moreover be strengthened by the occurrence of carnivora in both orders.

G. C. Druce.

Northampton.

Suppositories.

Sir,—Having to make two dozen suppositories this morning I thought I would try Mr. A. Ellis's plan, published in a recent Journal, with this modification—viz., using 2-inch squares of waxed paper instead of writing paper, folding them round a wooden mould I always use, and placing them in a dry sand-bath, thus saving both the time and trouble of wetting, inserting in bottle, and re-emptying moulds. Also pouring into the moulds from a small palette knife I consider an improvement.

They turned out a success, having a better appearance and shape than I had previously obtained when using tin foil moulds.

The excipient I use is as follows:—

Benzoated Lard	50 grains
White Wax	20 ,,
Cacao Butter	104 ,,

For twelve suppositories; which answers well both in summer and winter.

Fredk. B. Bingley.

Guildford, April 26, 1875.

In Memoriam.

It was with a shock of intense sorrow that I, in common, I am sure, with hundreds of others, read the announcement of the death of Daniel Hanbury, and I felt impelled to ask you for a few brief lines of space in which to pay a tribute to his memory.

I do not intend to say one word of his scientific attainments, of the loss which the profession has sustained by his death, but to tell the world of workers in the field in which he so diligently laboured something of the man whose loss they deplore.

Conscientious discharge of the duties that came to his hand was the characteristic of his life which cannot be too widely known or too closely imitated. Conscience dictated the path he should follow without swerving to the right or to the left, whether in business matters or in following his scientific studies, and the example he set should be known beyond the circle of those who had the good fortune to be brought into daily contact with him.

Of his widespread and unostentatious charity none but the recipients will ever know, for he was one of those whose left knew not what his right hand gave.

But to his tender regard for the feelings of others numbers are living who can bear witness; while many quondam despairing students must bless the day they first knew Daniel Hanbury. The extreme simplicity and blamelessness of his life will cause his memory and example to be cherished with the profoundest regret, and all who ever knew him must feel that by his death they have lost a valued friend.

Occupied as he was by business he still found time to perform prodigies of labour—now before the world—in those hours so often frittered away; and yet with all his occupations he never ceased to be, with a stern sense of duty, the true-hearted, kindly, gentle man who charmed all brought within the radius of his influence.

In the example of his unswerving sense of duty, his conscientious diligence and his faithfulness to the right, it may most truly be said that "he being dead yet speaketh."

A. C.

Paris, April, 1875.

Aucuba Japonica.—Mr. R. Goodwin Mumbray, of Richmond, writes respecting this plant, which although introduced nearly a century since has only fruited in this country during the past few years, that a medical friend has recently shown him a specimen bearing a large crop of scarlet berries, the size of hazel nuts. As the situation was very unfavourable for the pollen to have been carried to it by the wind, our correspondent thinks the fertilization was probably effected by bees who have conveyed the pollen from male plants situated as far distant as Kew or Wimbledon.

W. Bird.—Dynamite is a mixture of nitro-glycerine and some inert substance, generally a silicious earth. See *Pharm. Journ.*, Jan. 18, 1873, p. 563.

"*Minor.*"—We do not know of the existence of any such book.

"*Oxygen.*"—You are recommended to consult a dictionary as to the meaning of the word "anonymous."

E. J. B. We are not acquainted with any work of Lindley's, bearing the title you mention, which describes British plants. Babington's 'Manual,' and Bentham's 'Handbook' are the two most generally used for the purpose.

"*Competitor.*"—(1) Specimens of any trees included in Babington's 'Manual' are admissible. (2) Yes.

G. C. Druce.—(1) *Viola sylvatica*, var. *Riviniana.* (2) *Carex præcox.* (3) *Trifolium repens.*

S. C.—We presume you mean sarcosin, a substance formed by boiling creatin with baryta water. Its formula is $C_3H_7NO_2$. It is also a derivative of acetic acid. For a history of the same see Watts's 'Dictionary of Chemistry,' vol. v., p. 197.

W. Thomas.—We are unable to furnish any information respecting "those men who undertake to get one through the examinations."

Strychnia.—The change is probably due to the decomposition of the strychnia.

"*Stamp.*"—Your letter has been received, but the labels referred to in it were not enclosed.

Erratum.—On p. 882, col. i, line 38, *for* Mr E. Hefford *read* Mr. C. Hefford.

"*Plato.*"—We have no recollection of the appearance of any such paper.

"*Good Templar.*"—The published formulæ for inks and tooth powders and pastes are innumerable, and may be found in any good book of recipes. The other information you ask for we will endeavour to obtain.

R. Calvert.—You may obtain all necessary information by applying at the Patent Office.

N. M. Goose.—First put as much distilled water as you have oil to emulsify into and let it well moisten the sides of the bottle. Next add the oil and shake well. Then add the potash gradually and more water, shaking constantly till the whole has been added. The oil should be as fresh as possible and the potash free from carbonate. The proportion of the potash to that of the oil is scarcely sufficient to yield a very good result.]

F. Porter Smith.—Probably silica.

G. Taylor.—'The Handbook of British Plants,' by Lowndes Notcutt, published at 171, Fleet Street.

"*An Examined A.P.S. (Glasgow).*"—We cannot make our columns a medium for the communication of threats of personal violence. In other respects while the letter of our correspondent on the subject of the Glasgow memorial appears open to the reproach of being "scurrilous and malicious" its composition and spelling are not creditable to the author or to the fact of his having been examined.

J. B. L. M.—(1) It is the custom in London when "Ext. Aloës Aquasum" is ordered, to use Ext. Aloës Socotrin. B.P. When "Extractum Aloës" is ordered, the same should be used, because in the P. L., 1851, only the Extract of Socotrine Aloes was official, and it was there simply called "Extractum Aloës." (2) It is a name sometimes given to Syrup of White Poppies. (3) Oxide of Zinc officially described as "a soft, nearly white, tasteless, and inodorous powder, becoming pale yellow when heated." (4) We prefer to follow the orthography of the Pharmacopœia.

Communications, Letters, etc., have been received from Mr. Barrett, Mr. J. McCann, Mr. Wilkinson, Secretary of the Assistants' Section of the Glasgow Chemists and Druggists' Association, Secretary of the Bristol Pharmaceutical Association, A. P. S., "Dix Vera," "A Minor," "Pharmaceutist."

NOTES ON BRAZILIAN DRUGS.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

In this country very little is known of the drugs used in Brazil, although there are probably some to be found among them possessing considerable medicinal activity. In the catalogue of Brazilian drugs by Martius,* a number are enumerated and the medicinal virtues of many of them are described, but no description is given of the characters by which one drug may be distinguished from another. In different countries of South America the same name is applied to different drugs, if they possess somewhat similar properties; hence much confusion arises. Thus the jaborandi of Pernambuco is a Rutaceous plant, while the jaborandi of Paraguay is a species of *Piper*. On this account it is necessary that the physical characters of the drugs from the different provinces should be described, so that in case any of them are hereafter imported into this country there may be no difficulty in recognizing the particular kind required.

The following list is a description of some drugs lately presented to the museum of the Pharmaceutical Society by Messrs. Cyriax and Farries; the specimens were collected in the province of Rio, in Southern Brazil. For convenience of reference they are arranged in alphabetical order according to their native names. The specimens were accompanied by a manuscript list, drawn up by Dr. G. S. Barnsley, together with remarks upon the medicinal properties of the various drugs. Most of these appear to have been copied from Martius's work; only his original statements will be noticed.

Braço do Preguiça or *Velame*. This drug consists of large brittle leaves of a papery texture. They are, as far as can be judged from their broken state, about a foot long and nine inches broad, of a dark-green colour above, and white and hoary underneath. The hoariness is owing to the under side of the leaf being densely covered with stellate hairs which are almost entirely absent on the upper surface of the leaf. The veins are depressed on the upper side of the leaf and prominent beneath. The stalks and petiole are also densely covered with a thick coat of down, and with a number of linear brownish scales like those on the base of the fronds of ferns. The plant is referred by Dr. Barnsley to *Solanum jubatum*, Dumal. The leaves correspond exactly to specimens of that species in the British Museum. An entire leaf, however, sent with the drug, which is without scales on the petioles, is referable rather to *Solanum bullatum*, Vell. In the collection of the late Dr. Pereira the same drug occurs under the name of "Panacea," but from the fragmentary state of the leaves it is impossible to say to which of these two species it may belong. According to Dr. Barnsley, the leaves and root are used in the form of infusion or extract, and are considered to possess excellent antisyphilitic properties; they are also sometimes used as a purge.

According to Martius, Braço do Preguiça is used as a resolvent in congestion of the bowels and as an external application for cleansing and healing wounds and ulcers.

Bútua.—This root corresponds in structure and taste with true Pareira Brava root, but is of a more yellowish hue than is usual in that drug. A smaller piece, labelled "abutua negra," exactly corresponds with the usual specimens of true Pareira Brava met with in commerce, and is without doubt the root of *Chondodendron tomentosum*, R. et P. Dr. Barnsley states that it is used in the form of infusion, extract, and powder in chronic hepatitis, dyspepsia, etc. He makes one extraordinary statement with regard to this drug, for which I am totally unable to account:—"This root has a basic salt which unites with sulphuric acid, is white, etc., almost like that of cinchona. It is exported to Europe in great quantities to adulterate quinine." This salt has been examined by Mr. J. Moss, F.C.S., and proves to be sulphate of quinidine!

Caroba.—"This specimen consists of the leaves of two nearly allied plants, one of which has serrate and the other entire leaflets. The serrate-leaved species is known as 'Caroba paulistana,' and the one with entire leaves as 'Carobinha' or 'Carabo da muida.' The Carobinha consists of bipinnate leaves from 12—18 inches long, with 7—10 pair of pinnæ, each pinna having about eight pair of leaflets and an odd one; the leaflets are obovate, slightly unequal sided, sessile, but tapering below; the leaflets in size and texture resemble the leaves of *Chimaphila umbellata*. The margin of the leaves is entire, and the leaves are smooth on both sides and minutely dotted beneath, but the dots are not transparent. The petiole is slightly winged on its upper surface so as to appear canaliculate, and the rachis of the pinnæ is also slightly but more distinctly winged. The leaves appear to correspond well with those of *Jacaranda oxyphylla*, Cham."

The Caroba paulistana has leaves and leaflets similar to those just described; but the leaflets are serrate about the middle of the leaf and tapering at both ends, and minute hairs are sparingly scattered over the leaf. It seems to correspond well with the description given of *Jacaranda paulistana* in De Candolle's Prodromus. Martius gives this name as synonymous with *Jacaranda oxyphylla*, Cham., of which it may, perhaps, be only a variety. The leaves of both species have a distinctly bitter taste.

According to Martius, other species are also used under the name of Caroba. Among these are *J. procera*, Spreng., which has leaves abruptly pinnate with the pinnæ imparipinnate, and the leaflets elliptical, wedge-shaped, and obtuse; *J. subrhombea*, D.C., which has bipinnate leaves with both leaves and pinnæ imparipinnate, the leaves having not more than four pair of pinnæ, and the pinnæ not more than five pair of leaflets; *J. Caroba*, which has abruptly bipinnate leaves, with not more than four pair of imparipinnate pinnæ, and the pinnæ with not more than six pair of leaflets, which in this species are elliptical and serrate.

From the leaves are prepared an infusion, a decoction, and a fomentation, which are used in syphilis and skin diseases arising from it, in which, according to Dr. Barnsley, its effects are most marked. He states that it is a favourite remedy in Brazil.

Casca d'Anta.—This is a thick yellowish-white bark. Both the inner and the outer surfaces are smooth. When cut transversely the substance of the bark is seen to be made up of numerous resinous granules, the outer layer being very thin and stratified, of a purplish colour, infiltrated with yellowish powder (whether this powder be natural

* 'Systema Materiæ Medicæ Vegetabilis Brasiliensis.' Leipsic, 1843.

or of a fungous nature, I am unable to judge from the small piece received). The taste is bitter and slightly pungent. Dr. Barnsley attributes it to *Drimys granatensis*, Linn., which is certainly not correct, the bark of that tree being of a dark reddish-brown colour and its inner surface very rough. An infusion and a tincture of Casca d'Anta, according to Dr. Barnsley, are used in dyspepsia, debility, leucorrhœa, etc. He further remarks that it is a very valuable tonic, and that he prefers it to quassia or cinchona bark; that it is very abundant, and that the tree grows to an enormous size.

Cipó sumá.—This root occurs in pieces of a pale greyish-brown colour and of a very dense and horny substance, so much so that it is very difficult to cut. The pieces vary in thickness from that of the thumb to that of an ordinary lead pencil. The external surface is much wrinkled longitudinally and covered with numerous warts. A transverse section shows that the meditullium occupies nearly the whole of the root, is of a yellowish white colour, and is marked with a number of horny-looking undulating lines and innumerable horny dots. Under a lens each dot is seen to enclose a bundle of porous vessels. The bark of the root is scarcely distinguishable, except as a dark line at the circumference of the root. The taste is like that of a raw potato, but has a peculiar acridity like that of senega. Mixed with this root are a number of pieces of the stem of some species of *Aristolochia* of the same colour externally, but internally distinguished by having a large porous meditullium with distinct medullary rays, and by the outer bark being of loose texture, dark grey in colour, and about a line in thickness, the medullary rays running through it. It has a slight acridity only. Cipó sumá is referred by Dr. Barnsley to *Anchietea salutaris*, St. Hil., a Violaceous plant. He has probably followed Martius in this. Martius, however, only attributes the Sipó sumá of S. Paulo and Minas Geraes, not that of Rio Janeiro, to the above-named plant. A piece of the plant accompanying the root is certainly not *Anchietea salutaris*, since it has opposite leaves. As the specimen has neither flowers nor fruit it is not possible to identify it.

A FEW NOTES FROM THE FAR EAST ON OPIUM.

BY T. H. BATEMAN, PH.C.

Some of the details in the following notes will doubtless be familiar to most readers, especially to those who take an interest in the manner dwellers in the far east use the drug. Opium has been used as a medicine from the earliest ages, but the date of its being resorted to as a luxury is somewhat doubtful, though it is not at all improbable that it was coëval with its employment in medicine. As connected with a national vice it was not known until the spread of Islamism, when wine and fermented liquors being prohibited, in accordance with the teaching of the prophet, it came to be used in their stead together with bhang, coffee, and tobacco. The inhabitants of the Eastern Archipelago most probably imbibed their predilection for opium from the Arabs, although the particular manner of using it has been derived from the Chinese.

Notwithstanding that the consumption of opium in China is considerable, I think the number of debauchees would compare favourably with the number of drunkards in other countries. From my own observations I feel convinced that in a climate like that of China the drug in some form or other is a necessity. In the summer months diarrhœa and cholera are rife in the crowded, filthy, and ill-drained cities, and I have been frequently informed by the Chinese that a few whiffs from an opium pipe quickly dispel the sharp attacks of pain to which they are subject. In my occasional walks through Shanghae and its environs I have failed to discover (as described by one or two highly coloured articles found in the pages of some English monthly serials) groups of emaciated wretches lying or sitting about the doors of the opium shops. The consumption of the drug in China is large; but then the inhabitants are countless myriads, numbers of whom use the opium pipe as we do the tobacco pipe, namely, as a solace. Would it not be more desirable if the "quasi-philanthrophy" at present engaged in "worrying up" the "opium trade in China" would expend some of its superfluous energies at home? Surely, the neighbourhoods of St. Giles, Whitechapel, and similar dens of vice in every form, afford ample scope. "Ea sub oculis posita negligimus: proximorum incuriosi, longinqua sectamur."

The great bulk of Indian opium finds its way to China, but a few thousand chests meet with a ready market in the Straits Settlements. The mode in which opium sales are conducted in this port (Shanghai) and the manner in which it is stored is as follows:—On arrival it is received by some of the officers of the storage ships and placed on board, being held to the order of the various owners. Patna opium being prepared under the supervision of the British Government it is never deemed necessary by the native brokers to cut or sample it. The price being settled between the merchant and buyer, the vendor gives an order to deliver the number of chests as arranged; this order, being duly stamped by the Customs authorities, is presented to the official in charge of the receiving ship, and the drug is handed over without any further ceremony.

Malwa opium, however, is treated very differently. An order to inspect so many chests is presented with the price attached thereto; should the quality meet the approval of the purchaser, and the bargain be concluded, each chest is opened and three balls are chosen by the broker or buyer, as the case may be, and from each ball one-third is cut as a sample; these cuttings are then boiled down to test the quality more fully, and to prove to what extent adulteration has taken place. It is by no means uncommon to find sand added to increase the weight, in some instances to so great an extent that buyers refuse to take the opium, and cancel their bargain. After the cutting and weighing is completed it is again repacked, and the net weight marked on each chest, and as a further safeguard to the new owners a strip of paper, on which is printed the Chinese firm's name, is pasted on the top and bottom of each end of the chest. It is now ready for delivery, and is taken away in large or small quantities, as may be most convenient, subject always, however, to the pleasure of the Maritime Customs.

The amount of opium cultivated in China is small compared to that imported, but the native drug cannot be smoked without previous admixture with the foreign, as it causes some affection of the skin the nature of which is unknown to me. Frequent edicts are issued from the throne against its culture on pain of forfeiture of land, and imprisonment. This difficulty is overcome by a little judicious "palm greasing" to the local mandarins. I have by me at present a specimen of the native drug from the Szechuan Province. Its external appearance presents none of the characteristics of either Malwa or Patna opium, it being hard, somewhat brittle, and without "odour." In fact, it closely resembles a specimen of opium from Gipps' Land which I had the opportunity of examining whilst at 338, Oxford Street. The average yield of morphia in native opium is 1·5 per cent., although some authorities (!!) state the yield to be 6 or even 8 per cent.; a sample containing such a percentage as the latter has never unfortunately fallen into my hands.

2, *Nankin Road, Shanghai,*
March 25, 1875.

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.*

BY J. BURDON SANDERSON, M.D., V.P.R.S.,
Jodrell Professor of Physiology in University College, etc.

LECTURE III.

(*Concluded from page* 870.)

Another reason why no method based on the separation of the living contagious particles could possibly be successful is, that the particles themselves, if removed from the conditions adapted to them, would in all probability, as a direct consequence of that change, entirely alter their properties. Even organisms much higher in the scale, for example, many plants containing active principles, become inert when removed from an appropriate to an inappropriate soil. Much more, therefore, should we expect a similar result in the case of organisms, the vital processes of which are so much more under the influence of conditions.

Considering these difficulties, I set myself last year to consider whether there might not be methods of investigation within reach, which, if they did not come up to the strict requirements of the problem, might help us to approach it. If, it occurred to me, in any disease capable of propagation by the insertion of a contagium containing recognizable living organisms, however minute, it were in our power to observe the behaviour of these organisms during and after the act of infection, even if it were impossible to separate them from the contagious liquid or substance along with which they were introduced into the body of the infected person or animal, we should be able, by comparing the transformations or other manifestations of vital activity in the lower organism or parasite, with the functional derangements and textural changes in the higher organism resulting from the infection, to ascertain with the utmost precision the nature of the relation, if any, between the two series of phenomena. If this method could be carried out, I thought it might be anticipated with great certainty that it would be possible by means of it to determine in the particular case, that the one process is or is not the efficient cause of the other.

As regards many infective or contagious diseases, the application of such a method would be impossible, for we have no sufficient knowledge either of the door by which the contagium enters, or of its whereabouts in the organism after its entrance. In the case of small-pox these difficulties do not exist; and of all human contagious diseases it is theoretically the most fitting for such an inquiry. We have the virus, we have the organism, we have the process. We know how the virus enters. We know how it is scattered over the surface as thistle down is scattered over a field; and how each seed sown serves as a centre of origin for a morbid process, complete in itself. If we could—imitating Dr. Weigert's method, but carrying it out much further than he did—not merely search for our organisms at the sixth day, but at each successive period in the local process, from the first sign of functional disturbance in the rete Malpighii at the seat of the future papule, to the maturation of the pustule, and could trace the two developments—that of plant-life on the one hand, and that of pathological and structural change on the other—going on side by side; and, as has been already explained, see that both were correlative manifestations of the same action, the object would, as regards small-pox, be accomplished.

But here we are met by an insurmountable practical difficulty. No opportunity is ever likely to be afforded us of investigating the pathological anatomy of small-pox in those early stages about which it is most important to obtain information. Happily, comparative pathology affords us a means of circumventing this difficulty. In the sheep there is a disease which, as regards its origin, progress, and local manifestations, is the very counterpart of human small-pox.

The virus of sheep-pox, as I had the opportunity of observing in 1869, contains organisms similar to those of small-pox and vaccine. The analogy, therefore, is complete—so complete, indeed, that whatever can be ascertained by observation as to the behaviour of the organism of sheep-pox within the body of the infected animals, might be applied with the greatest confidence to the elucidation of the corresponding processes in human disease. On these grounds, I suggested to the Chief of the Medical Department of the Government that my colleague at the Brown Institution, Dr. Klein, should be requested to undertake an anatomical investigation of the disease, for which I was enabled to obtain material through the kindness of Professor Chauveau, of Lyons, and Professor Cohn. The results have been already communicated to the Royal Society, and will shortly be published in the *Philosophical Transactions,* as well as in the forthcoming Report of the Medical Officer of the Government.

Before giving a short account of them, I must refer for a moment to well known facts relating to the development of the pustule in human small-pox. Each pustule must be regarded as what is called in pathology a focus of inflammation—an acute process which has a centre of origin. Where is this centre? If we refer to a diagram of the skin, as to a map, we fix the first localization of the process at the junction-line between corium and epithelium, *i.e.*, between the structure called the rete Malpighii, and the very vascular layer beneath it which forms the papillæ. Let us consider what lies on each side of that line. Above it there are small cells, polygonal and closely packed—the growing cells of the epithelium. As you trace the stratum upwards, they flatten, then suddenly change their character and become horny. This we call the natural *stratum corneum.* Below the line referred to, there are papillæ composed of a dense but transparent tissue, so closely packed with loops of capillaries that, when these are distended, it looks as if it were all blood-vessels. Below this is a layer where there are fewer vessels, but they are still very numerous.

The anatomical changes in the structures of the corium and epidermis which result in the formation of the small-pox pustule have their principal seat and origin on either side of the well-defined line, which, as I have just said, separates in a vertical section of skin the rete Malpighii from the vascular tissue of the papillæ. Above that line, the pathological processes consist at first merely in overgrowth—*i.e.*, in germination of the cells of the deep layer of the epidermis; but, as it progresses, two remarkable changes occur. Cavities (the future "vesicles" or "cells") form in the Malpighian layer, which are at first full of clear liquid, afterwards of pus; and, secondly, the epidermis-elements appear to fuse together into a horny material.

---

* Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal.*

This horny material constitutes not only the covering of the vesicles, but the septa by which the adjoining cells are separated from each other; and it is by the shrinking which attends its formation that the central depression afterwards observed is produced. In the corium, on the other hand, the lymphatic spaces fill, the tissue swells, and thus the prominence or "papule" is formed.

In sheep-pox, the same changes take place; but they have been much more completely studied, as I have said, by Dr. Klein. To save time, I must carefully avoid all that, however interesting, is not essential. Let me draw your attention once more to the rete Malpighii and to the superficial lymphatics of the cutis. In the rete, there is at first a general germination. Then certain cells become distinguished as being larger; these expand by vacuolation; they become cysts. The cysts coalesce, and thus are formed cavities (the cells of the older pathologists) in the thickened rete. In the corium, we have filling out of the tissue by liquid, which occupied the interfasicular spaces of the lymphatic network. Then (tracing the process further) we observe that, in the rete, the vesicles continue to enlarge, and their contents alter. Instead of containing clear liquid with granules, they are full of pus-corpuscles. In the corium, the change is of the same nature, but goes on earlier; the whole tissue becomes inundated with leucocytes.* This inundation begins from the lymphatics, the appearances being such as to suggest an obstruction or blocking up of these vessels. Rapidly the tissue of the corium becomes fuller and fuller of corpuscles, the final act being the extension of the cellular inundation to the rete Malpighii. How do they get there? They are certainly not formed in the vesicular cavities. Dr. Klein has no doubt that they migrate into the vesicles from the papillary layer below, by virtue of their amœboid movements.

As yet I have said nothing about the organisms. It will be remembered that Dr. Weigert found them only in the early stage of the pustule of small-pox; so here it would be in vain to look for them in the stage of suppuration. With this consideration in mind, Dr. Klein devoted his whole attention to the early changes. I may as well state at once that the anticipation that the early stages of the papule would be accompanied by the development of vegetation has been realized. The process has been studied both in the primary inoculation-pustules and in the general eruption, with results which may be thus stated. From the first, the cavities in which liquid collects, whether the lymphatics of the corium or the vesicular cavities of the skin, begin to show indications of containing organic forms. As the process is observed in sections made at various stages, its nature becomes more and more manifest. At first, it might be said, "Oh, these are merely the ordinary septic organisms with which we are familiar." Soon, however, this becomes impossible. First, the form which is most characteristic—that of the *rod*—is entirely absent. Secondly, the stage of the process is not that at which ordinary septic bacteria present themselves. In all infective inflammations, when they assume the destructive character, bacteria may appear in the inflammation-products, but they never appear in the early stages of the process.

Then, finally, the development of the vegetations, whether it was examined in the primary pustules or those of the general eruption, whether in the corium or epidermis, presented everywhere the same characteristics—characteristics which differed entirely from anything we have up to this moment had under our consideration. It consisted in the formation of a felt-work of extremely delicate filaments, which, although they were not jointed, were unquestionably branched, and gave off at the growing ends minute acrospores or conidia, after the manner of the fungi of the penicillium group. These mycelia were first discovered in the initial stage of the disease in the lymphatics. Although the most scrupulous precautions were used—the portions of skin examined being plunged in the absolutely fresh state into alcohol—the fact was so strange, so unexpected, that it could hardly be credited. Whatever doubt, however, existed, was at once removed when it was found that the development was repeated in the "cells" or vesicular cavities of the epidermis, the same forms exactly presenting themselves; and the intimate relation of the whole process to the disease was rendered still more certain when it was observed that, on the appearance of the secondary eruption at the tenth day after inoculation, each of the small papules was an epitome of the large one, not only as regards the structural changes, but also as regards the evolution of plant life which was associated with it.

* From an abstract just received of Dr. Weigert's further researches on small-pox, it appears that the migration of leucocytes takes place in the pustule of this disease in the same way as above discussed in sheep-pox.

NOTE ON ARICINE.*

BY DAVID HOWARD.

Dr. Hesse, in his paper on the cinchona alkaloids, in the *Annalen der Chemie und Pharmacie*, clxvi, f. 259, a translation of which is published in the *Pharmaceutical Journal*, vol. iv., 750, calls attention to the very unsatisfactory state of our knowledge of aricine, the very existence of which he is inclined to doubt.

At the time when Pelletier (*J. Pharm.*, 1829, f. 565), Manzini (*ibid.*, 1842, f. 95), and Winkler (*Repert. Pharm.* [2], xxxi., 294; xlii, 25, 231-3, [3], 1, 11) wrote on the subject, the barks containing aricine appear to have been plentiful in commerce; but the importers, finding them utterly valueless, have never, as far as I can learn, repeated the experiment of importing them, and thus, unfortunately for science, it is impossible to obtain a sufficient supply of the bark to make a satisfactory investigation of the alkaloid.

It seemed, however, so desirable to obtain some fresh light on the subject, that although the quantity of the aricine-yielding bark, *Cinchona Pelletieriana* (Wedd), which still remained in the collection of my uncle, J. E. Howard, F.R.S., was too small to give much hope of a sufficient supply of alkaloid for a full investigation, he placed a large portion of it at my disposal, and I have carefully examined it; and though I am unable to decide the composition and properties of the alkaloid contained in it, I can at any rate say with considerable certainty that it is perfectly distinct from any other of the cinchona alkaloids.

The bark yields a large quantity of quinic acid, differing in no respect from that of the other cinchonæ, and a small quantity of quinovine, undistinguishable from that already known, yielding quinovic acid by treatment with hydrochloric acid gas; but I failed to obtain any trace of cinchotannic acid or cinchona-red. It also contains an intensely yellow colouring matter, little soluble in water, but freely soluble in spirit, to which it gives a beautiful green fluorescence.

The study of the alkaloid presents special difficulties; solutions of the crude alkaloid change very rapidly when exposed to the air, the colour speedily deepening from pale yellow to dark brown, and the quantity of material at my disposal did not enable me to complete the purification. But when the alkaloid was obtained approximately pure, all the distinguishing reagents for the well-known cinchona alkaloids were carefully applied, and proved it to be different from any of them. It is scarcely possible that any impurity should have so masked their properties as to prevent their being recognized, if present. The alkaloid is freely soluble in ether; solutions of its salts give no sign of crystalline precipitate on the addition of sodio-potassic tartrate. The iodide is moderately soluble

* Read before the Chemical Society; from the *Journal of the Chemical Society*, April, 1875.

in water, and will not crystallize either from aqueous or from spirituous solutions. The sulphocyanate is very slightly soluble in water, and the solution does not yield any alkaloid crystallizable from ether; the platinum salt also dissolves with difficulty in water. We may therefore pretty confidently assert that neither quinine, quinidine, cinchonidine, cinchonine, nor quinamine is present, while the constitution of the platinum salt, of which I shall speak below, and the property possessed by the pure alkaloid of crystallizing from ether, sufficiently distinguish it from quinicine or cinchonicine, and the amorphous alkaloid usually contained in cinchona bark.

On the other hand, the gelatinization of the solution of the sulphate, described by Pelletier, is very well marked, even in dilute solutions, but I failed to obtain the sulphate crystallized from spirit that he describes. The addition of nitric acid, or of a nitrate, throws down a yellow precipitate from solutions of these salts; this may be owing to the presence of paricine.

A small quantity of the pure alkaloid, prepared by my uncle in 1847, which he had preserved, gives me the opportunity of adding an observation of the optical properties, which are also distinctive. A solution in alcohol of 90 per cent. showed a specific rotatory power of 63° for the yellow ray.

A portion of this alkaloid gave a platinum salt, which lost 4·63 per cent of water at 105°, it then gave on ignition 13·88 per cent. of platinum; some of my own preparation precipitated cold by platinum chloride from a solution in hydrochloric acid, gave a salt, which, when dried at 100°, gave 13·93 per cent. of platinum; to another portion the platinum chloride was added when the solution was boiling; it showed signs of decomposition, and a considerable quantity of a resinous precipitate separated, and after filtration a salt was deposited on cooling, which gave, dried at 100°, 16·16 per cent. of platinum. This last number most nearly agrees with the percentage 16·31 given by Manzini for the platinum salt of cinchovatine.

The wide divergence of these results from those given by the platinum salts of quinine and its congeners is very remarkable, and points to an altogether different constitution of the salt, strongly confirming the opinion that the alkaloid is distinct. It is hardly to be doubted that the authors who have already described this body are right in taking this view.

The properties of the alkaloid, as well as the composition of the platinum salt, tend to show that it belongs to the interesting, but comparatively little known group of alkaloids comprising paricine and berberine, and it is most probable that more than one is contained in the aricine barks.

SULPHOVINATE OF QUININE FOR HYPODERMIC SOLUTIONS.*

BY DR. P. JAILLARD.

The author, after alluding to the limitation in the practice of administering quinine hypodermically in consequence of the inconveniences sometimes arising from the slight solubility of the salts usually employed, states that this difficulty may be entirely avoided by the use of either an acid or neutral sulphovinate of quinine.

The acid sulphovinate of quinine, which has been described by Schlagdenhauffen,† is white, difficultly crystallizable, and very hygroscopic. It is rapidly altered by heat, and contains only 56·25 per cent. of quinine. It is obtained by the reaction between 54·8 parts of acid sulphate of quinine, and 42·3 of sulphovinate of baryta, both salts being previously dissolved in distilled water. The liquid is filtered to separate sulphate of baryta, and then gently concentrated by means of a water-bath.

The neutral sulphovinate of quinine is, however, the salt specially recommended by the author; it being non-hygroscopic and slightly alkaline, and containing a larger proportion of quinine, viz., 72·16 per cent. It is white, solid, and crystallizes in silky non-deliquescent tufts. It is very soluble in water and in alcohol, and is insoluble in ether.

An aqueous solution of the neutral sulphovinate prepared with 1 part of sulphovinate, and 2 parts of distilled water keeps perfectly at an ordinary temperature. It does not exhibit the fluorescence of the solution of the sulphate; it has a bitter taste, and perceptibly blues red litmus paper.

The neutral sulphovinate can be prepared by adding 8·71 grams of ordinary sulphate of quinine to a boiling solution of 4·27 grams of sulphovinate of baryta in 100 cubic centimetres of distilled water. After boiling some time the whole is thrown upon a filter, and the clear liquor is tested to ensure that the double decomposition has been complete. If the examination should demonstrate that either of the salts is in excess it is indispensable that such excess should be decomposed by the careful addition of a sufficient quantity of the other salt. The solution is afterwards evaporated by the aid of a water-bath until it is reduced to an oily liquid, which upon cooling forms a crystalline mass. This should be dried either by submitting it to pressure, or by placing it under a glass over quicklime, before reducing it to powder. This salt may be used in the preparation of hypodermic injections, as follows:—

Neutral Sulphovinate of Quinine . .	1 gram.
Distilled Water	2 „

Dissolve with the aid of a gentle heat.

Sulphovinate of soda may be used instead of sulphovinate of baryta in the preparation of this salt, operating in the presence of alcohol. But the product thus obtained is not so soluble as the former, and requires for its solution four parts of water instead of two.

PHARMACY IN ITS RELATIONS WITH MODERN MEDICINE.*

BY WILLIAM H. SPENCER, M.B. CANTAB., F.L.S.

The title of a discourse, whether written or spoken, generally serves one or other of two purposes. It serves either to give information or to raise expectation. In the former case the title is in the nature of a guide to an intending reader or listener; the trouble of reading or listening may be avoided if the purport of the discourse be distasteful, or if it seems likely to be dull. In the latter case the reader or listener is placed in a dilemma; he must wade through or listen to the whole of the discourse before he can tell what it is all about, or on the other hand he must leave it alone altogether with the feeling that he may have missed something that would have pleased him.

I am afraid that the title I have affixed to my discourse may have placed some of you who have come to listen to me to-night in the position of the listener in a dilemma. Nor do I well know how to make amends for this. I am afraid I must ask you to hear me through and then find out what it has all been about, settling whether the whole thing has been insufferably dull or satisfactory. But at least I will try to help you to follow me as I go along by giving at the outset a brief outline of the argument of my discourse.

I suppose it would be taken as a matter of course that there should exist relations, and most important and intimate relations, between medicine and pharmacy. But unanimity would probably vanish directly the attempt was made to substitute for vague assertion of general relationship any specific and definite relations, and there would be still greater difference of opinion as to the

---

* *Répertoire de Pharmacie*, [N. S.] vol. iii., p. 102.
† *Pharm. Journ.* [3], vol. iii., p. 682.

* Read before the Bristol Pharmaceutical Association, March 25, 1875.

degree of importance of particular relations. This diversity arises, I think, chiefly from two causes. First, a universal tendency to identify the scope and limits of any department of practice with the interests of those who practise it, or of those on whose account it is practised. Medicine and pharmacy both, in various degrees and at different epochs in their history, illustrate the operation of this cause. The kind of relations that such a way of looking at the matter creates between two related arts may be termed "sociological" and "commercial." Whether men associate for duty or interest, or dissociate for similar reasons, so long as the necessity or preference exists for such relations so long will they be of prime interest and importance both to medical practitioners and pharmacists. The error that is liable to attach to this view is the mistaking those exigencies of practice that arise out of men's association for the conditions imposed on the cultivation and practice of our art by the state of knowledge of the art itself. I may observe in passing that there has been no greater obstacle to the growth and development of arts than this mistake.

A second cause of the diversity of opinion as to what are the particular relations between medicine and pharmacy and what the degree of their importance may be, is to be found, I think, in misapprehension or ignorance of what an art really is—and more especially what constitutes a scientific art. And if there be this misapprehension or ignorance, the conception of an art is pretty sure to take the shape of the particular interests of the persons who practise it. Now, practice of any kind implies an end or purpose, and this purpose is the satisfying a need. In the absence of distinct conceptions of what the needs are which govern the purpose of an art, these needs are sure to become the individual needs of him who practises it. Men need houses in which to live in comfort and safety, and to supply this need is, or ought to be, the purpose of the builder's art.

If, as I am afraid is too often the case, the comfort, to say nothing of other more important needs of mankind, should be set aside for the interests of the builder himself and other trades with which he is connected, then we should have an illustration of the misapprehension of which I speak.

I reject all relations that come from such modes of looking at our respective arts, and found what I have to say upon a logical, and therefore correct, appreciation of what a scientific art really is.

Any art consists in a body of maxims of practice or rules, together with the knowledge, more or less accurate, upon which the rules are founded. The rules are what is commonly called the art; they are the immediate grounds of the practice or doing. The knowledge constitutes the reasons for the rules, for what is done. There is no art so rude but that some reasons may be given for its rules of practice; the position of an art in the scale of arts depends on the validity of its reasons, that is on the quality of the knowledge upon which its practice is based. If we can give no better reasons for our practice than that experience justifies it, though such reasons are valid enough in their way, the art is in the condition of an empirical art; it is not scientific at all. I must, however, make a reservation here to avoid misconception. Do not think that I am crying down experience. Experience is either the confession of ignorance or the test of truth. Used in the former sense it characterizes the empirical art; in the latter sense it is one of the weapons of scientific research. On the other hand, if the rules of an art are founded on knowledge of a higher quality, if we can justify our practice by an appeal to knowledge in that form which is called science, *i.e.*, to knowledge we know to be true—then the art is a scientific art.

Now the rules of an art belong to that art and not necessarily to any other, and the knowledge that is mere empiricism is the property of the art to which it refers. But the knowledge of the higher quality, the knowledge which has been tested and found to be true, which has been generalized and organized into methodical arrangement—this highest kind of knowledge that we call science—is the common property of all arts that can claim to be beyond the stage of empiricism; the claim to this kind of knowledge establishes a community, a relationship between arts which is the highest and most enduring relationship that can exist.

This is the relationship between medicine and pharmacy that I propose to deal with to-night; this relation that comes of a common appeal for the reasons or grounds of practice to knowledge in its highest form.

Both arts now assuredly, however deeply in days gone by they may have struggled in the darkness of the slough of empiricism, are emerging fast into the daylight of science. The rules by which the practitioner of each is now guided can own a better and a surer warrant than blind experience can give; their methods are the methods of scientific observation and reasoning; their aims are true knowledge concerning nature.

So then, I have supposed that if I—as one much interested and occupied in what belongs to the scientific aspects of the medical art—were to come down and from my stand-point give you—who are much interested and occupied in what belongs to the scientific aspects of the pharmaceutical art—some thoughts of mine about these our scientific relations, I might perhaps not unprofitably occupy your minds as I have certainly profitably occupied and gratified my own.

And, to complete the argument, I have thought of medicine and pharmacy as scientific arts, whose material is very different and whose rules of practice and final purposes are distinct, but which in their respective fields seek to work out their purposes by similar methods of research and by the application of the principles and results of the same two departments of science—physics and chemistry to wit. It is this use of similar methods and this common application of physics and chemistry that constitutes the particular scientific relationship about which I desire to speak. The use of these methods and the influence of these two sciences have given special features and a special direction to medicine. In my view thereby is imposed on pharmacy an obligation to develop or acquire corresponding special features and to pursue a corresponding direction.

Before I proceed to detail what these special features are in the one case and should be in the other, let me justify the position that there should be any correspondence at all, let me explain the obligation. And for greater clearness I will throw the idea into the concise form of a proposition—"That the condition of medicine and the direction in which it is tending at any given time ought to be reflected in the condition of pharmacy, and the direction in which it is tending at the same time."

This proposition shall be imperfectly and briefly proved by some abstract considerations—by showing the necessity on philosophical grounds of the reciprocal relations.

I have said that practice implies an end or purpose, and that purpose is the satisfying a need. This has been the starting-point of my thoughts, and when reduced to the concrete expression of what are the actual purposes of medicine and pharmacy, this abstract statement will give an exact definition of the nature and scope of those respective arts. The statement requires no proof—no one would deny it. It is expressed in the fact that arts usually precede science,—that is the knowledge on which they are founded. The need that things should be done causes attempts, rude at first, to do the things, then by the exercise of the art the ways of doing are improved, and science later on still further improves the practice and furnishes reasons and grounds for the rules. If we start from the other end, and look at the matter from another point of view, the statement holds good. Science in the abstract is founded on a need, the need for knowledge,—on the condition that the knowledge be true,—and its end is to collect, to verify, and to communicate knowledge. Then science naturally falls into departments, for the facts of nature are not all of the same kind, and this division of natural phenomena must be preserved and indicated in the divisions of science. And, when all the available knowledge about all departments of Nature has been collected and arranged, it will be found that what we have got is really assertions about matters of fact. We have got knowledge, but it is not on that account of any use to us—we have got what is called "pure science." In medicine and pharmacy both we have a good deal of pure science, and it is rather in the way than otherwise, as some people think. At least, it introduces difficulties, one of which I see your own Pharmaceutical Society has groaned over, and which may be sufficiently described by the question—"How is a man to live whilst he prosecutes pure science?" It is quite certain that in these times pure science will not feed and clothe its votaries, and yet these votaries themselves and their fellows need to be fed and clothed. These sort of needs, connected with the conditions under which mankind exists, necessitate that our knowledge, whether in the form of pure science or not, should be made use of—applied. Thus we get applied science, or what may, perhaps, with more propriety be termed practical science. And just as in science there are departments corresponding to the different kinds of natural phenomena, so there are numerous departments of practice corresponding to the varied wants and needs of human beings. Thus, whether we build up from the origin of art or pass downwards from the state of an art when it has become scientific, we find that an art is defined, marked out by its purpose or end.

The purpose or end of pharmacy originates in the needs and demands of medicine. Man needs that his health be secured, that disease should be prevented, alleviated, and cured; and to this end the art of medicine exists. To fulfil its end, medicine requires also means and agents—preventive and remedial agencies, let us say. We may be sure that so soon as the desire or necessity for dealing with bodily ills arose, the necessity for means to deal with them would also arise. To provide these agencies is, I take it, the final purpose and end of pharmacy. It is the proper business and function of the pharmacist to provide the physician with those agencies wherewith the physician may proceed to fulfil the purpose and end of his art. This way of looking at their respective final purposes at once links medicine and pharmacy in the closest bonds of union and separates them as distinct departments of practice. And so, I think, it ought to be. This way of looking at the matter, too, regards the pharmacist in a very different aspect to that of the mere dispenser of physicians' prescriptions or the compounder of drugs according to legalized formulæ. The dispenser, important though his functions be, is not necessarily a pharmacist in the sense in which I would use the term, as one who practises a scientific art. In putting the matter in this way, I do not mean that the physician simply asks for drugs which he enumerates and for whose preparation he gives directions in a standard Pharmacopœia, which drugs and which preparation the pharmacist supplies and performs. Viewed from the side of art alone, the practice of the physician is to apply known remedies, when he has brought his case under certain rules. From the scientific side, the physician constructs the rules according to which he is to act from the data of the case and the knowledge he possesses. In both cases, the problem presented is one of causation, an inquiry into cause and effect. But in the first case, what may be termed the practical view of causation is taken, that is certain prominent, serious, or critical circumstances are selected as being practically and for the purpose efficient causes. In the other case, cause is to the physician an aggregate of numerous, complicated and interacting conditions or circumstances all concerned positively or negatively in the causes and effects. Take, for instance, the action of drugs—to say nothing of the conditions connected with disease itself; a drug, more especially a vegetable substance, may have many possible ways of acting consequent on the complicacy of its composition or properties. The question then is what is the precise property of the drug that affects the system or what the circumstances of the system that co-operate in producing the effects. Here a large field is opened up to the pharmacist. The physician may appropriately need that the pharmacist should by his work at least eliminate and disentangle such circumstances as depend on the composition and properties of the agencies with which he has to do. The physician, meanwhile, will have his hands full enough if he concerns himself with inquiry into the conditions which belong to the body and its derangements—the things with which he has to do. Time would fail me to pursue the analysis further, and, in this way, to state other specific and detailed purposes which mark off medicine and pharmacy as distinct departments of scientific practice. I have said enough, I will hope, to set you thinking, if you are so minded, for a long while. I have been particular upon this point, because I think that though these relations, through need and purpose, that I have sketched out, are recognized in a general way and are certainly acted upon, yet, being admitted, fallacious ideas as to the grounds of the relations and as to what they involve and lead to are not uncommonly entertained.

I am conscious that much of this that I have said is neither new to you nor other than very dry discourse. Let me then now invite your attention to what may perhaps prove more interesting. Let us inquire into the parallel history of medicine and pharmacy with a view to see if any light can be thrown on this matter of reciprocal relations by the relations and circumstances that have existed in the past. We may find that it would have been better had such relations been acted up to; we may find that progress has been hindered because such relations have not been acted up to; or perhaps we may find that the principle involved has been gradually evolved out of the past.

The starting-point in such an inquiry would naturally be where first we meet with a well-defined distinction between the art of preparing remedies and the art of using them. But it will be, if I mistake not, interesting and helpful to go back further than the comparatively late period at which such a distinction first appears. I shall therefore, make no apology for going back to the beginning of the stream of medicine and conducting you rapidly through its whole course.

The beginning of the main stream of pure medicine, true to nature, is in the conjunction of little rills. In the midst of gross superstition and idolatrous rites the first records of reason and experience appeared. Very ancient medicine is a very dark page and very ancient pharmacy was, so far as I can see, quite as dark.

The deity Isis by her anger caused all diseases, and Isis by her favours cured such as she pleased. Such was the medicine and pharmacy of the ancient Egyptians, and they were the first nation, so far as we know, that cultivated medicine. Even down to the time of Galen several compound remedies in the materia medica bore the name of the Egyptian deity Isis. Among the Greeks, every evening was burned in the temples dedicated to Isis a composition that contained sixteen drugs, and the sick were made to sleep in the temples in order that the oracles might reveal to them the remedies they should use to their cure.

The origin of medicine was much the same in all countries.* Greece has the credit of having first evolved system, or what may pass for system, out of the chaos of superstition. Pythagoras, who lived B.C. 580, practised and enjoined a life of sobriety as one of the means of preventing disease. He used plants in medicine and knew the virtues of squill, aniseed, mustard and the cabbage; but then these virtues were, to Pythagoras, magical, and

* Corresponding to the priest-physicians of Egypt Greece had her caste, the sons of Æculapius.

were evoked by divination and magical rites. One of the followers of Pythagoras, Alcmæon, may be said to have been the first anatomist. But as to anatomy, this study as an aid in medicine was really only commenced at a very late period, in consequence of the stringent laws of every religious creed. The knowledge of human anatomy was entirely speculative up to A.D. 1315, when Mondini de Luzzi first dissected the human subject before his pupils.

What was good and useful in the knowledge of his predecessors was gathered up by Hippocrates (the "Father of Medicine"), B.C. 460, who, on a basis of experience and philosophizing, founded scientific medicine. Hippocrates divided medicine into three branches, dietetics, pharmaceutics and chirurgics. The practice of these times was, however, extremely rude. The practice of pharmacy was of this kind: euphorbium was one of the few known purgatives, but it was acrid; to diminish the acridity the then pharmacopœial directions ran thus, "pour the juice drop by drop on dried figs." Thus a remedy for dropsy was manufactured.

The immediate followers of Hippocrates constitute the "dogmatic" school, and we may dismiss them with the reflection that they illustrate the truth of a wise modern saying that "men often dogmatize most who are least supported by reason."

The first beginnings of that store of knowledge of things from which afterwards the materia medica was selected is associated with the conquests of Alexander the Great, and of Philip of Macedonia.

Aristotle (B.C. 384) had, thanks to Alexander, unrivalled opportunities for the prosecution of scientific research in natural history, and he used them well. To him, and to his successor, Theophrastus, who did for botany what Aristotle did for zoology, medicine and pharmacy are indebted in no ordinary degree. During the time of the Ptolomies, who succeeded Alexander, science flourished and progressed greatly. It will not be out of place just to point to Ptolomy the First, the King of Egypt, as an example even to us very advanced moderns of what may be done for knowledge by an enlightened ruler. Ptolomy founded at Alexandria a society called "Museum," the members of which were maintained at the public expense in order solely to carry out philosophical research, and to advance science and the arts; subsequently this institution became the most celebrated school of medicine in the world. This was 300 years before the Christian era. The vast extension of commerce at this time caused a great development in the knowledge of drugs, and attracted the attention of physicians to this department especially.

Then arose the empirics, a school that gave rules for observing and rejected theory. This school regarded chiefly symptoms, and sought by observation a knowledge of how diseases could be most readily cured. What the empirics themselves made of their doctrines, although they gave a type to the healing art in subsequent ages, may be gathered from the mode of treating epilepsy as practised by a celebrated empiric, Serapion. This mode consisted in the administration of camels' brains, the excrement of the crocodile, turtle's blood, and such like things. I cannot avoid a piece of satire here, for which you must forgive me. Young ladies afflicted with anæmia and phthisis 2100 years after Serapion's time, only a year or two ago, were wont to resort to the slaughter-houses of Paris to drink the warm blood of fresh killed bullocks! The pharmacists, true to their vocation, have provided an extract of bullock's blood made up in the form of pills.

Two centuries before the Christian era much attention came to be bestowed on toxicology. Attalus Philopater, who died B.C. 133, left the cares of his kingdom, Pergamus, to cultivate in his garden poisonous plants (aconite, hyoscyamus, and hemlock), and to devise antidotes against them. The name of his successor, Mithridates, is familiar enough in pharmacy; his antidote of fifty-three ingredients beats poly-pharmacy out of the field. Asclepiades, who lived B.C. 90, must not pass without notice. He, aided by his successor, Themison, founded the "Methodic school, which aimed at a correct practice by reducing pathology to a few principles from which indications for treatment could be easily seen.

Arrived at the Christian era, Celsus's name comes naturally as the first of note. But beyond the fact that Celsus was an industrious collector of what others had said and done, and wrote elegant Latin, his influence on medicine would appear to have been small.

About this time (A.D. 100) we get the first important treatise on materia medica in a learned and complete account, in five volumes, by Dioscorides, of the then state of natural history and remedial agencies. In this work nearly 1000 articles were described, and it remained a text-book down to modern times.

The methodic school did not survive long, and was split up into others, of which the chief was the "Eclectic" school. The eclectics tried, what others have often tried to do since, to reconcile discordant opinions as to medicine and its practice, and they selected from each system that which they deemed best.

Archæus was a celebrated eclectic, and an enlightened practitioner, who used many remedies with discrimination, and pursued medicine in the true Hippocratic spirit. To show how often knowledge gained from the ancients, supposed to have been due to remarkable genius or industry, is only the brilliant guesses of a philosophical imagination, I may cite this supposition of Archæus. He supposed that the nerves did not pass or grow from their origin to their termination in straight lines, but crossed each other like the letter X, and passed so to opposite sides, and he actually thus explained the fact that when the head has been injured on one side, the other side of the body suffers. Now Archæus never dissected in his life; his supposition was a brilliant deductive hypothesis.

(*To be continued.*)

ANILINE BLACK MARKING INK.

The following directions for preparing Dr. Jacobson's aniline ink for marking linen are quoted from *Dingler's Journal* in the *Moniteur Scientifique* for April:—

The ink is prepared by means of two solutions, one of copper, the other of aniline, composed as follows:—

(1). *Copper Solution.*—8·52 grams of crystallized chloride of copper, 10·65 grams of chlorate of soda, and 5·35 grams of chloride of ammonium are dissolved in 60 grams of water.

(2). *Aniline Solution.*—20 grams of hydrochlorate of aniline are dissolved in 30 grams of distilled water, and to this are added 20 grams of solution of gum arabic (1 part of gum to 2 of water) and 10 grams of glycerine.

By mixing in the cold 4 parts of the aniline solution with 1 part of the copper solution, a greenish liquid is obtained, which can be employed directly for the marking; but as this liquid can only be preserved a few days without decomposition it is advisable to keep the solutions separately until the ink is required for use. The ink may be used either with a pen or a stencil plate and brush; if it do not flow freely from the pen it may be diluted with a little water without fear of weakening the intensity of the colour. At first the writing appears of a pale green colour, but after exposure to the air it becomes black; or it may be changed to a black colour immediately by passing a hot iron over the back of the fabric, or heating it over the flame of a spirit lamp. As, however, a dry heat is apt to make the fibre saturated with the ink brittle, it is preferable to hold the marked fabric over a vessel containing water in full ebullition; the heat of the vapour is sufficient to determine almost immediately the reaction by which aniline black is formed.

After the steaming the writing should be washed in hot soapsuds, which gives the ink a fine blue shade. The ink is not acted on by acids or alkalies, and if care be taken that the fibres are well saturated with it there is no danger of it being removed by washing.

The Pharmaceutical Journal.

SATURDAY, MAY 15, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE ILLEGAL SALE OF POISON.

THE papers of last Monday contained reports of an application made to Mr. COOKE, the magistrate at the Clerkenwell Police Court, which serves to show that many persons are not aware of the liabilities they incur by selling any of the articles included in Schedule A of the Pharmacy Act.

As stated in last week's Journal, an oil and colourman in Islington was fined for selling oxalic acid without a label bearing the name of the substance, and the word " Poison," as prescribed in clause 17 of the Act. We took occasion to point out that this was not the only infringement of the Act which had been committed in this case, inasmuch as clause 15 provides that any person who sells a poison under any circumstances without being registered as a Pharmaceutical Chemist or Chemist and Druggist as the Act provides, commits an offence which renders him liable to prosecution, and to the payment of a penalty of five pounds for every such offence. This penalty may be sued for and recovered in England and Wales by plaint under the provisions of any Act in force for the more easy recovery of small debts and demands, and in Scotland by action before the Court of Sessions, the Sheriffs of Counties, or the Magistrates of Burghs.

In fact, any person who sells poison, without possessing the legal qualification of the chemist and druggist, thereby renders himself liable to a special penalty over and above the penalty to which he, in common with the chemist and druggist, would be liable for selling poison without conforming with the regulations of the Pharmacy Act.

It appears from the statement of Mr. ALDRIDGE that since he was fined last week he has received a letter from the Solicitor of the Pharmaceutical Society informing him that he has incurred a penalty of five pounds, under section 15 of the Pharmacy Act, and that in default of payment proceedings will be taken against him. The magistrate of course told him that so far as his court was concerned he had nothing further to do with this matter, and that the applicant should consult his solicitor. No doubt if he adopts this course he will learn what is actually the position in which he has placed himself, and will find reason to regard the sale of poisons as a business not likely to be profitable to him. It may, therefore, fairly be expected that, so far as he is concerned, there will be no further need to complain of interference with the proper functions of chemists and druggists in this respect.

We have thus prominently referred to this case because the numerous complaints that have reached us as to the illegal sale of poisons serve to show that the practice is very general, and that it amounts sometimes to a serious interference with the business of the chemist and druggist. In the course of the discussion that took place last week, several members of the Council expressed the opinion that the authorities of the Society had hitherto been too lenient in regard to this matter, and it was now high time energetic measures should be taken with the object of enforcing the provisions of the law.

We fully concur in this view and consider that if in addition to the propriety of observing the law any further argument were needed to show that action is desirable at the present time, it may, we think, be gathered from the derisive and defiant tone of some letters which have appeared in the *Standard* upon the subject. Thus, for instance, a correspondent of that paper, signing himself " Cornish Miner," referring to the letter of the Secretary and Registrar of the Pharmaceutical Society, explaining how it was that Mr. ALDRIDGE had made himself liable to a twofold penalty, expresses himself confident that it " will not fail to raise a smile in many quarters." In justification of this belief he goes on to say that although he is not on the Register of Chemists and Druggists he has often sold arsenic but has never been fined, and that he has just sold 700*l.* worth of it unhindered and without undergoing prosecution. The " Cornish Miner " evidently classes the Pharmacy Act and the Register of Chemists and Druggists with the kobolds and bogies which miners are familiar with as being very often talked about but very seldom seen, and his letter merely demonstrates his individual want of information as to the law affecting the sale of poisons.

Another correspondent signing himself, " A Colourman," writes in a somewhat indignant strain, and asks how he is to carry on his business in supplying people with paints and plaster of Paris if he is to be prosecuted for selling poison? His opinion of the labelling of poisons is that you may as well seek to compel tradesmen who deal in razors and revolvers to label them dangerous, and he evidently entertains a profound disbelief in any powers of the Pharmaceutical Society to enforce regulations as to the sale of poisons, or to protect the members of the drug trade from illegal competition, or interference with their proper business.

Obviously there is need of enlightenment among colourmen as well as Cornish miners, and as the Pharmaceutical Society is charged with the enforcing of a law intended for the public protection, it is no less on that ground than out of regard for the interests of those it has more immediately to consider that it is incumbent upon the Society to make its power felt and respected.

M. DUMAS' REMEDY AGAINST PHYLLOXERA.

About six months ago it was mentioned in this Journal (before, p. 404) that M. Dumas had recommended a solution of an alkaline sulphocarbonate as an effective insecticide, especially suited to cope with the phylloxera which have ravaged so seriously several of the wine districts of France. The sulphocarbonates are compounds of sulphide of carbon with metallic sulphides, which are slowly decomposed with evolution of sulphurretted hydrogen. The importance of such an announcement, if it should prove well founded, may be estimated by the fact that apparently from a dread of introducing this pest the Government of Italy has forbidden the importation of plants of every description into that country after the 18th inst.

The vinegrowers of France will, therefore, have heard with pleasure, from M. Dumas' recent report to the Academy, that actual experiment has shown that the alkaline sulphocarbonates act very energetically against the phylloxera without injuring the vitality of the vines, in fact, in some cases the vines have apparently been invigorated by the application. The phylloxera are reported to disappear wherever the solution of a sulphocarbonate penetrates; the penetration into the soil being favoured by rains, as the salt is soluble in water. At first the sulphocarbonate of potassium was used, but experiment has shown that an equal weight of sulphocarbonate of sodium is even more efficacious, whilst it is less expensive.

The sulphocarbonates not being commercial salts it has been necessary to initiate a new manufacture; the price is probably, therefore, higher now than it will eventually become. But at present the cost of sufficient to dress a hectare of land is estimated at from 100 to 150 francs.

THE APPOINTMENT OF A PUBLIC PROSECUTOR.

We are glad to notice that on Monday night the Home Secretary stated, in reply to a question put in the House of Commons, that it is the intention of the Government to introduce a bill during the present session to provide for the appointment of a public prosecutor in England.

THE BANK HOLIDAY.

Few acts of the Legislature have received so widespread and immediate adhesion, not only to their letter, but to their spirit, as has attended the Bank Holidays Act. We venture to express a hope that Monday next may show no falling off in this respect, especially amongst chemists and druggists. It is with satisfaction we learn that the Society's School of Pharmacy will not be open on that day.

Mr. Francis Sutton, of Norwich, has been requested to supply the apparatus and chemicals required by the Arctic Expedition for their experiments on the specimens of sea water which they will collect in the course of their voyage.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

May 12th, 1875.

Present: Messrs. Allchin, Benger, Bottle, Carteighe, Corder, Haselden, Linford, Martindale, Moss, Schweitzer, Taylor, and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

One candidate was examined, and declared qualified to be registered as a Pharmaceutical Chemist, namely:—

Herbert, John .... Kingston-on-Thames.

MINOR EXAMINATION.

Eight candidates were examined. *Six* failed. The following *two* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jackson, Henry John ....Bawtry.
Varney, Henry George ....Oxford.

These names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned Certificate was received in lieu of the Society's Examination:—

Certificate of the College of Preceptors.

Jones, Ivor Lloyd.................Swansea.

NORTH BRITISH BRANCH, EDINBURGH.

Annual Meeting.

The annual meeting of the North British Branch was held in the Society's rooms on Monday forenoon, 10th May, at 12 o'clock, Mr. W. Gilmour in the chair.

The Chairman called on the Secretary to read the following annual report:—

The Annual Report.

The Council have much pleasure in submitting for approval the usual annual report of the proceedings of the North British Branch of the Society during the year 1874.

Removal from the rooms formerly occupied was effected in the month of May last. The reasons for the change from St. Giles Street were so fully given at the time, that no further reference need be made, beyond reminding the meeting that additional space was urgently required to carry on the business of the Society in all its departments. Increased accommodation having been obtained in the present rooms, and at a less annual rent, the Council have much pleasure in intimating, that the existing arrangements are most comfortable, and suitable in all respects for the purposes of the Society.

In the large front room the museum is now seen to some advantage, while the cabinet for the use of students, containing as it does specimens of nearly all drugs and preparations in the Pharmacopœia, is found well adapted to assist those who are preparing for their examinations. This room is also available for conducting the Preliminary examinations, while, for the Minor and Major, space is afforded for distinct tables, at which are conducted the oral examinations on prescription reading, botany, materia medica, pharmacy and chemistry.

The centre room forms an admirable library and general reading room, while during the examinations a large dispensing counter, with all convenient appliances, is here used for practically testing efficiency in this department.

The back room, which is of a convenient size, has been fitted up as a laboratory, with benches and all other conveniences, and here the Minor and Major candidates perform their practical chemical work in connection with their respective examinations.

The numbers who have presented themselves before the Edinburgh Board during 1874, are as follows:—Preliminary, 134; Modified, 22; Minor, 180; and Major, 6—in all, 342. The results of these examinations having from time to time been published in the *Pharmaceutical Journal*, no farther reference need be made excepting an expression of regret that so many have failed to pass. With this feeling in regard to the number of failures, the Council express a hope that there may be for the future a complete change, and that young men knowing the requirements will better prepare themselves for the different subjects on which they are to be examined. It may also be noticed that the number of applicants in September was exceptionally large, arising doubtless from a desire to escape the practical chemical work, which came into operation in the beginning of October.

In connection with the examinations in Scotland the Council have again to notice the kindness of the London President, Mr. Hills, for having so handsomely provided a fund from which to give a prize of books to the candidates passing highest in the first division at the Minor examinations in Edinburgh.

The following is a statement of the operation of this fund during the year 1874:—

Cr.

		£	s.	d.
March 18.	Cash paid for Books to B. L. Mackay, Inverness	1	0	6
May 12.	Cash paid for Books to G. A. Shum, Edinburgh	1	0	3
July 30.	Cash paid for Books to R. K. Currie, Glasgow ..	1	1	0
Sept. 22.	Cash paid for Books to C. J. Cowper, Edinburgh	0	19	0
Dec. 31.	Balance over and carried to next year's account	0	18	7
		£4	19	4

Dr.

		£	s.	d.
Jan. 1.	Cash in Bank	2	10	0
June 5.	Cash from London	2	9	4
		£4	19	4

The Council are glad to find from the Secretary that he has issued in connection with the Branch during the past year thirty-five tickets for lectures on chemistry, materia medica, and botany.

The scientific meetings for the session just closed have been six in number. The subjects introduced were deeply interesting, and the meetings well attended. To those gentlemen who have contributed papers the Council beg to tender their warmest thanks.

Thanks are also offered to those who have made presentations to the library and museum. The names of Mr. D. R. Brown, Mr. Baildon, and Mr. Tait are especially worthy to be remembered for having been so liberal in their donations.

The opportunity afforded of using the museum and reading-room has been fairly taken advantage of. Thus, from January 1st to December 31st, 1874, twelve hundred and forty-eight visits have been made by young men, while from the commencement of opening the rooms for this purpose in January, 1873, up to the present date, no fewer than two thousand six hundred and two visits have been made; the names entered daily in the visiting-book proving the correctness of this statement. Last February a division was made in entering those who used the rooms before four o'clock and those who came after seven in the evening. The result of this will be communicated in the next annual report.

The demand for books from the library has also improved. The books show that during last year 160 volumes have been given out, while from January 1st, 1875, to beginning of May, 50 volumes have been in use.

The Council refrain from making any remarks upon the Adulteration Act now in process of being amended. They have not been uninterested in its progress, and beg to thank the London Council for the assistance they have given and the care they have evinced, in their endeavour to render the operation of such an important Act more perfect and less objectionable than it has hitherto been.

It is with regret the Council feel compelled to notice a memorial recently sent from Glasgow to the London Council, wherein special reference is made to the Board of Examiners in Scotland, with certain inferences regarding the operation of the examinations generally upon young men entering the business of chemist and druggist. It cannot but be viewed as a matter of satisfaction, that the tenor of the memorial, so far as can be judged by public expression, is considered unfair and uncalled for by a great majority of those connected with pharmacy in the West of Scotland. The aim of the Society has always been to make the Council and Board of Examiners fairly representative bodies for Scotland, and if the Society has at any time failed to carry this out, it has arisen entirely from difficulties in the way of getting parties to act. At present there are four representatives from Glasgow in the Council, and one from the same city in the Board of Examiners, and those belonging to the former cannot but feel that the course followed by their brethren in the west has shown an apparent want of courtesy in not having taken means to indicate the nature of the memorial which they intended to send to London, more especially as it has transpired that in framing the document it was conveyed that the Edinburgh brethren were at one with the memorialists, while such was not the case. Other three gentlemen from the country in addition to four from Glasgow have seats in the Council, and it will be for the voting to-day to declare whether the members from a distance are to form a greater proportion than 7 out of 15.

It may be farther remarked that the constitution and appointment of the Scotch Board of Examiners is somewhat different to the election of to-day, inasmuch as, the Council just about to be elected will, as usual, be called upon in December to nominate eight parties to act as an examining board. This nomination must be approved by the London Council, and confirmed by the Privy Council. Any names therefore of qualified pharmaceutical chemists who are desirous of acting as examiners in Edinburgh, will be gladly received and fairly submitted, as in the past, along with the present members, for consideration before sending the list up to London.

As to the examination having produced a dearth of assistants and apprentices, or as to the question of the present fees being changed, the Council would rather, in the meantime, refrain from giving an opinion. They would simply object to any alteration of a system which only came into operation so recently, after full consideration by the two Examining Boards, the Government Assessors, and the concurrence of the Privy Council. Six months they feel is too short a time during which to test whether the alteration has been right or wrong, and the Council have no doubt that if after a fair trial injustice has been done or any error committed, matters will be so arranged as to give satisfaction to all.

The Council cannot close the report without alluding to the sudden and unexpected death of Mr. Daniel Hanbury. They feel that the removal of so able and gifted a man must be felt not only as a loss to the cause of pharmacy in this country, but throughout the continent of Europe and in other places where his name and labours were so well known and so highly appreciated. Modest and unassuming in manner as he was highly gifted intellectually, his memory cannot fail to be cherished in connection with our own Society, whose interests he had so much at heart, and in whose cause he so successfully laboured.

The approval of the report was moved by Mr. Davison, Glasgow, and seconded by Mr. Blanchard.

Mr. Currie, of Glagow, explained that no discourtesy whatever was intended to the Edinburgh Board in the memorial which had been sent to the London Council. He further explained that the feeling in Glasgow was not of a personal kind, but was simply an objection to the system pursued in regard to the election of Council and Board of Examiners. He thought that members of both boards ought to be drawn from a wider area than hitherto; in other respects he had no fault to find with the report of the Council, but hoped that ere long an Examining Board would sit and act in Glasgow if not twice, at least once a year.

Mr. Mackay explained that from the very first Glasgow and other parts of Scotland had been kept in view in forming the local Committee, while in regard to the Board of Examiners several unsuccessful endeavours had been made to get parties from Glasgow and elsewhere to act upon the board. He knew that he only expressed the feelings of the Council in Edinburgh when he stated, that they would at all times be glad to receive the names of qualified parties to take a share in the examinations, and reminded the meeting that the month of December was the proper time for sending up a list of names to London for appointment and approval by the Privy Council.

Mr. Anderson, of Musselburgh, was glad to hear an explanation from Mr. Currie that there was no want of courtesy intended by their Glasgow friends to the Board of Examiners in Edinburgh. He had long thought, however, that the fees retained by the Society in cases of failure were excessive, and ought to be reduced.

Mr. Fairlie, of Glasgow, took exception to the paragraph in the report wherein a remark was made in reference to their Edinburgh brethren not being acquainted with the nature of the memorial proposed to be sent to London. He certainly had conferred with the President and Vice-President of the North British Branch in regard to some of the leading points in the memorial, while for the preamble to the said memorial, which seemed to be the objectionable part of the document, he felt himself chiefly responsible. He begged, however, distinctly to disclaim any intention to slight the Board in Edinburgh, for the members of which he had the greatest respect, and, as already stated, he had less hesitation in making this statement as he might be considered the author of the preamble itself.

Mr. Kinninmont, of Glasgow, said that he had supported the memorial up to a certain point, but he repudiated entirely the obnoxious attack which had been made on the examiners in Edinburgh. He thought his Glasgow friends were called upon to make an apology, for as yet no proper retractation had been made. He also bore testimony to the fact that he himself had repeatedly tried, but in vain, to get some of his friends in Glasgow to allow their names to be put in nomination for the Board of Examiners in Edinburgh.

Mr. Currie said Mr. Kinninmont was a party to the whole thing, he and other two having had the memorandum to draw up, but he did not know until afterwards that Mr. Kinninmont had not seen the memorial before it was finally sent to London. He (Mr. Currie) thought they had no power to withdraw the memorial.

Mr. Kemp, of Portobello, thought the meeting was losing sight of the object they had in view. The question before them was one of courtesy. He had frequently seen individuals belonging to public bodies of which they themselves were members acting injudiciously towards their fellow members—and this seemed to be a similar case, as Mr. Fairlie and others in Glasgow belonged to the Edinburgh Council, and he thought they ought to have communicated the intentions of the Glasgow meeting more thoroughly than they did. So far from the fees being reduced in cases of failure, he thought they should be increased, as young men were constantly coming up unprepared, and thus costing the Society a good deal of money.

After some remarks from Mr. Anderson and Mr. Davison, Mr. Tait, as Chairman of the Board of Examiners for Scotland, thought Mr. Currie and Mr. Fairlie ought to withdraw that part of the memorial where discourtesy was plainly inferred. From his long connection with the Board he begged to state, that there was considerable difficulty to get suitable men to act as examiners. Besides, the whole subject of examination was discussed before the deputation went to London, and he considered it too premature to make the attempt to change the system which it had been decided fairly to try by a majority of all concerned.

Mr. Gilmour was glad that the subject had been so fully discussed. He expressed his regret that the movement in the west had not been conducted somewhat differently, because there was but one feeling in Edinburgh and he could not express this too strongly, and that was to take their Glasgow friends along with them in any matter connected with the encouragement of true pharmacy and the operations of the North British Branch of the Society.

Mr. Young took exception to Mr. Fairlie founding so strongly upon sending notices regarding business meetings of the local Association, in Glasgow, and reminded him that the Council meetings of the North British Branch were entirely of a different character to those of any other Association in Scotland.

The Chairman then put the report to the meeting which was carried unanimously;—Messrs. Currie and Fairlie requesting the following notice to be inserted as part of the meeting:—

"The Ex-President and Secretary of the Glasgow Association were present, and previous to the adoption of the report of the Council disclaimed that there was any discourtesy intended on the part of the Glasgow memorialists, either in the preamble or substance of the memorial, with regard to the Scotch Board of Examiners."

The Secretary then intimated the result of the scrutiny by the Committee appointed to count the votes, and declared the following gentlemen to be duly elected as Council for 1875-6; the names are arranged alphabetically, and not according to number of votes:—William Ainslie, Edinburgh; H. C. Baildon, Edinburgh; James Buchanan, Edinburgh; George Blanshard, Edinburgh; Wm. Duncanson, Stirling; Thos. Davison, Glasgow; Daniel Frazer, Glasgow; Wm. Greig, Glasgow; Alex. Goan, St. Andrews; Wm. Gilmour, Edinburgh; David Kemp, Portobello; Alex. Kinninmont, Glasgow; A. Seath, Dunfermline; Wm. Tait, Edinburgh; James R. Young, Edinburgh.

Mr. Davison proposed, and Mr. Young seconded, that Mr. Gilmour be appointed President for another year.

Mr. Tait proposed, and Mr. Ainslie seconded, that Mr. Kinninmont, Glasgow, should continue as Vice-President; both these appointments were carried unanimously, and with acclamation.

Committee for library, museum, and general purposes:—Messrs. Young, Ainslie, Gilmour, Baildon, Buchanan, Kinninmont, and Tait.

Mr. Blanshard proposed, and Mr. Davison seconded, that Mr. John Mackay should be asked to continue his services as Honorary Secretary.

After a few remarks from Mr. Gilmour, Mr. Kinninmont, and Mr. Mackay, the meeting adjourned.

The Dinner.

The Council and other friends dined together in the evening at the Balmoral Hotel. Mr. Gilmour in the chair, and Mr. Kinninmont croupier.

The following toasts were proposed and responded to:—"The Queen" and usual loyal toasts were given by the Chairman, who also proposed the toast of the evening, "The Pharmaceutical Society;" "The Council in London" by the Croupier, responded to by Mr. Mackay; "The Honorary Members in Scotland," responded to by Professor Archer; "The Lecturers to the Society in Edinburgh" by Mr. Tait, responded to by Dr. S. Macadam and Dr. Craig; "The Memory of Jacob Bell" by Mr. Kemp, of Portobello; "Friends from Glasgow" by Bailie Blanshard, responded to by Mr. Rait; "The Chairman" by Mr. Ainslie; "The Secretary" by Mr. Noble.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eleventh general meeting of this Asssociation was held at the Royal Institution, April 22nd, Mr. A. H. Mason, F.C.S., President in the chair.

Donations to the library of *The Pharmaceutical Journal*, and the *Canadian Pharmaceutical Journal*, and to the museum of a specimen of Carnauba Root from Dr. Symes, were received and thanks voted to the donors.

The President then said: Gentlemen,—It is with extreme pleasure that I comply with the request of Mr. Thomas Morson, and in his name present to the Association this beautifully executed portrait of his father, the late Mr. Thos. Newborn Robert Morson. It was the previlege of some present to have enjoyed his personal friendship, but he has left behind a name so well-known to chemists throughout the world, that I need not say more than express a hope that this picture will for many years adorn the walls of our museum, and that he will be looked upon as an example for us to follow, and our students to emulate. I beg to move, "That the best thanks of the Association be given to Thos. Morson, Esq., F.C.S., of London, for his acceptable donation to the museum of an admirably faithful portrait of his father, the late Thos. Newborn Robert Morson, Esq., F.C.S. who was so highly esteemed by the members."

Mr. Abraham seconded the motion. He had had the pleasure of a personal acquaintance with Mr. Morson during many years. He believed that Mr. Morson was the first and most distinguished of those who devoted themselves to the preparation of the vegetable alkaloids, and other active constituents of vegetables, when these came into demand fifty years ago and subsequently. He was a talented and useful man, kind, hospitable, and genial, and was much loved in a large circle. The portrait was an excellent likeness.

The motion was carried unanimously by acclamation.

Dr. Symes made some general remarks on carnauba root, which he described as a new remedy from Brazil, acting as an alterative, and used as a substitute for sarsaparilla. He also exhibited a sample of extract made by adding 1 lb. to a gallon of water, and heating to boiling point. It is then allowed to stand, strained, and evaporated to 12 ounces, 4 ounces of rectified spirit are then added He also exhibited a fine sample of salicylic acid, and spoke of its use as an antiseptic, especially calling attention to the fact that it is not poisonous.

Mr. Abraham said that carbolic acid ought to be conspicuously labelled "poison." He had spoken to the late Dr. Calvert on this point.

Mr. Parnell, F.C.S., then read a long and interesting paper on "The History of Bleaching Powder," of which the following is an abstract:—

The ancient method of bleaching cotton and other fabrics by exposure to the influence of air and sunshine was exclusively used in Great Britain up to about eighty or ninety years ago, and is still employed to a great extent in many civilized countries. This method of bleaching, which was very practicable a hundred years ago when the turn out of cotton goods in England was something like one-five-hundredth of what it is at the present time, became gradually, as the trade increased, a very serious drag upon this important industry. It is easy to understand, therefore, that the attention of manufacturers and inventors was called to the importance of introducing some improvement in the operations of bleaching. We are indebted to the French chemist Berthollet for the idea of applying chlorine for this purpose. This gentleman, who was practically engaged in dyeing and bleaching operations, observed that an aqueous solution of chlorine readily bleached vegetable colouring matters; he applied it most successfully on the large sale for his bleaching operations, and very soon chlorine water came into general use among bleachers. The compound of lime and chlorine known as chloride of lime or bleaching powder was discovered by Mr. Charles Tennant, of Glasgow, in the year 1798. This body on being dissolved in water gave a solution possessing similar properties to those of chlorine water, but at the same time could be easily stored and transported. Its advantages were quickly recognized, and the demand for it rapidly increased, bleachers preferring to pay an extra price for their chlorine to the disagreeable alternative of manufacturing it on their own premises. The manufacture of bleaching powder has steadily increased up to the present time, the present annual turn out in Great Britain being something like 100,000 tons.

The process of its manufacture as carried out by Mr. Tennant received very little modification up to within the last six or seven years. It consisted of two distinct operations, first, the production of the chlorine, and secondly, its absorption by slacked lime. The chlorine is produced by the action of hydrochloric acid, obtained as a bye-product in the alkali process, upon native binoxide of manganese. This operation is performed in stills, made of large stone flags, fitted with suitable openings for admitting the manganese, steam, and acid, and allowing the escape of the chlorine. The latter gas is conducted by pipes to the absorbing chambers, which are usually made of sheet lead in a manner similar to those used for the condensation of sulphuric acid. Lime of first-class quality carefully slacked and sifted is placed on the floor to a depth of about six inches, and on the doors being closed and luted the gas is admitted through the roof. The latter is very quickly absorbed by the lime, and the resulting bleaching powder usually contains about 36 per cent. of chlorine.

The various methods that have been proposed for the recovery of the manganese employed in the generation of the chlorine were then described, special attention being directed to the process invented by Mr. Walter Weldon, which is now becoming universally adopted. Mr. Parnell concluded with a sketch of the chemical nature of bleaching powder, and of the various analytical methods employed for its valuation.

The paper was illustrated throughout with experiments.

Mr. Davies proposed a vote of thanks to Mr. Parnell, and suggested that as it was late, the discussion should be adjourned to the next meeting.

Mr. Murphy seconded the motion, which was carried by acclamation. The discussion was adjourned.

The twelfth general meeting was held at the Royal Institution, May 6, 1875. The President, Mr. A. H. Mason, F.C.S. in the chair. Several donations to the library were received and duly acknowledged.

The President exhibited a sample of artificial vanillin, made from coniferin, and possessing the powerful odour of the natural product.

The President then called upon Mr. E. Davies, F.C.S., to open the discussion on Mr. E. Parnell's paper on "The History of Bleaching Powder."

Mr. Davies said that his remarks would be of an unconnected character as he did not intend to review the whole subject. His opinion was that bleaching powder is a loose combination of chloride and hypochlorite of calcium, based on the production of hypochlorous acid when a dilute solution was distilled with sulphuric acid added to semi-saturation, and from the analogy of the reaction when chlorate of calcium was formed. With regard to the quality of manganese as dissolving readily or with difficulty he had devised a method for getting some idea by making a coarse powder of definite size, and heating in a water-bath with hydrochloric acid of 24° Tw. The comparative time required to dissolve the manganese gives a fair idea generally, though in a case where the manganese was intersected with thin veins of quartz it had failed.

Mr. M. Murphy, F.C.S., said that he had been acquainted with the manufacture of bleaching powder for twenty-six years, and gave a description of the method employed at first. Whilst the arrangements for making the chlorine had been wonderfully improved, the absorption of it had been neglected. The necessity for men to have to enter the chambers and turn over the half-saturated lime, and to pack it when finished, was barbarous and inhuman. The inhalation of chlorine and the dust of the powder was exceedingly injurious—produced phthisis—and the work could only be carried on by the use of large quantities of whisky. It was time that some mechanical means should be discovered. He mentioned Dr. Muspratt's work on bleaching powder, and concluded by objecting to the method of testing bleaching powder, in which the proto-sulphate of iron was used, as giving results 1½ to 2 per cent. too high.

Mr. Armstrong spoke of the value of Mr. Parnell's paper, and thought that the Association might be useful in giving hints to practical men. He thought by an arrangement similar to a proof stick in sugar manufacture, exposure to chlorine in taking samples at least might be avoided.

Mr. Parnell replied at length. He did not consider that the composition of bleaching powder had been absolutely settled. With regard to chlorine in the chamber, when the packing had to be done in well-regulated works the excess of chlorine was siphoned off before opening the chamber. He thought that any arrangements for mechanical agitation of the lime and packing would necessitate too expensive a plant.

A cordial vote of thanks to Mr. Parnell concluded the meeting.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

The eighth and final meeting of the session was held in the West Hall, Anderson's University, on Wednesday, the 28th April, at 9 P.M., Mr. John C. Hunter, A.P.S., President, in the chair. There was a large attendance of members. The minutes of the preceding meeting having been read and confirmed, Mr. William MacKenzie, A.P.S., delivered a most interesting lecture "On the Detection of the Fourth Groups of Metallic Oxides."

At the conclusion of the lecture several members made a few remarks, and the Chairman proposed a hearty vote of thanks to Mr. MacKenzie for his very interesting and instructive lecture, which was carried by acclamation.

The Secretary (Mr. John Foster) then read the annual report. In the report the Committee congratulated the Association that the number of members on the roll for this session is 96, against 25 last session. This great increase of members was attributed to various causes; foremost among which was mentioned the library, which, although not very extensive, is exceedingly select. There being a sum of £20 still in hand for the purpose, the library will receive during the coming session a large addendum. The assistants are reported to have proved themselves worthy of a good library by the advantage they have taken of the, as yet, necessarily small one. Another source of interest and instruction has been the microscope, for which the Association is indebted to the kindness of Messrs. Evans, Sons, and Co., of Liverpool. The President, Mr. John C. Hunter, has kindly given both time and talent in mounting a very large number of interesting objects. Thirty-seven members have availed themselves of the tutorial class, and the Committee is confident that it will enable many to pass the Preliminary examination. The chemistry class under the supervision of Professor Dittmar has also been a decided success, twenty members having enrolled themselves for the same. A botanical class has just been formed, which is conducted by William Keddie, Esq., F.R.S.E. This class has every prospect of being successful, twenty-three members having already joined it. During the past year six members of the Association have passed the Preliminary examination, six have passed the Minor examination, and two the Major examination; not a few of these have passed with honours. The Committee report that in the arranging and getting up of the syllabus no difficulty was experienced. The Committee regret, however, that so little has been done in a matter of such vital importance as early closing, although the Association has discussed the matter again and again. The several committees appointed to call on refractory members have had little or no success to chronicle. The general statement is that the contingencies of their businesses and their pockets will not allow them to close at the same time as their more liberal-minded and large-hearted neighbours. The Committee, however, is confident that early closing will never be brought about by framing and moving compulsory motions respecting office-bearers and members. The Committee closes its annual report by acknowledging some handsome donations received from members of the Association, amongst which were the President's donations of microscopic objects and books, and Mr. R. S. Neilson's donation of books, including 'Spon's Workshop Receipts,' 'Attfield's Chemistry,' and 'Green's Botanical Dictionary,' 2 vols.

Mr. Simpson moved that the report be adopted, which was seconded by Mr. William De Nance, and unanimously agreed to.

A few more members were then enrolled for the botanical class.

The Secretary (Mr. John Foster) intimated that the new President of the Senior Section of the Association (Mr. William Greig, New Apothecaries' Co.) had presented three guineas to purchase books for the most proficient in the several classes, which are about to terminate for the session. The Secretary was instructed to write and acknowledge Mr. Greig's generosity.

The election of office-bearers and Committee for next session then took place, which resulted in the following:—President, Mr. John C. Hunter, A.P.S. (re-elected); Vice-President, Mr. William MacKenzie, A.P.S.; Secretary, Mr. John Foster, A.P.S. (re-elected). Committee: Messrs. J. Fotheringham, W. De Nance, J. Bardsley, J. M. Nicol, R. K. Currie, and W. Wallace.

The Secretary proposed a vote of thanks to the retiring office-bearers, which was warmly responded to.

SUNDERLAND CHEMISTS' ASSOCIATION.

The annual meeting of the above Society was held on Wednesday evening, May 5th., Mr. Harrison Thompson in the chair.

The following officers were elected for the ensuing year:—President, Alderman Thompson; Secretary, Mr. J. J. Nicholson; Treasurer, Mr. R. Robinson. Council: Messrs. J. Harrison, H. Thompson, Nasbet, Lord, Chakman, Priestly, Mitchinson, Turnbull, Sayer, Sharpe, Clarke.

The following resolution was brought forward by Mr. J. Harrison, and unanimously agreed to—

> "That this Society being deeply impressed with the unequal state of the law by which Pharmaceutical Chemists are exempt from service on Juries, whilst Registered Chemists and Druggists, who discharge the same duties and incur equal responsibilities, enjoy no such exemption; desires to urge upon the Council of the Pharmaceutical Society the necessity of taking such steps as may tend to bring about a more equitable and satisfactory state of the law."

BRISTOL PHARMACEUTICAL ASSOCIATION.

A meeting of this Association was held on Friday, April 30, when a lecture "On Some of the Phenomena accompanying a Change of Physical State" was delivered by Mr. Thomas Wills, F.C.S. We shall take an early opportunity of printing the lecture in the *Pharmaceutical Journal.*

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, May 6, 1875. Dr. Odling, F.R.S., Vice-President, in the chair. After the ordinary business of the Society, Professor N. S. Maskelyne read a paper on "Andrewsite and Chalcosiderite," the former of which is a new mineral from Cornwall, named after Professor Andrews. There were also papers entitled "An Examination of Methods for Effecting the Quantitative Separation of Iron Sesquioxide, Alumina and Phosphoric Acid," by Dr. W. Flight, and "On Sodium Ethylthion-sulphate," by Mr. W. Ramsay. Mr. J. Williams, in his communication "On a Milligrade Thermometric Scale," proposes to substitute the freezing and boiling points of mercury for those of water, and to divide the scale into a thousand parts. Mr. C. Griffin exhibited and described some new gas furnaces, which are very economical and of great power. The meeting finally adjourned until the 20th May, when the following papers will be read:—1. "Note on Milk in Health and Disease," by Mr. A. Smee, jun.; 2. "The Effects of Pressure and Cold upon the Gaseous Products of the Distillation of Carbonaceous Shales," by Mr. J. J. Coleman; 3. "On Some Nova Scotia Triassic Trap Minerals," by Professor How; 4. "On Some Points in the Examination of Waters by the Ammonia Method," by Mr. W. H. Deering.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of the above Society was held on Wednesday, April 7, under the presidency of M. Planchon. Amongst the correspondence read was (1) a note from M. Stanislas Martin, on paper made from the sugar cane, accompanied by a specimen of the paper; (2) a note from M. Vidau, upon some new reactions of saccharine bodies; and (3) a note from M. Husson relative to the action of iodine upon different rhubarbs as a means of recognizing their quality and source.

The President announced the loss to the Society, by death, of M. Roucher, and invited M. Jeannel to read the discourse that he had pronounced over the tomb of their late colleague. M. Planchon also announced the death of Mr. D. Hanbury, which he described as being a loss to materia medica, the study of which had been facilitated by the numerous correspondents with whom Mr. Hanbury had maintained relations throughout the world.

Dr. De Vrij, who was present at the sitting, offered to the Society a specimen of a crystallizable resin obtained from *Podocarpus cupressina*. The resin is found only in aged trees; it is soluble in alcohol from which it crystallizes, slightly soluble in carbon bisulphide and melts at a temperature above 120° C. Dr. De Vrij quoted a memoir on this resin by M. Oudemans, who thought its origin went to support the theory that cellulose may be transformed into resin.

The Mixed Alkaloids of Red Bark.

Dr. De Vrij also presented to the Society a specimen of a product, which he said was esteemed in England and Holland, and consisted of a mixture of all the alkaloids extracted from red bark. He felt assured that such a mixture would be an excellent febrifuge.

M. Mialhe said that he had long held the same opinion.

To a question whether such a mixture had clearly defined characters, Dr. De Vrij replied: (1) That if the mixture be examined polarimetrically it is always found to be levogyre, in consequence of the predominance of cinchonidine; (2) that by making a hot concentrated solution of this mixture in alcohol slightly acidulated, a crystallization is obtained resembling sulphate of quinine, which would not take place if cinchonine were present in great quantity. The composition of the mixture was not constant.

MM. Baudrimont and Poggiale thought that the use of this product was not to be recommended, and that it was important to supply practitioners and patients with definite crystalline compounds like sulphate of quinine, the composition and purity of which could be recognized.

In reply to a question as to the kinds of red bark which were most suitable for use, Dr. De Vrij said that the Indian barks are preferable to those from America: the latter are always old, and it has been proved that when barks have arrived at the age of fourteen years they begin to be less rich in alkaloids than younger barks. Dr. De Vrij added that the Indian barks are rather brown than red, and that they acquire that colour only with time in consequence of the oxidation of the cinchotannic acid.

Preparation of Ethylene Perchloride.

M. Bourgoin described two new methods of preparing ethylene perchloride. By the first sesquichloride of carbon is dissolved with heat in double its weight of commercial aniline. The mixture is heated in a retort to 170° C., and the product, which distils slowly, is collected in a slightly cooled receiver. The action commences directly, and the liquid rapidly acquires a fine red colour. The distillate is ethylene perchloride containing aniline and sesquichloride of carbon in solution. In order to remove the latter body more aniline is added, and it is distilled at a temperature between 130° and 145° C.; the small quantity of aniline the product contains is easily removed by washing with dilute sulphuric acid, and it is dried over chloride of calcium. A strongly coloured liquid is left in the retort; it becomes solid on cooling and is aniline red. The ethylene perchloride prepared by this process, however, is not quite pure; the boiling point is not constant, although the greater part passes over at about 121° C.

M. Bourgoin states that he has obtained perfectly pure ethylene perchloride by treating well crystallized bromide of chlorethose with aniline. The reduction, which is more easy than with sesquichloride of carbon, is effected between 140° and 150° C. Hydrobromate of rosaniline remains in the retort. Prepared by this process ethylene perchloride has an ethereal odour, resembling that of chloroform. It boils exactly at 121° C, and has a density of 1·6595.

M. Vigier read a note upon the employment of glycerine in the preparation of pastes and pills.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Sale of Food and Drugs Bill.

On Tuesday the Committee on this Bill was resumed.

On Clause 21,

Mr. Muntz moved an amendment to the effect that the Justices before whom any complaint might be made under the Act might, upon the request of either party, cause any article of food or drug to be examined and analysed by the Inland Revenue Department, at Somerset House, whose certificate should be final.

Mr. Sclater-Booth could not accept the amendment, on the ground that it proposed to leave the final decision on questions of adulteration with the Department at Somerset House. That decision must rest with the Courts of Law. He was prepared to accept a proposal which had been placed upon the paper by the hon. member for Leicestershire, to the effect that the analyses might be conducted by persons appointed by the Commissioners of Inland Revenue, such persons to give certificates of the results to the Justices who were to decide the cases.

Sir H. Peek supported the amendment and quoted instances to show that many analyses conducted by local analysts were neither thorough nor sensible. The trading classes generally had no objection to inquiry, but they altogether objected to inquiry by incompetent men, which, as had been shown, too frequently resulted in both inconvenience and injustice. Personally, he should rather like to see all the analyses which might be necessary under the Act left to the Department at Somerset House. This would be a cheaper and more satisfactory course than the one proposed in the Bill. He quite agreed in the observation that if the chemists at Somerset House were made the sole analysts for the purposes of this Bill, it would largely prevent adulteration, while the ratepayers would be gainers by change. He did not think that it was fair that the same magistrates who in Petty Sessions had the appointment of the local analysts should afterwards at Quarter Sessions determine appeals from the reports of those persons. He should therefore support the amendment.

Dr. Cameron remarked that the scarcity of analysts now complained of was owing to the sudden demand for their services, which was the consequence of this sort of legislation. The *personnel* at the laboratory at Somerset House consisted of a principal, a deputy principal, eight permanent assistants, and eight temporary assistants, and it was impossible that such a staff could get through the enormous amount of work that was about to be thrown upon it under this Bill, and it could not be increased without great cost to the country.

Dr. Playfair said that in accepting the proposal that all the analyses should be conducted at Somerset House the Government were incurring considerable responsibility. He should wish to know what security the Government had that the assistants at Somerset House were properly qualified for the discharge of such important duties as were about to be thrown upon them by this Bill, because it was evident that the salaries they received were not such as the first chemists in the country would be entitled to. He, however, should not divide the Committee on the amendment.

Mr. Muntz withdrew his amendment in favour of that of the hon. member for Leicestershire.

Mr. Pell moved his amendment, which was as follows:—

"Clause 21, page 7, leave out line 6 and to end of clause and insert 'by persons to be appointed by the Commissioners of Inland Revenue, who shall thereupon make the analysis, and give a certificate to such Justices of the result of the analysis; and the expense of such analysis shall be paid by the complainant or the defendant as the Justices may by order direct.'"

Mr. Sclater-Booth would accept the amendment of the hon. member for Leicestershire, and said Her Majesty's Government were quite aware of the responsibility they were taking upon themselves by so doing.

Mr. Sullivan observed that the analyses conducted at Somerset House would command confidence.

Mr. Grantham thought cases might arise in which it would not be desirable to make either the complainant or the defendant pay the expense of the analysis.

Dr. Playfair moved that the amendment of the hon. member for South Leicestershire (Mr. Pell) be altered so as to make it begin with the words "by the chemical officers in the employment of the Inland Revenue."

After a brief conversation, the amendment was adopted with this alteration, and the Committee reported progress.

The House again went into Committee on this Bill on Thursday, when the amendment referring all disputed analyses to Somerset House was adopted as a substantive resolution. A considerable discussion took place in respect to the warranty referred to in Clause 24, and hopes were held out that at a future stage of the Bill a form of warranty would be sketched out. At the time of going to press the Committee had reached Clause 25, and was still sitting.

The following tabular arrangement will allow of a comparison of the clauses of the Sale of Food and Drugs Bill that have thus passed through Committee up to Clause 21 with the corresponding portion of the Bill as originally introduced under the title of the Adulteration of Food and Drugs Bill:—

As read a first time; the parts now altered or omitted printed in italic :—	As agreed to by the Committee; the new and altered parts printed in italic :—
7. No person shall sell any *article mixed for any of the purposes mentioned in the exceptions above set forth, if the matter mixed be more than is ordinarily required for the purpose, under a penalty of ten pounds. No person shall sell any article of food which by the usage of trade is sold in a mixed state, unless the ingredients shall be mixed in the proportions required by such usage, and no person shall sell any compounded drugs, except the same shall be compounded according to the prescription in writing submitted for that purpose, or in accordance with the regulations prescribed by the British Pharmacopœia issued by the General Medical Council, or with a basis to be laid down by the Pharmaceutical Society, or the Local Government Board, or the Privy Council, subject to a penalty of twenty pounds.*	6 [formerly 7.] No person shall sell any *compound article of food which is* not *composed of ingredients in accordance with the demand of the purchaser, under a penalty of twenty pounds. No person shall sell any compounded drugs except the same shall be compounded in accordance with the demand of the purchaser, or with the prescription in writing of a registered medical practitioner,* or with the *regulations prescribed by the British Pharmacopœia issued by the General Medical Council, or in Great Britain with a basis to be laid down by the Council of the Pharmaceutical Society of Great Britain or the Privy Council, or in accordance with the provisions of the Pharmacy Act,* 1868, *or in Ireland in accordance with the Act of the Session of the thirty-third and thirty-fourth of Victoria, chapter* 26, *under a penalty of twenty pounds.*
8. Provided that no person shall be guilty of *an offence* in respect of the sale of an article mixed with any ingredient not injurious to health, *whether the case may or may not fall within any of the above-mentioned exceptions*, if at the time of delivering such article he shall supply to the person receiving the same a notice *to the effect that the article is mixed, by a label written or printed on or with the article.*	7 [formerly 8.] Provided that no person shall be guilty of *any such* offence *as aforesaid* in respect of the sale of an article *of food or a drug* mixed with any *matter or* ingredient not injurious to health, *and not intended fraudulently to increase its bulk, weight, or measure*, if at the time of delivering such article he shall supply to the person receiving the same a notice, *by a label distinctly and legibly written or printed on or with the article, to the effect that the article is mixed.*
9. No person shall *knowingly*, and with the intent that the same may be sold in its altered state without notice, abstract from an article of food any part of it so as to affect injuriously its quality, substance, or nature, and no person shall knowingly sell any article so altered without making disclosure of the alteration, under a penalty in each case of ten pounds.	8 [formerly 9.] No person shall, with the intent that the same may be sold in its altered state without notice, abstract from an article of food any part of it so as to affect injuriously its quality, substance, or nature, and no person shall sell any article so altered without making disclosure of the alteration, under a penalty in each case of *twenty* pounds.

The first important alteration in clause 9 [formerly 10] is the addition of the following paragraphs:—

In Scotland the like powers shall be conferred and the like duties shall be imposed upon the Commissioners of

Supply at their ordinary meetings for counties, and the town councils for boroughs within their several jurisdictions; provided that one of Her Majesty's principal Secretaries of State in Scotland shall be substituted for the Local Government Board of England.

In Ireland the like powers and duties shall be conferred and imposed respectively upon the grand jury of every county, and town council of every borough; provided that the Local Government Board of Ireland shall be substituted for the Local Government Board of England.

11. The town council of any borough may agree that the analyst appointed by any *adjoining* borough or for the county in which the borough is situated, shall act for their borough during such time as the said Council shall think proper, and shall make due provision for the payment of his remuneration, and if such analyst shall consent, he shall during such time be the analyst for such borough for the purposes of this Act.

10 [formerly 11.] The town council of any borough may agree that the analyst appointed by any *neighbouring* borough or for the county in which the borough is situated, shall act for their borough during such time as the said council shall think proper, and shall make due provision for the payment of his remuneration, and if such analyst shall consent, he shall during such time be the analyst for such borough for the purposes of this Act.

12. Any purchaser of any article of food in any district, county, city, or borough where there is any analyst appointed under this or any Act hereby repealed shall be entitled, on payment to *the* analyst, or if there be no such analyst then acting for the district to the analyst of a *neighbouring district, of a sum not more than ten shillings and sixpence*, as shall be agreed upon between such person and the analyst, to have such article analysed by such analyst, and to receive from him a certificate of the result of his analysis.

11 [formerly 12]. Any purchaser of any article of food or of a drug in any *place being a* district, county, city, or borough where there is any analyst appointed under this or any Act hereby repealed shall be entitled, on payment to *such* analyst *of a sum not exceeding ten shillings and sixpence*, or if there be no such analyst then acting for such place, to the analyst of *another place, of such sum as may be* agreed upon between such person and the analyst, to have such article analysed by such analyst, and to receive from him a certificate of the result of his analysis.

Section 12 [formerly 13] relating to the officer named to obtain a sample of food or drug to submit to analyst remains unaltered.

14. The person purchasing any article with the intention of submitting the same to analysis shall, after the purchase shall have been completed, notify to the seller or his agent selling the article his intention to have the same analysed by the public analyst, and shall offer to divide the article into three parts to be then and there separated, and each part to be marked and sealed or fastened up in such manner as its nature will permit, and shall, if required to do so, deliver one of the parts to the seller or his agent. He shall afterwards retain one of the said parts for future comparison and submit the third part, if he deems it right to have the article analysed, to the analyst.

13 [formerly 14]. The person purchasing any article with the intention of submitting the same to analysis shall, after the purchase shall have been completed, *forthwith* notify to the seller or his agent selling the article his intention to have the same analysed by the public analyst, and shall offer to divide the article into three parts to be then and there separated, and each part to be marked and sealed or fastened up in such manner as its nature will permit, and shall, if required to do so, proceed accordingly, and shall deliver one of the parts to the seller or his agent. He shall afterwards retain one of the said parts for future comparison and submit the third part, if he deems it right to have the article analysed, to the analyst.

Clauses 14 and 15 [formerly 15 and 16] containing the provision when sample is not divided, and the provision for sending article to the analyst through the post-office, remain unaltered.

17. If any such officer, inspector, or constable, as above described, shall apply to purchase any article of food or any drug exposed to sale, and shall tender the price for the quantity which he shall require for the purpose of analysis, not being more than shall be reasonably requisite, and the person exposing the same for sale shall refuse to sell the same to such officer, inspector, or constable, such person shall be liable to a penalty of *five* pounds.

16 [formerly 17]. If any such officer, inspector, or constable, as above described, shall apply to purchase any article of food or any drug exposed to sale, *or on sale by retail on any premises or in any shop or stores*, and shall tender the price for the quantity which he shall require for the purpose of analysis, not being more than shall be reasonably requisite, and the person exposing the same for sale shall refuse to sell the same to such officer, inspector, or constable, such person shall be liable to a penalty of *ten* pounds.

Clause 17 [formerly 18] relating to the form of the certificate, remains unaltered.

19. Every analyst appointed under any Act hereby repealed or this Act shall report quarterly to the authority appointing him the number of articles analysed by him under this Act during the foregoing quarter, and shall specify the result of each analysis, and such report shall be read at the next meeting of the authority appointing such analyst.

18 [formerly 19]. Every analyst appointed under any Act hereby repealed or this Act shall report quarterly to the authority appointing him the number of articles analysed by him under this Act during the foregoing quarter, and shall specify the result of each analysis, *and the sum paid to him in respect thereof*, and such report shall be read at the next meeting of the authority appointing such analyst, *and every such authority shall annually transmit to the Local Government Board at such time and in such form as the Board shall direct, a certified copy of the number of articles analysed.*

Proceedings against Offenders.

20. When the analyst having analysed any article shall have given his certificate of the result, from which it may appear that an offence against some one of the provisions of this Act has been committed, the person causing the analysis to be made may take proceedings for the recovery of the penalty herein imposed for such offence, before any justices having jurisdiction in the place where the article or drug sold was actually delivered to the purchaser, in a summary manner. Every penalty imposed by

Proceedings against Offenders.

19 [formerly 20]. When the analyst having analysed any article shall have given his certificate of the result, from which it may appear that an offence against some one of the provisions of this Act had been committed, the person causing the analysis to be made may take proceeding for the recovery of the penalty herein imposed for such offence, before any justices *in petty sessions* assembled having jurisdiction in the place where the article or drug sold was actually delivered to the purchaser, in a sum

this Act shall be recovered in the manner prescribed by 11 and 12 Vict. c. 43, and may be mitigated according to the judgment of the justices.

mary manner. Every penalty imposed by this Act shall be recovered in England in the manner prescribed by the eleventh and twelfth of Victoria, chapter forty-three. *In Ireland such penalties and proceedings shall be recoverable, and may be taken with respect to the police district of Dublin metropolis, subject and according to the provisions of any Act regulating the powers and duties of justices of the peace for such district, or of the police of such district; and with respect to the other parts of Ireland, before a justice or justices of the peace sitting in petty sessions, subject and according to the provisions of the Petty Sessions (Ireland) Act, 1851, and any Act amending the same.* Every penalty herein imposed may be reduced or mitigated according to the judgment of the justices.

Clause 20 [formerly 21] which provides that the certificate of the analyst shall be *primâ facie* evidence for the prosecution, that the analyst shall be produced if required, and that the defendant and his wife may be examined, remains unaltered.

22. The justices before whom any complaint may be made under this Act may, upon the request of either party, in their discretion cause any article of food or drug to be examined and analysed by *the analyst of an adjoining district, who shall thereupon make the analysis as if he were applied to by any officer in his district, and may be required to attend to give evidence at the hearing of the case; and the expense of such examination, analysis, and attendance shall be deemed part of the expenses of executing this Act, unless the justices order the same to be paid by the complainant or the defendant.*

21 [formerly 22.] The justices before whom any complaint may be made under this Act may, upon the request of either party, in their discretion cause any article of food or drug to be examined and analysed by *the chemical officers in the employment of the Commissioners of the Inland Revenue Department, who shall thereupon make the analysis and give a certificate to such justices of the result of the analysis, and the expense of such analysis shall be paid by the complainant or the defendant as the justices may by order direct.*

Censure of a Druggist.

An inquest has been held by the City Coroner at Manchester on the body of Matilda Hardy, aged 10 months. The mother said that on Saturday night the deceased "seemed to have a cold," and would not take its food, and on Monday morning, "when it was a little worse," she took it to Mr. Holt, druggist, Deansgate. Mr. Holt said that the child had a severe cold, and he told witness to apply mustard and meal as poultices on the child's chest. The poultices had no effect whatever. Witness also received from Mr. Holt a bottle of medicine, with directions to give the child a spoonful every three hours, which she did. On Tuesday morning, at seven o'clock the child had several fits, and it died at eight o'clock. Mr. Holt saw the child, and after the death witness went for a certificate. He told his assistant to "write a paper out." The certificate upon which "Mr. Holt wrote something" was not ready till night, and witness's husband took it to the registrar.

Mr. G. W. Pettinger, surgeon, of 93, Great Jackson Street, who had made a *post-mortem* examination, said that death was caused by inflammation of the lungs, aggravated by want of medical aid. "The majority of such cases might be cured if taken earlier." The medicine produced seemed to be paregoric, and would be an improper medicine. The tendency of the doses given would be to increase the inflammation, and not to diminish it. The following verdict was returned:—"Died from inflammation of the lungs, aggravated by want of medical aid." The jury censured the druggist for his treatment of the deceased, and for giving the certificate in another person's name.—*Manchester Courier.*

Review.

The Science of Disinfection. By John Dougall, M.D Glasgow: James Maclehose. 1875.

Under the title of "The Science of Disinfection." Dr. Dougall has published a paper which he read before the Health Department of the Social Science Congress, at Glasgow, in 1874.

This little *brochure* of fifteen pages will be read with interest and profit by those who have formed no distinct notions regarding *disinfection, antiseption,* and *deodorization.* The author explains the difference between fermentation and putrefaction, and describes a series of experiments undertaken with the object of determining the effects of mineral acids, caustic alkalies, and carbolic acid, on solutions of organic matters. The substances selected for experiment were vaccine lymph and an aqueous solution of fresh beef juice, and Dr. Dougall has satisfied himself that the action of strong mineral acids is better in a hygienic sense than the fermentative action, and that fermentation is better again than antiseption.

As the author's experiments show that vaccinine is unaltered by carbolic acid, and as vaccinine is inimical to varioline, he argues that varioline would also be unaltered by carbolic acid, and if so, that there is then "a strong presumption that all zymotic poisons will, under the same circumstances, remain active; and not only so, but that carbolic acid rather antisepts—rather preserves than destroys—their infecting powers."

Dr. Dougall sums up the inferences to be deduced from his experiments in his concluding paragraphs, to which we refer our readers.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Plattner's Manual of Qualitative and Quantitative Analysis with the Blowpipe. From the last German edition. Revised and enlarged. By Professor W. Richter. Edited by T. Hugo Cookesley. London: Chatto and Windus. 1875. From the Publishers.

A Manual of Inorganic Chemistry. The Non-Metals. By T. E. Thorpe, Ph.D., F.R.S.E. London: W. Collins, Sons and Co. 1874. From the Publishers.

Handels-Bericht von Monat April 1875 von Gehe and Co., in Dresden.

Southall Brothers and Barclay's Monthly Price Current.

Notes and Queries.

[435]. CEMENT FOR COMPOSITION MORTARS.—As there is perhaps quite as much in the manner of effecting a joint as in the cement, the following hints may be serviceable:—

Scrub the fractured parts with a hot solution of soda, afterwards with clean hot water to remove the soda; this will give a pure surface for cement of any kind to adhere to.

Note.—If any radiating cracks remain in the mortar break them out, minding to save every bit; it is of no use to piece a mortar and leave it with a cracked sound, as it would certainly break out in use.

Place all the pieces in a warm oven (not too hot).

We place a bottle of the "coaguline" to liquify (you will pardon us if we say it is the best cement we know), and also a mixture, in equal parts, of fresh, fine plaster of Paris and powdered quicklime in a galipot in the oven to warm.

When all are of a suitable temperature, with a small spatula made from a slip of wood we mix the cement and lime powder to an easy paste, unite the pieces promptly as they best come together, squeezing out as much of the cement as possible, and testing with the finger nail by passing it over the joint that each is in its original position; now bandage tightly up, invert on a flat surface, put a 56 lb. weight or two on it, and leave for a day. Then place in a warm dry place (as on a mantelshelf) for a time, say a week, and afterwards bring into use.

We have had a No. 12 mortar, broken in five pieces, put together in this way which has been in constant use over seven years; being now unsound it is about to be restored.—T. K.

---

[438]. MICROSCOPIC EXAMINATION OF STARCHES.—I should recommend your correspondent to retain, unmounted, his specimens of the different starches, and when any one of them is required for comparative examination, or for study under the microscope, to use, as a medium, a small quantity of water, or any other fluid more suitable. I have not yet met with a medium for the permanent mounting of starch grains that yields perfectly satisfactory results, and, in addition, there are great difficulties as regards the cell, not yet fully surmounted.

The following fluid, as a medium for the temporary examination of starch grains, I have found very convenient and may be kept for any reasonable length of time:—

Saturate Distilled Water with Creosote, and take of the Filtered Solution	ℨv.
Spirit of Wine	ℨiss.
Glycerine	ℨiss.

Mix.

Water alone may be used, but it does not take to the glass plate so readily as this fluid, and if the examination in water be prolonged the granules tumble into heaps very inconveniently.

Not only the form of the granule, the shape and position of the hilum, but equally the lamination, form important points in the determination of a starch granule, and it will be found that the presence of a little glycerine in the medium makes the lamination more decided.

If starches be required for examination by polarized light, turpentine as a medium may be used, and if for a permanent mount, Canada balsam.

The result of investigations on some samples of Natal arrowroot will shortly be noticed.—THOMAS GREENISH.

Obituary.

Notice has been received of the death of the following:—

On the 15th March, 1875, Mr. Thomas Davison Wilson, Chemist and Druggist, of Newcastle-on-Tyne, aged 26.

On the 24th March, 1875, Mr. Thomas Williams, Chemist and Druggist, of Penrhyn, Mon., aged 57.

On the 7th April, 1875, Mr. William Dengate, Chemist and Druggist, of New Shoreham, aged 63.

On the 28th April, 1875, Mr. William Augustus Raynes, Chemist and Druggist, of Bethnal Green, aged 64.

On the 30th April, 1875, Mr. George Henry Ellis, Pharmaceutical Chemist, of Finsbury Pavement, London, aged 74. Mr. Ellis had been a Member of the Pharmaceutical Society since 1849.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE GLASGOW MEMORIAL.

Sir,—One would have thought that your correspondent "Scotus," who, in his first letter, talks of the "wonderful logic running through the whole" of the Glasgow memorial, would have taken care to be himself logical. That he is not so, particularly in his letter on the scarcity of assistants, I would venture, with your indulgence, to show. At the outset, "Scotus" proceeds on the assumption that if he can prove that the scarcity of assistants is due to a cause other than the examinations, he will also disprove the assertion that that scarcity is owing to "the regulations laid down for conducting the examinations." Need I say that a more fallacious and illogical assumption it would be difficult to make? Does "Scotus," for a moment, imagine that a consequent must have only one antecedent—that one effect has one and only one cause? If such is his idea he is to be pitied. If it is not, then his whole letter is a blunder, seeing it neither proves, nor can prove, that for which it was written. Your correspondent has spent, I had almost said wasted, much time in endeavouring to show what everyone knew before, that, by the increased prosperity of the country, some trades were enriched in respect of followers, and others, notably the drug trade, were impoverished. The facts "Scotus" has stated about this and its influence on our own trade, both in respect of the number of its followers and of their efficiency and intelligence, are undeniable. Had "Scotus" confined himself to the statement of these obvious facts, and had he drawn, as his conclusion, that these were one of the causes of the scarcity and inferiority of assistants, his remarks would have been harmless. Your correspondent, however, has gone further, and has implied that not only has he given a cause, but the cause, and the only cause, and has therefore excluded altogether the possibility of the examinations having the same effect. Now, Sir, I maintain that this inference is, not only utterly illogical and unwarrantable, but also utterly false and unsound. I do not, like "Scotus," declare that there is only one cause for the scarcity of assistants; but, on the contrary, I hold there may be many. It can, however, be indubitably proved that the examinations that have at the present time to be passed are not only one of these causes, but a very important one. "Scotus" must have been exceedingly unfortunate in his choice of acquaintances, if it is after studying human nature, as displayed in them, that he has come to the conclusion that when a man decides what trade to follow, he does so merely from considering how much that trade will bring him in £ *s. d.* Let him study human nature from a higher platform than he has hitherto done, and he will find other motives than these influencing a man. It is acknowledged by everyone that, in spite of not very high wages, and very long hours, the drug trade has inducements which others have not. The position of a druggist, even at 20*s.* per week is above that of the bricklayer at 35*s.* To ignore this fact is to ignore truth, either ignorantly or wantonly. It is here the examinations come in, with what result is well known. The man who would forego the few shillings extra per week, when he considers the higher position he would obtain as a druggist, is yet deterred from entering the drug trade by the thought of these examinations, which, in his mind, assume gigantic proportions. Many men, who consider that the advantages of a higher social position make up for the smallness of the salary, yet consider that salary (otherwise large enough) too small for the trouble and expense accruing from the necessity of having to pass two or three examinations. While, I doubt not, many leave the trade, and others refuse to join it, from the smallness of the salary and the long hours, I am persuaded that an incredibly larger number are frightened out of it by these bugbears—examinations. These are facts which are indisputable, and can be proved any day, and to any extent. So that, in this respect, the grounds of objection "Scotus" and others urge against the Glasgow memorial are, in reality, *nil*. Nor is this a mere theory extemporized for the occasion. It will be found to be the only explanation that will apply universally. Nor is it an argument against it to say that many go in for the medical examinations, which are very much harder, and to which no objections are made. This was urged in one of the letters on the present subject,—and very unwisely. It must be remembered that the person who obtains his diploma and permission to practise has unlimited means at his command for more than compensating himself for his past trouble, and for raising himself to a position much higher than that to which the mere druggist can aspire. By these considerations he is led to undergo the examinations, whereas, in the case of the druggist, the advantages are not such as to repay him for his previous extra labour. I trust I have said enough to show that the scarcity of assistants is not due solely, as "Scotus" would affirm, to little wages and long hours, but to the present regulations concerning examinations as well. Thus, on this score at any rate, if the memorial is not to be supported, it cannot at least be condemned.

With regard to the large number of "doctors' shops," I would only say let druggists beware lest, in trying to abolish these they are not, in reality, knocking away their own footing. Many do not only assist in and keep druggists' shops, but also themselves study for medicine. They thus at once support themselves and obtain the wherewithal to conduct their studies. If "doctors' shops" are done away with, the means druggists now have of becoming members of a learned and honourable profession, and of making a competency while at the same time trying to obtain a practice, would be greatly diminished. Let druggists beware lest they imitate "vaulting ambition, which o'erleaps itself, and falls on the other side."

DIC VERA.

Glasgow, May 4, 1875.

Sir,—As Messrs. Currie and Fairlie have pointed out the delusion I laboured under in stating that Mr. Frazer must have gone to London with the intention of presenting a memorial without first having obtained a copy of it in Glasgow, I can now conceive of something more ridiculous than that—viz., that Mr. Frazer should have gone to London with the intention of supporting a memorial which he had never seen, especially when that cast discredit on his own conduct. It, however, strengthens the conviction that I have already expressed. As regards Mr. Fairlie's recommendation that "those who live in glass houses should not throw stones," it would be well if he reflected who commenced throwing the stones in this instance?

"Oh wad some power the giftie gi'e us,
To see oursel's as ithers see us!"

A quotation so beautifully expressed by Mr. Fairlie himself when he made his attack on the Edinburgh Council. I understand Mr. Fairlie's statement as proverbial, but if otherwise I can assure him, as far as the Glasgow assistants are concerned, their salaries are so infinitesimally small compared to the expense of a glass habitation that there is no chance of such an event, a more probable one being, "considering their long hours of labour, night-bell duty, etc.," a premature wooden encasement six feet underground, at the expense of the parochial board, from whence they will have little likelihood of pitching stones at the enlightened heads of the framers and supporters of the Glasgow memorial.

ASSISTANT.

May 11, 1875.

The Office of Public Analyst.

Sir,—On the plea that the office of public analyst if held by one "in trade" is unfair to others similarly engaged, Dr. Lyon Playfair proposes to disqualify such pharmacists from holding this position. In the face of the educational *status* of the pharmacist of the present day, and the thoroughly well-deserved encomiums of Mr. Sclater-Booth in the House as to the special qualifications of many such in office, no successful attempts can be made to discredit their ability to hold and to act; the argument then is mainly unfairness to others.

Some eighteen months' actual experience teaches me that no such unfairness has arisen; the great mass of the public care little for such distinctions; the marked improvement in the therapeutic value of medicines is due to the high education of this generation of pharmacists and has long since destroyed the idea that a special talent in medicinal preparations is illustrated by a few vendors only. Couple with this the fact that simple "drug-selling," as applied to the pharmacists of 1875, is as much an anachronism as an analyst of a bygone generation. What will be the result? An attempt to swamp the borough by a county interest in the appointment of future analysts has failed, and the value of local administration been fully recognized, but the value of the pharmacist's skill is to be stultified by a theory of unfairness. Thus many districts will go unrepresented.

The supply of analysts is regulated, like most things, by the demand; and as we are told science tendeth to clothe in rags, the practice of analytical chemistry alone is but an out-of-elbow sort of trade; the value of its association with pharmacy is recognized as means to the end of most men's labour.

I regard this motion in the light of a side wind levelled at the possible increase in the ranks of public analysts by skilled pharmacists, many of whom have laboured long and diligently to acquire that knowledge which, if we may believe certificates given to many medical aspirants for the office by some eminent professors of chemistry, may be acquired in a short term of ten lessons at one guinea per lesson.

EDWARD MOORE.

Pharm. Chemist, Public Analyst, Brighton and East Sussex.

Saxifraga Tridactyles amongst the Carnivora.

Sir,—Do you know the plant perched "in the crannied wall," barely three inches high, with leaves a quarter of an inch across? It scarcely looks like one of the raptores. Just imagine a bluebottle being strangled by it! Why the fly, if he were only a vegetarian, would quickly turn the tables. Besides, the plant in question is not noted for its wan, squalid leaves. The colour is due to its situation (witness many of our wall plants). I have gathered it myself on a damp hedgebank, bright and green, but still dotted with the red glands. Would some "advanced believer" kindly oblige me with the alimentary canal dissected from a Pinguicula, or the digestive organs of a Drosera for the microscope? I know we constantly find flies and such small deer dead in the embrace of their slimy, hairy glands, so we do in the bells of campanulas and in many others. The flies look dried up too, an appearance with which probably the summer's day has had somewhat to do, and not of necessity referable to the blood-sucking propensities of the plants. I know I may be very heretical, but did anyone ever observe a plant look any further advanced after refreshing on an unfortunate fly?

BOTANIST.

Norwich.

W. H. Kerr.—We are not aware that an authorized formula for the preparation you refer to has been published.

G. C. Druce.—(1) The plants sent are hybrids, between the cowslip and the primrose, and may be referred to *Primula vulgaris, β variabilis*, of Babington. The oxlip has shorter pedicels, a narrow calyx tube, and corolla tube not contracted at the mouth.

J. W.—Simple syrup flavoured with orange-flower water. The name "capillaire" was originally applied to a mucilaginous syrup, prepared by adding infusion of maidenhair to syrup, and flavouring with orange-flower water. For formula see Gray's 'Supplement,' p. 951.

"*Stamp.*"—All the labels sent would require a stamp.

"*A Minor.*"—If you refer to the reports of the discussions which took place at the time the Council decided upon the alteration in the conditions of the Bell Memorial Scholarship, you will find that the considerations to which you refer were not overlooked. See vol. iii., pp. 264 and 367.

A. S.—You are recommended to consult the agent, as the answer to your question would depend upon the manner in which the article is advertised.

"*Potio.*"—The coat of arms is the property of the Society in its corporate capacity, and neither Members nor Associates are entitled to use it as individuals.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. G. Mee, Mr. Hetherington, Mr. Lunn, Mr. J. Ince, Messrs. Sturge, Mr. Collier, Mr. Thresh, "An Examined A. P. S.," F. L. P.

ASAFŒTIDAS OF THE BOMBAY MARKET.

BY W. DYMOCK,

Professor of Materia Medica, Bombay.

Three distinct kinds of asafœtida are found in the Bombay drug market, and are known to dealers as Abushaheree Hing, Kandaharee Hing, and Hingra.

Of each of these drugs numerous qualities, more or less mixed or adulterated, are met with, but I purpose first to notice the unadulterated varieties only.

Abushaheree Hing is brought from the Persian Gulf ports, principally from Abushaher and Bunder Abbas; it is produced in Khorasan and Kirman by the *Ferula alliacea* of Boissier.

Specimens of the plant with the gum resin attached have been supplied to me through the kindness of Mr. Ardeshir Mihrban, of Yezd, and these specimens, which show both flowers and fruit, have, with plenty of mature seed, been forwarded to Mr. D. Hanbury, who has kindly taken the trouble of submitting them to Boissier, and has also sent packets of seed to the botanical gardens of Kew, Edinburgh, Oxford, Paris, St. Petersburg, Berne, Strassburg, Florence, Pisa, Naples, Palermo, Athens, and to botanical friends on the Mediterranean coast, in South Africa, and a few other places.

The specimens sent to Mr. Hanbury were collected near Yezd and Kirman, and were from three and a half to four feet in height, and the roots of some young plants which had never flowered were quite fresh when they arrived in Bombay, and exuded a thick milk when cut, which after a day or two became brown and translucent.

It is this drug alone which appears in the Bombay Custom returns as Hing or Asafœtida; all other kinds pass under the name of Hingra. Hing arrives here either in skins sewn up so as to form a flat oblong package, or in wooden boxes. It varies in appearance with age; when quite fresh it is soft and of the consistence of treacle, of a dull olive brown colour, and *purely garlic odour;* it is mixed with about an equal bulk of slices of the root. After having been kept some time the gum resin becomes hard and translucent, and of a yellowish brown colour.

In 1872-73, 3367 cwts. of this drug were imported from the Persian Gulf.

The method of collection has been described to me by Mr. Godrez Mihrban, of Yezd, and resembles the method of collecting Asafœtida, as described in the 'Amanitales,' except that the slices of root are mixed with the juice.

The price of the best Hing in Bombay is from twenty rupees to twenty-two rupees per maund of forty pounds.

Kandaharee Hing is a much rarer article and only occasionally appears in this market. It is brought from Kandahar packed in goat skins which are sewn up into an irregularly shaped oblong bag with the hair outside. This Asafœtida, when fresh, is in flaky pieces quite wet with essential oil, of a yellow colour, opalescent, with an odour like a mixture of garlic and oil of carraways. When kept for some time the gum resin loses its moisture and gradually becomes perfectly transparent and of a golden yellow colour; the odour also loses much of its aroma and approximates to that of the best Asafœtida of European commerce. Some packages of the latter which I have examined this season in Bombay I found to contain small portions of the moist opalescent gum mixed with the ordinary opaque kind, as well as with some fragments of an intermediate character, partly opaque and partly opalescent. I believe this drug will turn out to be the superior kind of Asafœtida noticed by Bellew as obtained from the node or leaf-bud at Kandahar. Kandaharee Hing is little known in Bombay, and is not retailed in the shops. It fetches about double the price of Abushaheree, and is not always obtainable; it is used as a condiment by wealthy people in Northern India.

Hingra or the Asafœtida of European commerce comes to Bombay in large quantities from two sources, viz., Southern Persia and Affghanistan. The Persian drug is met with in two forms, viz., in tears more or less agglutinated together, and secondly, as a soft, white, viscid mass. It arrives in skins or boxes, and is mostly exported to Europe, but some is used in India as a condiment or medicinally by the poorer classes. This gum resin is the Anghuzeh-i-Lari of the Persians, and there seems to be little doubt that it is the produce of Kämpfer's plant, whichever that may be. In price it varies much; the average for a good quality will be about ten rupees per forty pounds.

The Affghan drug differs somewhat from the Persian in appearance and odour. The best samples occur in small flat pieces or tears, to one side of which a few particles of sand are adherent as if the gum had run out into the ground near the root; these pieces are quite hard and dry, yellowish white externally, and display, when broken, a conchoidal milk-white surface. Many packages, as already mentioned, under Kandaharee Asafœtida, contain the opaque gum above described mixed with opalescent pieces and moist yellow particles together with much dirt; from such packages the best tears are removed, and the remainder pressed together forms second sort Asafœtida. Affghan Hingra is generally packed in skins, and the best sort will fetch about twelve rupees per maund of forty pounds.

The adulteration of Hing is carried on in Bombay. It is simply mixed with gum Arabic by treading the two together; the mixture is then packed up in skins so as to resemble genuine packages. Several qualities are prepared containing different proportions of gum.

Hingra is adulterated in Affghanistan and in Persia by the admixture of some white earthy material. The adulterated article which comes from Persia is in dirty white gritty masses and becomes very hard when kept. That from Affghanistan is of a brown colour and in small roundish masses, easily crushed into powder by pressure; according to Bellew, gypsum and flour are the adulterations.

A substance called Heera Hing is also met with here; it is obtained from the packages of Abushaheree Hing; many of these are quite liquid in the centre: the people who buy them for adulteration squeeze out this liquid portion and retail it at a high price as Heera Hing; it is of the consistence of treacle, and when dried becomes solid and translucent.

From the examination of a great many bales of fresh Hingra I have come to the conclusion that the Persian variety is produced by a different plant than the Affghanistan. Probably *Scorodosma fœtidum* will prove to be the source of the Persian and Falconer's *Narthex* of the Affghanistan kind.

OFFICIAL *VERSUS* OFFICINAL.

BY JOSEPH INCE.

Dr. Miller is reported in the Journal (May 8) to have read a paper before the Philadelphia College of Pharmacy entitled "Official and Officinal."

In it he disputes the correctness of Professor Attfield's adoption of the word official when applied to articles contained in the Pharmacopœia. The passage in the 'Manual of Chemistry,' which raised the question, is as follows:—

"The Pharmacopœia and all in it is official (*office* Fr. from L. *officium*, an office). There are many things which in pharmacy are *officinal* (Fr. from L. *officina*, a shop) but not official. To restrict the word *officinal*, first, to the contents of a pharmacist's shop, and, second, to that portion of the contents which is pharmacopœial is radically wrong, and should be avoided."

Dr. Miller's chief objections were, that the two words were both derived from the same root and the distinction was therefore arbitrary, that the term officinal had become established, and that its signification was well understood by all pharmacists.

The difficulty seems to depend on the want of an accurate application of the rules of etymology. That is official, in title or mode of preparation, which emanates from a legally constituted and recognized authority. That is officinal, a pharmaceutical expression, which is prepared according to the private judgment of a manufacturer and issued under the sanction of his *officina* or workshop.

Thus, for years Mr. Schacht's liquor bismuthi was an officinal remedy; since the production of the British Pharmacopœia it has become official. The statement that the two words being derived from the same root renders the modern distinction arbitrary or immaterial does not hold good.

In the first place, official and officinal are not immediately taken from the same root.

Officina, which gives *officinal*, is the contracted form of *opificina*, from *opifex*, the workman. It means a workshop—hence a laboratory—hence, in the third place, a shop, or place where manual labour is performed.

Officium, which gives *official*, is the contracted form of *opificium* the working or the work; and does not involve one solitary allusion to mechanical employment.

In the second place, not only may varied forms of words, drawn from one ultimate common source, be adopted with extreme advantage, but the *same* word, bearing totally different applications, may be traced to the same root; and it would be unsound in etymology to assimilate the meaning of either, or force them into convertible terms. Such a course would make havoc of the English language.

Let the word "office" stand as an illustration. Mr. Bremridge is the secretary of an official body, and the secretarial office is in Bloomsbury Square. It is surely not an arbitrary selection of a phrase to say in relation to his work that each member of the Council receives an official, not an officinal notice, when his attendance is desired. These summonses are authoritative, the delegated acts of authority, and consequently official. The names, the formulæ, and the instructions of the Pharmacopœia rest on the same foundation, and we are bound to use the fit expression. But a merchant in the City likewise keeps an office—the word is identical—yet his written directions to his clerks are not official, for they are of a private, personal character; nor are they officinal, for the latter bears only a medical signification. They are called *office* notices, and it is not arbitrary but strictly in accordance with the genius of the language to limit terms to their strict meanings, and to use their variations properly. To accomplish this thoroughly was Professor Attfield's motive in the construction of his book. He knew that to attach the word "official" to titles and preparations which come to us clothed with direct authority, was to follow the rules of common sense as well as those of grammar. Instead of keeping in the track of hereditary misconception a careful writer coming upon a doubtful word asks himself—what does this expression mean? and he is not compelled to perpetuate an error because it has passed unchallenged through the hands of successive authorship.

The credit of the initiation of the reform is due to the veteran author of the 'Companion to the British Pharmacopœia.'

It need not be pointed out to Dr. Miller that in French *l'officine* means the laboratory of a pharmacist, and his shop generally; that *les préparations officinales* are such as are found ready made in that *officine* as distinct from *préparations magistrales* which are made extemporaneously from the prescriptions of a physician.

The term "officinalis" still holds its place in botany because it is the Latin word; and the plants to which it is applied were those used in medicine and stored in the *officina* of the pharmacist.

Lastly, there is no wish in these remarks to stoop to special pleading.

It is at once conceded that up to a recent date the term officinal has been employed in the sense in which Dr. Miller would have it still retained; and that that use is fairly intelligible to pharmacists at the present time.

It is contended, on the other hand, that the old practice is open to serious question; that it cannot be defended fairly; and that the new nomenclature has solid arguments for its support.

PHARMACY IN ITS RELATION WITH MODERN MEDICINE.*

BY WILLIAM H. SPENCER, M.B., CANTAB., F.L.S.

(*Concluded from page* 912.)

Anon, the empirical, methodic, and eclectic schools were setting an example to the moderns which they were not slow to imitate—that of devouring one another. Galen appeared to set things right. He was born at Pergamos, in 132, studied medicine at the then centre of the learned world, Alexandria, and settled to practice in Rome, the then centre of the whole civilized world. Galen derives a good deal of his reputation from his own estimate of himself; he claimed to have removed all difficulties from the road that Hippocrates had opened, and to have shown the true way of treating disease. What that way was you shall judge from this specimen of how he treated fevers. He said that the morbific matter of fevers had to be "concocted," *i.e.*, to undergo a change whereby it was made fit to be eliminated from the body.—How true it is that history repeats itself! This change, so far as art was concerned, could be promoted by heat. Hence Galen shut his patient up in a room, closed him in with curtains, kept up a large fire, and gave the most heating medicines he could find. There is, however, a far greater interest for our purpose about Galen. He refers in his writings to the preparers and sellers of the materia medica, as a

* Read before the Bristol Pharmaceutical Association, March 25, 1875.

class distinct from those who practised medicine, under the names "Pharmacopolites" (φάρμακον, πωλέω) and "Ropopoles." It is probable that the origin of preparers and compounders of remedies is very ancient, for scattered through ancient writings are many references to several offices that are connected with this function exclusively. Thus we find in addition to Galen's class, the "Migmatopolai" (μίγματος, mixture, πωλέω, to sell), the "Pharmacopœus" (φάρμακον, a remedy, ποιέω to make), and the "Pharmacotriba" φάρμακον, and τρίβω, to draw out from). I think we may conclude that by Galen's time these various offices had become more or less merged in one, that of the Pharmacopolite, who may be regarded as the true ancestor of the modern apothecary.

For 800 years (from B.C. 400 to A.D. 400) the stream of medicine, pure as the knowledge of the times allowed—at least mixed with a goodly amount of knowledge derived from reason and experience—flowed on without obstacle in a straight and gradually improving course.

But by the beginning of the fifth century medicine had sunk to a very low ebb, or rather the stream was turned aside and diverted out of its straight course. Medicine was literally persecuted and banished from Europe, superstition and intolerance gaining the ascendant. The Nestorians, flying from persecution, found a home at Edessa, in Persia, and there they founded a school of medicine. Another branch of the Nestorians also settled in Arabia. Both schools became very celebratted, and it was in them that the Arabs first learned from h e Greeks that art and science they afterwards were so prominent in restoring and advancing.

Speaking of the Arabs, I shall recall to your minds a common belief that Arabia was the cradle of pharmacy. It is true that pharmacy owes more to the Arabs than to any other race or people; they first trained a special class to fulfil the functions of the pharmacopolites; they through alchemy started the now important department of pharmaceutical chemistry; their commerce enriched the materia medica with some of its choicest material. But the origin of pharmacy, and of the pharmacist or apothecary as distinct from the physician, dates from a period long anterior to that of Arab influence.

From the Nestorians and Arabs medical knowledge spread over Europe again, and three celebrated schools mark three centres whence the knowledge came—Bagdad, Cordova, and Salernum (this last the seat of Benedictine monks). In these three were deposited all the knowledge and science that had survived. For the rest, convents and monasteries were the places where relics of saints and martyrs were, so to speak, prepared and compounded for the use of the priest-physician, and be it said by the priest-physician himself. This stream of ignorance and superstition usurped the channel in which legitimate medicine should have flowed and ran on in no small force. But, thanks more especially to Salernum, the stream of medicine, though narrow, still flowed on. From this school emanated rules and enactments respecting both physicians and pharmacists—the distinction between the two was thoroughly confirmed,—and from this school also emanated the prototypes of our modern pharmacopœias. Thence, up to the twelfth century, the dispensatories were compiled by the physicians, and the government controlled those whose business it was to prepare drugs according to the formula of the dispensatories by strict regulations concerning adulteration and selling at too high a price. Subsequently, in the thirteenth century, the laws of Frederick II. of Germany confirmed these rules, clearly defining the distinction between the physician who used and the pharmacist who supplied remedial agencies. I need not tell you how much pharmacy owes to Germany, but I will point out here that one chief reason of this is the fact that in Germany the distinction that I have already shown to be based on necessity and reason has been thoroughly preserved.

Coming down to later times I may pass over the introduction of a distinct class of traders in drugs from Italy, and the gradual rise of the class we know as apothecaries in our own country, to a well-marked era which throws some light on the reciprocal relations I have spoken about.

In the middle of the 16th century the physicians began to need chemical remedies. Paracelsus was the pioneer in the introduction of chemical remedies into medicine, and Van Helmont afterwards carried on what Paracelsus had started. Hitherto alchemy had influenced medicine chiefly in calling forth much energetic and laborious effort to discover means for prolonging life. But when the body came to be looked at from the chemical side and disease came to be treated by chemical means, pharmacy reflected the influence. This, rather than alchemy, I take it, gave birth to pharmaceutical chemistry and eventually brought up a special class to pursue it. At the beginning of the 17th century, when the incorporation of the apothecaries took place, and the London Pharmacopœia was published, the relations between physician and pharmacist were clearly defined and reciprocal. The proportion and form of the compounds and simples used in medicine were fixed by law, and supervision over the apothecaries was given to the censors of the College of Physicians.

I must now refer to two important epochs, viz., 1618—1704 and 1704—1815. The events of these epochs influenced the state of medicine and pharmacy deeply, and to this day. In ancient and mediæval times the defective state of knowledge may be held to be a reason for unenlightened action and want of progress. But it is humiliating that in these later times, whilst such men as Harvey, Willis, Sydenham, Malphigi, and Glisson, in medicine, and Galileo, Newton, and Bacon, in science, were doing work such as no age has ever witnessed, medicine, as an art, was in our country brought into a state of degradation and opprobrium. Yet so it was; the light the men I have mentioned shed, illuminated a later age than that in which they lived.

After their incorporation in 1616, the apothecaries became a powerful body. The College of Physicians became a close corporation and failed to carry out the high and important functions with which it had been endowed. The apothecary was made use of to further the interest of the physican, he was gradually introduced into the sick-chamber, taking reports of cases to the physician, and carrying out his instructions as to treatment. Then the imperfect knowledge of disease, and the confidence he gained, operating with the dearth of educated physicians, brought the apothecary to apply remedies himself—to depart from his proper sphere and undertake the duties of the physician. Thus the apothecary became a rival of the physician and at the end of the seventeenth century the physicians resorted to an expedient to keep the apothecaries in check. The dispensaries arose and out of them a disgraceful contest. A celebrated law case settled matters in 1703. The decision of three courts of law was reversed by parliament, and the right of the apothecary to visit and prescribe as well as compound and sell, provided he took no fee, was affirmed. Consequently the apothecary measured his own worth and his patient's means in the quantity and price of the medicine he could induce the patient to take. The physicians had to assent or did assent to the system of polypharmacy that was thus occasioned, and acted accordingly. The departure of the apcthecary from his proper functions called up the retail chemist and druggist to compound and dispense. But this new class came into collision with the apothecaries; and then, be it said, men of education and high purpose amongst the apothecary-physicians (Mason, Good, Burrows—all afterwards members of the College of Physicians) could not brook the position in which they were placed, whence in 1815 the Apothecaries' Society was empowered by charter to grant licences for the joint practice of medicine and pharmacy. Thus, the distinction between physician and apothecary was obliterated, and the functions of the latter were transferred to an ill-educated and incompetent set of men. Much to their credit, this state of things was set about being remedied by the successors of this very set of men, and in 1840 the Pharmaceutical Society came into existence to undo the corruption that had arisen in the seventeenth and eighteenth centuries, and to restore to the apothecary his proper status and functions.

In all countries, except England, the functions of the physician and pharmacist have been kept distinct. Before each a high standard of attainments adapted to their respective duties has been set, which each has been bound to reach. So, instead of rivals, each has been the zealous and intelligent co-operator of the other in his separate and defined work. That England should no longer stand alone amongst nations in respect of the relations between her physicians and pharmacists, and consequently in respect of the relations between the state of her medicine and the state of her pharmacy, is now the aim of the work of men amongst you who are bound to carry out what they undertake.

I will then take it for granted that it is the function of the pharmacist to co-operate with the physician; the one following science and the development of his art to that mode of therapeutics thus pointed out, the other ready and able to supply all the needs created by this development.

Let me now attempt to put before you some thoughts as to the present state of medicine and the tendency of therapeutics with special reference to the state of pharmacy and the tendency of pharmacy for the future.

Medicine works in these times by scientific methods.

The questions asked are, *Why* does this or that take place? Why and in what way do such and such remedies produce their effects? The answer to these and such questions is not now, as formerly, sought in vague theory and philosophical guesses. The answer is sought, first: by patient observation and experiment and strict verification of the facts so obtained. The ultimate problem of medicine is to find means to remedy every remediable disease. The most direct way to attack this problem would be to try means or agents in actual cases and to note the results, and this way has been, and is, much employed. But, as I have already indicated, the great obstacle to true results in such a direct mode of attack is the plurality of causes and the intermixture of effects, both in the nature of disease and arising out of the many possible ways in which remedies may act. Modern medicine, therefore, attacks the problem in a roundabout way. Observation and experiment are carried on alike in health and in disease, and under every variety of conditions. I need only refer to the researches of Professor Bennett on the action of mercury on the biliary secretions, and to Dr. Harley's work upon the old vegetable neurotics, for illustrations of the application of this scientific method to the building up of a science of therapeutics in medicine. But facts are liable to be accepted without verification, and this points to an obstacle and a danger in the use of this method. I am afraid we have in medicine a considerable accumulation of unverified and worthless facts, and I would only now to you pharmacists convey a caution founded thereon. Do not assume too readily that needs founded on such facts are worth satisfying; be careful that the scientific work you do is demanded in consequence of *verified* therapeutic or other facts. In the second place, modern medicine works by generalization or induction. The inductions or laws of medicine are chiefly derived from other sciences; such as properly belong to medicine are derivative or empirical laws chiefly. Steady progress in observation and experiment, however, may be expected to produce true inductions of a scientific character, and thus we get a wide and hopeful field for the future. Then, a third method is inference and the application of laws to new cases—deduction. Medicine itself, I have said, contains but few generalizations obtained by induction, but it contains many derived from physics, chemistry and biology, of sufficient range to be good for deductive inference, at least for converting empirical into scientific laws. It is from physiology especially that such laws are derived, and these have had great influence in controlling and correcting empirical practice.

Such being the methods of modern medicine, it is unnecessary to argue that there is any obligation on the part of pharmacy to follow medicine and adopt the same methods. If medicine, working by these methods and gaining true knowledge, takes special precautions to render the knowledge true, the needs of medicine, at least their character, will correspond. It is, therefore, incumbent on pharmacy to be equally careful to use the same methods in order to produce work of the same character. There is abundant proof that pharmacy does use them now-a-days, and strictly within its own sphere. I will therefore content myself here with some thoughts of a practical kind that are suggested. The use of these methods multiplies the subjects for investigation and marks off districts and special fields in particular departments both of medicine and pharmacy. I think the practical upshot of this is that there is great advantage in relegating to pharmacy some work previously taken up by medicine. Let me instance the important work undertaken by Professor Tuson as to the action of digestive fluids on mineral remedies, for an illustration of what I mean. It has been a question whether medical men should study pharmacy or even the materia medica at all. Whether they should or not very much depends on what is meant by study. If it means such a knowledge only as will prevent errors and give an intelligent appreciation of what one's own business is, and what others have to do; then, I for one, should advocate the separation. In any view, there is no doubt that the present modes of medicine do place within the sphere of the pharmacist much work previously performed by others. The point for the pharmacist to consider then is, how he may best place himself and his successors in a position to undertake the work.

If I were to ask what intrinsic circumstances have most contributed to the present development of pharmacy, I should probably be referred to the development of the sciences physics and chemistry. There is no doubt about the fact that the great development of organic chemistry has influenced pharmacy to an immense extent. And as to physics, especially that department known as molecular physics, the influence has also been great. The properties of matter, those of gases in particular, have received much elucidation from the progress of physical research. And improved means of conducting physical research have influenced pharmacy. This would have been so had medicine developed in any direction. But the present state of medicine is due in great measure also to the influence of physics and chemistry, and herein we find new points of interest and a new relationship.

Medicine might be termed a department of applied biology, and we should therefore seek in biology those features which physics and chemistry have impressed on medicine. Biology is nothing more or less in the present day than organized physics and chemistry, for the great generalization of modern times, the laws of the correlation and conservation of force, have been carried up into biology and have made that science what it now is. These laws have in fact been made deductively the key to the phenomena of life. Biology has come to be the study of matter and force under special and complicated conditions, and that department of biology to which medicine is most closely affiliated—physiology, to wit—is now investigated from this point of view. The activities of living things are now investigated as due to the association of the same forces with the same matter that exist in the not-living world, only associated under new and special conditions of composition, form and situation.

Matter with its stored-up force is constantly entering the body; therein the matter undergoes change and the liberated force does work of a special kind, special because of the speciality of the conditions; both matter and force are finally returned to the inorganic world to be re-embodied, rearranged, and made fit to repeat the whole process again. Such is a statement in a general form of the prevailing physiological philosophy. The matter is investigated as a branch or as part of the science of chemistry, whilst force and its associations with matter are studied as a part of the science of physics. And, as in physics and chemistry, results to be of value must be expressed numerically, so in physiology it is aimed to express its results numerically too—the work done in the body is estimated in units. Thus the relations between food and muscular work, and through this the changes in muscular tissue when at work, are now expressed in definite numerical form. We have heat and its work also with its numerical equivalent, and we have chemical work and even nerve work similarly expressed.

If such is the conception of life-processes in health, what of disease? Well, modern pathology is modern physiology over again, the conditions being different and the results different. Let me quote from Professor Haughton to illustrate this: "The work due to animal heat would lift the body through a vertical height of six miles per day; .... an additional amount of work, equivalent to the body lifted though nearly one mile per day, is spent in maintaining its temperature at fever-heat." Now turn to therapeutics and see the influences on it. Dr. Gull says "The strength of modern therapeutics lies in the clearer perception than formerly of the great truth that diseases are but perverted life-processes." The facts of fever are now generalized in the statements "elevation of temperature" and increased excretion of urea and carbonic acid by the kidneys and lungs; thence we get all that knowledge summed up in the statement, increased metamorphosis and disintegration of the blood and tissues. And we get also a scientific and rational therapeutics. To the fever patient now, instead of Galen's heat and aids to concoction, we give fuel in the shape of wine and beef-tea—we seek to retard the desintegration of tissue—and we seek to reduce the temperature and consumption of the body by the external application of cold.

You will be paralysed with fear, in your anticipations for the future of pharmacy if I venture to suggest the probability of an extension of such an absence of need, *quâ* pharmacy, in the practice of medicine. Let me hasten then to reassure you.

Therapeutics is not all scientific and rational yet, and as it daily becomes more so, in some directions new needs that the pharmacist may satisfy come more and more into view. Even when most rational, it is not necessarily independent of the remedial agencies which the pharmacist may supply. Therapeutics is mostly empirical, *i.e.*, it depends on old remedies and upon experience as a reason for their use. But the tendency is to destroy empiricism, not by omitting the use of remedial agencies, but by resolving empirical laws into secondary and scientific laws, finding out why our practice succeeds and why it is confirmed by experience. The method of observation and experiment avails here especially and is largely prosecuted at the present day. A great need is thereby created, and the obligation to satisfy it rests upon the pharmacists. In accordance with some principles I laid down early in this paper, precise knowledge of what the therapeutical observer uses is needed as one of the first conditions of the research. This is not wholly a matter that pure science is concerned with; as this kind of research grows the demand will necessarily arise for particular preparations, and much of the material advantage of pharmacy will depend on the ability to supply the demand. Closely connected with this special need is another arising out of the same tendency of medical practice. It is that the composition and quality of remedial agencies, whether used for purposes of research or otherwise, should be referable to known standards. Volumetric analysis and the balance are now used to determine the results of the action of medicines, and medicine needs more accurate standards than reference to the British Pharmacopœia affords. The solutions used in analysis to test the purity, and this be it observed is only a relative term, of medicinal preparations are titrated. Why not titrate or similarly provide constancy of composition in medicinal preparations with a view to accurate determinations of the results? I will give an illustration of these sort of needs out of my own experience. As some of you may know, I have recently been working upon the effects of a comparatively new remedy for rheumatism, trimethylamine. I desired to know what it was that I was using, but the pharmaceutical chemists seemed a little surprised at the precise character of the information I needed. I got readily enough the mode of manufacture, but further information I had to find for myself. One reason for this may have been that pure science does not pay. However, it turned out that a substance was manufactured which was not what it had been assumed to be, nor could I ascertain, unless I paid same one to perform the necessary work, the exact composition and nature of what had been used. Naturally, if precise knowledge of the composition of the remedy has not yet been supplied, it would be too much to expect that the composition should be referable to some scientific standards. And, in this case we have a remedy, with considerable empirical pretensions to efficacy, whereas a good deal of useless work was lately done by pharmacists in connection with a remedy for cancer—condurango—before it was found that its efficacy had not been tested, that its reputation was indeed founded on the vague ideas and imperfect observation of one or two men who lived a long way off. But it would be such a fine thing to get a specific for cancer!

Therapeutics is also largely chemical, and thus supplies abundant subordinate purposes to the pharmaceutical science and art. As our knowledge of the chemistry of the perverted life-processes extends, so will develop knowledge of how to cure by chemical agents. This certainly promises plenty of future work to pharmacy. That old nightmare of incompatibles, which has weighed heavily on the minds of many a student and practitioner, opens up also need in the direction of chemical pharmacy. Again, I want to give carbonate of lithium in solution, and I refer to the pharmacist accordingly. The solution by means of carbonic acid gas is too cumbersome for my purpose—then, says the pharmacist, give it in pill. Under such circumstances the physician must either turn pharmacist or leave things as they are.

And now, in conclusion. I have given you principles rather than rules, I have dealt with generalities rather than details, and this because I would rather give, if I may succeed, a direction to your thoughts than convey detailed information. To complete the matter let me give you one more thought that comes out of what has been said, and has affinity with some important work that is now exercising the pharmaceutical mind. What bearing has all this on the education of pharmacists? If it is the purpose of the art of pharmacy to supply the need of the physician, it will be supposed that he who has to supply these needs should at least be able to find them out and appreciate them. The time has gone by when medicine could dictatorially bid pharmacy provide this or that for her purposes, and in certain form, and call in the aid of the censors of the College of Physicians to keep the pharmacist up to the mark. There must be, I take it, some notion on the part of the pharmacist of that art whose needs he is expected to satisfy, as a condition of intelligent co-operation. How this is to be brought about and carried out I will not venture to suggest, but to dispose of possible objections I may make this remark. In proportion as you give any man a thorough knowledge of the purposes he has to fulfil will you ensure that he does not mistake the purposes of another art for those of his own; but you will complete the security by giving him some sound knowledge also of what those other purposes are and what they involve.

THE ACTION OF IODINE UPON RHUBARB.*

BY C. HUSSON.

When a specimen of rhubarb in lump is examined, the physical characters, described by Cauvet,† are nearly always sufficient for the purpose of recognizing the quality and source of the drug. When, however, the examination is made of a sample in powder, the physical characters are insufficient, and the chemical properties leave much in doubt. In this latter respect the author thinks it would be of service to place on record some observations as to the phenomena that occur when rhubarb is submitted to the action of tincture of iodine. Like nearly all vegetable substances, rhubarb is capable of taking up a considerable proportion of iodine. The causes of this absorption are numerous, and the alkaline salts take their part in the phenomenon; but it is incontestable that the organic matters are also concerned in it.

The test liquor used by the author was a tincture of iodine (1 in 40), added by means of a burette graduated to $\frac{1}{20}$ of a cubic centimetre. The experiments were made upon picked specimens, in which the physical characters were clearly recognized whilst whole, and which were afterwards reduced to a fine, but not impalpable powder. The method adopted for testing was to suspend 5 grams of powder in 125 grams of distilled water, which was afterwards evaporated in a porcelain capsule to one-half, with continual stirring. It was then poured without filtering into a white phial, and restored to the original volume, care being taken to wash the capsule with a little water to remove adhering particles. To this liquor, when cool, iodine was added, until it gave a blue colour with starch mucilage. As at the close of the operation it was difficult to recognize the starch reaction because the liquid was turbid, this was ascertained by removing a drop or two of the liquid by means of a glass rod from the phial and letting it fall on some starch mucilage placed in a porcelain plate.

China Rhubarb, flat variety.—The convex surface presented the white lines disposed in a delicate network, mentioned by Cauvet; the under surface also showed the stars indicated as characteristic. It crackled under the teeth, and was hard and compact. Five grams of the powder, treated by the above process, gave a beautiful yellow-brown decoction, which heated with the tincture—

Absorbed without changing colour . .	14 c.c.
Changed colour with	17 „
Became dirty green with	23 „
Gave freely a blue colour with starch with	25 „

Or after having neutralized 0·625 gram of iodine. Thus 100 grams of this rhubarb would absorb 12·50 grams of iodine.

If the decoction were allowed to stand after the operation it was remarked that the liquid portion separated with difficulty from the insoluble matters. At the end of twenty-four hours it formed two layers,—the upper of a dark brown colour, the lower of a greenish brown,—separated by a greenish blue line.

If instead of boiling the rhubarb it was allowed to macerate twenty-four hours in 100 grams distilled water, stirring it every hour for the first twelve hours, about one-half the quantity of iodine was absorbed.

Chinese Rhubarb, round variety.—This rhubarb presented the same white network as the preceding; the interior, although more porous, was far from being spongy. The absorbent power of this specimen was greater than the former, as the decoction did not give a blue colour with starch until it had neutralized 29 c.c. of tincture, or equal to 14·50 grams of iodine to the 100 grams of rhubarb. After standing the liquid separated into two layers; the upper of a fine yellow-brown colour, the lower of a rather dirty yellow.

It may be admitted that this rhubarb, having the same origin as the former, belonged to an older plant. The starch had become transformed, thus augmenting the porosity and absorbent power of the rhubarb. It follows that although less handsome than the preceding it is more active, provided that it has not become altered. The product obtained by simple maceration neutralized 7 grams of iodine per 100 grams of rhubarb, or about half the proportion neutralized by the decoction.

Russian Rhubarb.—The specimen experimented upon presented the characters indicated by Cauvet. The interior was of a dark yellow colour, veined at the centre in white and red. The colour of the decoction was a rather redder brown than the preceding. Upon the addition of the tincture of iodine it—

Changed colour with	10 c.c.
Became bottle green with	12 „
Became a deep greenish blue with . .	17 „
Gave a strong blue colour with starch mucilage with	20 „

Hence 100 grams of this rhubarb would neutralize 10 grams of iodine. Upon standing, the liquor quickly formed two layers; the upper layer was of a greenish yellow colour, the insoluble portion was greenish blue. The product of maceration absorbed 5·5 per cent. of iodine, or little more than half as much as the decoction.

French Indigenous Rhubarb.—The specimen used was a very fine one. The decoction neutralized 10 per cent. of iodine, or as much as the Russian rhubarb. It was distinguished from the other, however, by the phenomena which accompanied the absorption of the iodine. The first drops of the tincture upon coming into contact with the liquor coloured it blue immediately, which did not occur with the other rhubarbs. This colour disappeared quickly upon agitation. After adding of the tincture of iodine—

8 c.c. the liquor remained of a dull colour.
10 c.c. it acquired a bottle-green colour.
11 c.c. it acquired a blue-green colour.
12 c.c. it acquired a blue-black colour.
20 c.c. it blued starch strongly.

Upon standing, the liquor separated into two not very distinct layers; the upper being green, nearly black, the lower quite black. The product of maceration absorbed 5 per cent. of iodine.

The differences above indicated the author considers to be sufficiently distinct to assist in recognizing the nature of a rhubarb, whilst not neglecting known methods. He believes, in fact, that the greater the proportion of iodine neutralized before any change in the colour of the decoction is manifested, the more certainty there will be that a rhubarb is of good quality. On the contrary, the less the proportion of iodine required to produce a greenish tint in the liquid, and to give afterwards a blue-black residue, the poorer would be the quality of the rhubarb.

One practical consequence of these reactions, which the author points out, is the possibility of having a certain number of iodized preparations, in which the iodine is completely masked by the organic matter. Thus it would be easy to prepare an extract of rhubarb containing a considerable quantity of iodine, which would not be driven off from the combination under the influence of heat. He suggests the following formula for a syrup of iodized rhubarb, which would contain 5 grams of iodine per litre:—

Macerate for twenty-four hours, 100 grams of Chinese rhubarb, coarsely powdered, in 400 grams of water. Strain, press, and wash the residue with 100 grams of water. Filter so as to collect 400 grams of liquid. Add gradually a quantity of tincture containing 5 grams of iodine as concentrated as possible. Dissolve in it 800 grams of sugar, and afterwards strain.

---

* Abstract of a paper in *L'Union Pharmaceutique*, vol. xvi., p. 99.

† See PHARM. JOURN. [3], vol. ii., p. 1009.

THE IRISH PHARMACY BILL.

On Thursday a deputation from the Pharmaceutical Society of Great Britain waited on Sir Michael Hicks-Beach, Chief Secretary for Ireland, on the subject of this Bill, which stood for second reading on Monday next. The deputation consisted of the President and Vice-President of the Society, Messrs. R. Hampson, J. Williams, T. Greenish, C. Cracknell, J. Robbins, Cornelius Hanbury, Dr. Paul, Mr. Flux (the Solicitor), Mr. E. Bremridge (Secretary and Registrar), and Mr. R. Bremridge (Assistant Secretary and Deputy Registrar).

Mr. Flux, in stating the object of the deputation, said: I think I may say for this Pharmaceutical body that last year, when there was a Bill before Parliament which showed something like an acceptable scheme, the Society displayed the utmost readiness to assist Her Majesty's Government in passing a practical measure, and, in now offering some opposition to this Bill, it does so only in the discharge of what it considers a duty.

The Pharmaceutical Society was established in 1841, for (amongst other objects) the purpose of advancing chemistry and pharmacy, and promoting *an uniform* system of education of those who should practise the same and providing a fund for the relief of the distressed members and associates, and of their widows and orphans.

The Society has always been entirely self supporting.

In 1843 the Society was incorporated by Royal Charter, and empowered to appoint examiners and conduct (voluntary) examinations.

In 1852, the Pharmacy Act confirmed the charter, recognized the two examinations under it as being the Major and the Minor, created and protected the title "pharmaceutical chemist," authorized registers of the examined persons, placed on those registers as pharmaceutical chemists all then members of the Society, and entitled all who should thereafter pass the (voluntary) Major examination to be placed on that register.

In 1868, the Act to regulate the sale of poisons altered and amended the Pharmacy Act, 1852, created a register of and protected the title of "chemist and druggist," and entitled all pharmaceutical chemists and also all persons then in business as chemists and druggists, and all persons who had passed or should thereafter pass the Minor examination to be placed on the register of chemists and druggists, and enacted that the retailing, selling, and dispensing of poisons should be conducted only by persons on the register of "pharmaceutical chemists" and "chemists and druggists." The last mentioned Act made the appointment of examiners subject to the approbation of the Privy Council, and the conduct of the examinations subject to the presence of an officer appointed by the same Council. Thus there has arisen a recognized body of chemists and druggists, and within that class those exclusively entitled to the style "pharmaceutical chemists."

The Society continues to be a voluntary society, and all pharmaceutical chemists, and some chemists and druggists, are eligible for election to membership.

At the close of 1874 there were—

Registered Pharmaceutical Chemists and Chemists and Druggists	13,286
Registered persons who have passed the Preliminary examination	2000
Total . .	15,286

Of the above there were—

Members of the Pharmaceutical Society .	3374
Associates and Apprentices connected with the Society	1614
Total . . .	4988

within the corporate body.

The above-mentioned Society and the above-mentioned enactments operate within Great Britain only, and it appears that the limit has been of necessity, because there never has existed in Ireland a class of persons corresponding with the "chemists and druggists" of the said part of the United Kingdom.

The Irish Apothecaries' Acts have long been, and are now, in operation, so that all persons who in Ireland have kept open shop for the dispensing of medicines have been licentiates of the Irish Apothecaries' Company, and, virtually, medical practitioners.

In Ireland a system of local public dispensaries, conducted by medical practitioners, has existed; and there have been shops in which the sale of drugs and chemicals has been carried on in conjunction with the sale of groceries and other articles; but, in fact, the comparatively few shops in Ireland similar to the shops of the chemists and druggists in England have been conducted by licentiates of the Apothecaries' Company, or other medical practitioners, which facts would appear to give a reason for the absence of Irish co-operation in the foundation of, and progress of, the Pharmaceutical Society, and the limitation hitherto of that Society's sphere of operations to Great Britain.

The inconvenience of separate legislation relating to poisons so that one Act of Parliament applies to Ireland and the other Act applies to the remainder of the United Kingdom, appears by comparison of the Act to regulate the sale of poisons in Great Britain, 31 & 32 Vict. cap. 121, and the Act to regulate the sale of poisons (Ireland), passed July 14, 1870. Comparison of the earlier Act, sect. 17, and the schedules, together with the addition to schedules (pp. 160 and 162-5 of the Society's Calendar), with the latter Act, at pp. 306-7 of the same Calendar, will show that four classes of very dangerous poisons, which are in Part 1 of the schedule prevailing in Great Britain, are not poisons within the meaning of the Act operating in Ireland; and also that formalities necessary on the transmission of poisons by wholesale between the various parts of Great Britain (say from England to Scotland, or *vice versâ*) do not apply to similar transmissions of like poisons where those transmissions are from Great Britain to Ireland, or *vice versâ*.

In the parliamentary session of 1874, a Bill brought in by members representing Irish constituencies was laid before Parliament, and having for its object the extension to Ireland of the Pharmaceutical Society's operations, was considered by the Pharmaceutical Society, and that Society laid evidence before a select committee, disclosing its readiness to acquiesce in the legislation thus proposed, and showing that no dissatisfaction whatever with the Society or its operations prevailed in Scotland, and also that the Society was preparing to open its doors and its funds freely to Ireland, and establish in Dublin an examining Board similar to that which had always been maintained in Edinburgh.

The Society has a large establishment and accumulated fund for general purposes, raised mainly by subscription, an accumulated Benevolent Fund raised by subscription, and funds for scholarships and rewards raised exclusively by donation or subscription.

The operations of the Society involve an annual outlay exceeding £10,000.

The accumulated funds referred to comprise:—

General Fund in New Three Per Cents.	£18,000
Benevolent Fund in Consols	14,400
Bell Memorial Fund, Consols . , . .	2,050
Pereira Memorial Fund, Consols. . .	100
Secretary's Casual Relief Fund . . .	105
Hills Prize Fund	300
Total	£34,955

It was not and is not desired by the Pharmaceutical Society to establish a branch Society in Ireland, but on the contrary, that the Society's operations should be extended to Ireland, so that those resident in Ireland would be part of the general body and stand on a footing of perfect equality with those already within the Society and its operations.

The Society is prepared to change its name and become

"The Pharmaceutical Society," and as above suggested to admit all Irishmen who may acquire the proper status to participate in its Benevolent Fund and all other its benefits.

The report of the Parliamentary Committee (which Committee was almost exclusively composed of members representing Irish constituencies) was in favour of establishing in Ireland a separate Society, and the Bill now before Parliament is framed with that object and purports to establish a manner of reciprocity between the proposed Society and the existing one.

There is no existing Society or Society machinery in Ireland to be incorporated and utilized, but it would appear that the scheme of the Bill would introduce the novelty of creating by Act of Parliament a Society, appointing the President and Vice-President (each for life) and organizing a Board of Examiners.

The Bill does not disclose provision either present or future for the expenses of the Society, but contemplates provision for the expenses of examinations by way of fees payable by those who may be examined. The Bill then provides that all persons examined in Ireland (whether Irish or not) shall have the right of being placed on the existing registers of the Pharmaceutical Society of Great Britain, with a qualification to trade within Great Britain, and on such registration "shall be entitled to all the rights and privileges of pharmaceutical chemists under the existing Acts."

It is capable of demonstration that the fees payable by persons examined under the existing Pharmacy Acts do not exceed the moderate fees to the examiners and other expenses incident to the examinations, and as that is the case with the large number drawn from the area of England, Scotland and Wales, it appears a fair assumption that candidates drawn from the lesser area of Ireland will not provide funds adequate to the expenses of examinations in Ireland, and therefore, that unless the expenses of the proposed Society in Ireland be thrown upon the National Revenue, they will only be raised by a competition which shall induce the students of the other portions of the United Kingdom to pass their examinations in Dublin.

Thus the suggested reciprocity may assume the form of a competition in which the lesser body without traditions or resources may flood the proper area of operations of the older Society, and possibly destroy or hamper the important work of that Society.

The Bill now before Parliament contains in its preamble the following : "And whereas a great deficiency exists throughout Ireland of establishments and shops for the sale of medicines and compounding of prescriptions, and great inconvenience thereby arises to the public in many parts of the country."

The truth of the recital cannot be doubted, but the remedy proposed is not the extension to Ireland of the class or degree of chemists and druggists (that is of men fitted for the work of chemists and druggists) but is either to create in Ireland a new class which shall be equal to and rank with the highest degree of pharmacists in Great Britain, or to degrade the title pharmaceutical chemist, as it has been used in Great Britain, and confer the title upon those who, if examined within Great Britain, would pass on to the register of and be contented with the title of chemist and druggist.

Believing that the true mode of extending to Ireland the good which has been accomplished in Great Britain is to extend the operations of the existing body, and raise in Ireland the two grades, viz., pharmaceutical chemists and chemists and druggists, the Parliamentary Committee of the Society has passed in relation to the Bill resolutions as follows :—

1. That the Pharmaceutical Society of Great Britain regards as desirable an extension of the Pharmacy Acts to Ireland, so as to embrace Ireland within the operations of the Society, as Scotland has always been.
2. That the proposal made by the Pharmacy Bill now before Parliament for the establishment of a separate Society and examining body in Ireland, appears to be at variance with the policy of not multiplying examining bodies, and to be objectionable.
3. That the Society do oppose the principle of the present Bill.
4. That a deputation do wait upon Her Majesty's Chief Secretary for Ireland, and lay before him the resolutions of the Committee.

Thus with every desire to assist in the most liberal spirit the passing of a measure for the benefit of the whole country, it is deemed necessary to oppose the measure which has been introduced.

In further evidence of the desire referred to, this Society will prepare and submit for consideration a Bill, having for its object to provide one law for the whole kingdom, for regulating the trade of chemists and druggists, and the sale of poisons.

Since I have been in this building, my attention has been drawn to the fact that the laws under which the Medical Council now exists established a Council for the whole realm, and that Council has established a pharmacopœia which is known as the British Pharmacopœia, and operates throughout the three kingdoms, extinguishing the three separate pharmacopœias which formerly existed. Before the Act was passed establishing that Council, Parliament arrived at a resolution that it was undesirable to multiply examining bodies in medicine. Now this is a branch of medicine, and it would appear that the proposal to form a new examining body in Ireland is really opposed to that which would appear to be a proper and satisfactory course.

Sir Michael Hicks-Beach: Well, gentlemen, there is a very strong feeling in Ireland which was manifest in the Committee of last year, and of which I have had still further proof, that they would prefer a Pharmaceutical Society of their own, as they have a College of Surgeons and a College of Physicians of their own, to any union, so to speak, with the Pharmaceutical Society of Great Britain. It is impossible for the Government or for Parliament, I think, to ignore that feeling, and therefore I have introduced this Bill to carry out the Report of the Committee of last year, and I think that so far as regards the formation of a separate Society, that is a point of principle which I can hardly depart from. Your ground appears to me to be this, that the formation of a separate Society may interfere with your position in Great Britain.

The Vice-President : Quite so.

Sir M. Hicks-Beach : I should like to know precisely in what points it would do so. I see here you stated that the Bill provides that all persons examined in Ireland, whether Irish or not, should be allowed to be placed on the existing register, and shall be entitled to all the privileges and benefit attaching to pharmaceutical chemists under the existing Acts. You have stated to me certain rights and privileges which arise from participation in the funds of the Pharmaceutical Society which are, of course, to all intents and purposes their private funds, and in which I do not think that Irish pharmaceutical chemists, if such a body should be established, would have any claim to participate. If there is anything in the Bill which enables persons who may belong to an Irish Pharmaceutical Society to participate in your private funds and the advantages which you derive from being members of this Society, I shall be very happy to amend it. That is one point, but that is rather of a private nature. The public matter is of course with regard to keeping open shop, and there I think reciprocity is desirable—it is almost essential in fact. But that of course ought to be guarded by providing, if possible that the examinations, in both countries should be as nearly as possible similar, at any rate that there should not be a danger, if we can guard against it, that either in London, in Edinburgh, or in Dublin, any body should provide an examination of an inferior character with a view to improve its own position by attracting candidates to pass its examinations ; thus flooding other countries with inferior pharmacists. That is what you wish to guard against, I think?

The VICE-PRESIDENT: Quite so.

Sir M. HICKS-BEACH: In this Bill it is proposed by Clause 12 that all the regulations to be made by the Irish Pharmaceutical Society shall be subject to the approval of the Lord Lieutenant and the Privy Council in Ireland, and be laid before both Houses of Parliament. You are subject in the same way, are you not, to the English Privy Council?

Mr. FLUX: Yes; our bye-laws have to be submitted for approbation, and the name of each examiner as he is appointed or re-appointed is submitted for approval, and, of course, he has no office until his appointment is approved. Our examinations also are attended by a medical gentleman nominated by the Privy Council. Uniformity between the examiners in England and Scotland is practically accomplished in this way.

Sir M. HICKS-BEACH: Because the Privy Council extends to Scotland?

Mr. FLUX: Yes; what we are desirous of is uniformity in the examinations, and we see great difficulties about that if there are examinations over which we have no control whatever. For the purpose of securing uniformity between England and Scotland within the past year the two Boards of Examiners have visited each other, and I believe that even the officials appointed by the Privy Council interchanged visits so as to see that perfect equality and fairness prevailed. Then, again, the President and Vice-President of the entire Society are *ex officio* members of both bodies of examiners, and occasionally go to Scotland and see for themselves, whilst by having the control over the appointment of the examiners the Council take care that the examinations really are identical and conducted in a *bonâ fide* manner. If an examiner were to run cunningly in any shape or way he would not be reappointed, or he might even be removed. It is thought to be almost impossible to create an examining body outside of these forces which should maintain the integrity of the examinations. Even the title of pharmaceutical chemist is regarded as the private property of this body, but the Irishmen are proposing to adopt our title: they are not content to go on as apothecaries or chemists and druggists, but want to be known by a name which we have created for ourselves.

Sir M. HICKS-BEACH: That title does not extend to Ireland now.

Mr. FLUX: No; but they want to come from Ireland to England and appropriate to themselves that title. The impression entertained is this, that, a foreigner, if he comes to us with diplomas of any and every sort, must pass our examinations if he wants our qualifications, so if an Irishman, who is in that sense a foreigner, will insist on being a pharmaceutical chemist, he has only got to demonstrate his capacity by passing the examinations like any other person who might present himself. In the same way, our English people, if they went to Ireland and want to begin to trade there, must demonstrate their ability to pass an examination and submit to it in Dublin.

Sir M. HICKS-BEACH: I would simply throw this out as a suggestion. Supposing a power were given to you, and to the new society contemplated for Ireland, to make regulations for what may be called an *ad eundem* examination, subject to the approval of the Privy Council in each country, do you think that would be satisfactory?

Mr. FLUX: I can hardly say whether it would or not. In all probability the Irish would desire that they should have a similar voice, in the control of our examinations, which have had approbation here of nearly forty years.

Sir M. HICKS-BEACH: I said regulations subject to the control of the Privy Council in each country.

Mr. FLUX: It would be the Irish Privy Council in Ireland, and the English in England, and if we are to have any weight whatever in framing regulations for Ireland, the Irish body, when created, will say they ought to have a voice in the regulations for England.

Sir M. HICKS-BEACH: You rather misunderstood me. I suggested, and I wish this to be understood merely as a suggestion with a view to ascertain your opinion upon it, whether you will consider it a satisfactory opinion if you, as the Pharmaceutical Society of Great Britain and the intended Society in Ireland were enabled to frame regulations for examination *ad eundem* in their respective Societies, subject in each case to the control of the Privy Council of the country to which they belong.

Mr. FLUX: Such a suggestion has not been laid before us, so far as I know, but it shall be considered. One can hardly see how it would be a satisfaction to Ireland our having a voice in regulations which should operate with them without their having a voice in ours.

Mr. WILLIAMS: The mere framing of regulations, unless the Society had a control over the appointment of members of the Board of Examiners, would, I fancy, be of very little service. It is necessary to have that controlling power as we have in Scotland. We appoint the Board of Examiners there, though there is a local body in Scotland, whose duty it is to recommend the men to be appointed, and I believe we have never rejected anyone they have recommended. At the same time the appointment is in the Council of the Society as a whole, and unless we have the appointment as well as the mere power of drawing up regulations, I do not think we should have a real control over the examinations. The 18th clause of the Bill says every person registered as a pharmaceutical chemist in Ireland, is, upon application, without being obliged to pass a further examination, entitled to all the rights and privileges, and subject to all the liabilities of a pharmaceutical chemist in Great Britain; therefore he would be enabled to sit on the Council and to be President, and enjoy the privileges of the Benevolent Fund.

Sir M. HICKS-BEACH: I did not contemplate that those privileges should attach to the position. What was contemplated, I think, was this, the privilege of keeping open shop, which is quite another matter.

Mr. WILLIAMS: There, again, we are afraid—as he will possess the title of pharmaceutical chemist, which is our highest title, and is to be subject to only one examination, although that might contain all the points of our three—he would, probably not be so efficiently examined as our present men are. Our system is to have three examinations, Preliminary, Minor, and Major.

Sir M. HICKS-BEACH: You are assuming, what I do not admit, that the Irish Pharmaceutical Society would institute a lower class of examinations than you have.

Mr. WILLIAMS: Our theory is that it would.

Sir M. HICKS-BEACH: To go back to the suggestion I have already made—supposing these rights and privileges so far as keeping open shop is concerned, were strictly extended to all persons belonging to the Societies, having passed an examination in either country, except in cases where it might be considered necessary that there should be a further examination by the Society of the country in which the person wished to practise, leaving you or the Pharmaceutical Society of Ireland, as might be, the power of requiring persons coming from the other side and desirous of keeping open shop to pass some fresh examination—would not that meet your objection?

THE SOLICITOR-GENERAL FOR IRELAND: I think you hardly realize the suggestion of the Chief Secretary as regards the *ad eundem* degree. It would be for the Pharmaceutical Society in England to settle in the first place the conditions of the *ad eundem* examination for persons coming from Ireland; in the same way in order to practise in Ireland the Irish Society would have to settle the conditions of it; but in each case it would be subject to the control of the Privy Council in either country. Therefore, it is not likely the English Council would frame terms too easy for the Irish candidates, nor would this be likely to happen *vice versâ*.

Mr. Williams: Pharmaceutical chemists are rather the exception than the rule, and nine out of ten of those who keep open shop are chemists and druggists. You do not propose or offer in this Bill to make the trade reciprocal, but simply limit it to pharmaceutical chemists, our highest grade, who have passed the third, and more important examination. Therefore, the Bill is not really reciprocal, and as I imagine many of the places in Ireland you wish to supply with dispensing chemists or pharmaceutical chemists are not very large or important places, they would not afford a very good living for any man, and would possibly not attract the best men from England to settle in Ireland, though they might attract chemists and druggists, who are very numerous, something like 9,000 or 10,000. These are all excluded from reciprocity in this Bill.

Sir M. Hicks-Beach: I do not think it would be reciprocity if we included them, if our examinations were equally difficult for the degree of pharmaceutical chemist. It would be impossible to allow a chemist and druggist to come to Ireland and obtain all the privileges of a pharmaceutical chemist.

Mr. Flux: In Scotland last year only six persons presented themselves as candidates for the higher degree, and this consideration arises out of the observation just made—that if you examine only for the higher degree you will defeat the object of the Bill altogether; because the higher degree as it exists in this country, and as appears to be contemplated in Ireland, involves a greater amount of skill in pharmacy and chemistry than is required by those bodies who examine in medicine. Now your deficiency in Ireland at this moment arises from the fact that you only allow licentiates of the Apothecaries' Company to carry on business as chemists and druggists. When I was in Dublin last year, a physician explained to me that the cause of the dearth of chemists and druggists in Ireland was that young men had to prepare for such a high examination in order to obtain the degree of licentiate, that they preferred taking the little additional trouble which would secure to them a degree in medicine. But that trouble would not be equal to that necessary to pass our Major examination, and so acquire our degree of pharmaceutical chemist. Thus, if you only establish in Ireland, under this Bill, an examination which shall be stiffer than the existing examination in pharmacy and chemistry, you will provide no persons to carry on the business of chemist and druggist according to the necessity indicated in your preamble. If out of the whole of Scotland there were only six candidates you cannot expect any very considerable number in Ireland.

Mr. Hampson: We find from experience that many persons who pass the Major examination are educated beyond their calling, and they leave the business to become pure chemists, or to enter some other occupation. The majority of those in business pass the Minor examination for chemists and druggists.

Mr. Robbins: We also think that a person who is sufficiently educated to practise as a chemist and druggist in England, ought to be considered sufficiently educated to practise in like manner in Ireland.

Sir M. Hicks-Beach: Would you put that *vice versa*.

Mr. Flux: Certainly; if the test be the same.

Mr. Williams: It seems clear that a man who is competent to dispense medicine for English and Scotch people, is competent to dispense for Irish people. Our Minor examination declares a man competent to carry on business and to dispense medicines, but it does not declare him a scientific or highly qualified pharmacist.

Mr. Flux: It is as though you were to say that no man should practise surgery who had not passed the very highest degree.

Mr. Williams: We are afraid that England will be swamped by an influx of cheap and inefficient pharmaceutical chemists from the sister country. That is why we come here in the interests of our own body to call your attention to the matter. We have no objection in the abstract to a pharmaceutical society for Ireland; on the contrary, we would support such a thing.

Sir M. Hicks-Beach: You wish there should be some provision—that if Irish pharmaceutical chemists are allowed to practise as such in England, they should have passed a proper examination.

Mr. Williams: Exactly so.

Sir M. Hicks-Beach: If that is secured in any way, it does not much matter to you whether the Bill would provide for Ireland a sufficient number of such chemists or not.

Mr. Williams: No.

Mr. Hampson: But apart from the feeling which exists in Ireland, do you not think it undesirable to have a new body created, when there is one already in existence which is willing to do the work satisfactorily, and also to permit Irish members to sit on the Council, and to have all the privileges, and an equal share of representation, and so forth? Any scheme of a different kind seems to exclude all these points, and so produce a difficulty which does not exist at present.

Mr. Flux: If the control were left to the central body of course the examiners appointed to act in Dublin would be resident in Dublin; the Society would not be sending men over there from time to time to conduct the examinations. In Edinburgh they appoint gentlemen resident in Scotland, and the same would be done with regard to Ireland. I would also mention that I believe there is actually prepared by the Medical Council, or, at any rate, there is in contemplation, a measure for doing away with the great number of examining bodies in the various kingdoms, and providing for a uniform examination which should emanate from the central body.

The Solicitor-General for Ireland: It has been suggested that there is a great difference of opinion as to the propriety of doing so.

Mr. Flux: Not amongst the medical faculty, I believe.

Sir M. Hicks-Beach: Possibly not, but amongst those who have to be examined.

Mr. Flux: I believe it is found that an unduly large number of English students go down to Scotland to get their degrees, because they can do so with greater ease.

Sir M. Hicks-Beach: Well, gentlemen, I think perhaps the best plan will be for you to consider the suggestion I have made with regard to the *ad eundem* examinations, and that you should appoint, if you would, two or three of your body to see me again upon the subject. I can assure you I am only anxious that this Bill should benefit Ireland without interfering with you.

Mr. Flux: Would you allow me also to submit a bill which I have in draft for working out this difficulty according to the views of this Society? If you would consider the draft you would see the scheme in its entirety.

Sir M. Hicks-Beach: I have no objection, but I believe your views were fully put before the Committee last year, and were not accepted for the reasons I have stated.

Mr. Flux: At the same time I think it is really imperial legislation which we are fairly entitled to look for; not English, Scotch or Irish legislation, but legislation for the whole realm.

Sir M. Hicks-Beach: What you are entitled to is a Bill to carry out what is wanted in the best way.

The President: I would venture to throw out the suggestion that you should follow the plan we have adopted for so many years of having three examinations—Preliminary, Minor, and Major.

Sir M. Hicks-Beach: I will consider it, certainly.

The President: We understand you will not bring forward the Bill for second reading until we have seen you again.

Sir M. Hicks-Beach: Certainly. I shall not bring it forward on Monday next. But I shall be glad if you will see me again about it as soon as possible.

The deputation having thanked the Chief Secretary for his courtesy then withdrew.

The Pharmaceutical Journal.

SATURDAY, MAY 29, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE IRISH PHARMACY BILL.

THE greater the consideration bestowed upon the details of the Irish Pharmacy Bill now before Parliament, the more apparent it becomes that the Bill, so far from accomplishing a public good for the United Kingdom, can, at its best, produce a very limited benefit to Ireland and is pregnant only with mischief to the other portions of the United Kingdom.

We believe the Bill to be unique in proposing to create by Act of Parliament a Society, and to be singular in raising up for a proposed Society a President and Vice-President to hold office for life. The Bill is silent as to the monetary provisions clearly necessary for the machinery of a Society, and leaves the inference that the taxpayer is to be resorted to.

Whilst the Bill proclaims a great deficiency "throughout Ireland of establishments for the sale of medicines and compounding of prescriptions, that great inconvenience thereby arises," etc., the remedy proposed for the evil is that of creating pharmaceutical chemists, and not that of creating in Ireland or permitting there the very useful class of chemists and druggists. Thus the evil for which the Bill professes to provide a remedy is in a fair way of being perpetuated by it; for, as is known, the examinations in pharmaceutical and general chemistry necessary for the Major Examination (that being the examination requisite for the title "Pharmaceutical Chemist") are a more severe test of proficiency than the examinations in the same subjects which are required of candidates for degrees at the Apothecaries' Hall in Dublin. It will follow therefore in the future (as it has been in the past) that in Ireland the young men who have to prepare for the examinations requisite for keeping an open shop for compounding medicines will go on and complete the curriculum and become medical practitioners. Hence if the Bill became law the Irish Board of Examiners might be left in the difficulty of seeing young men continue to pass through the Apothecaries' Hall and become apothecaries, or of having to lower its own examinations so as to attract young men to them; and we do not perceive how young Irishmen are to be attracted by a proceeding which shall fail in attractiveness with the young men from the other portions of the Empire.

Reciprocity between the existing Society and the one proposed appears to be contemplated by the Bill, but that can only be of the kind possible between a large and vigorous body and a new creation; full reciprocity between the registered persons is not proposed. Persons who are pharmaceutical chemists on the existing Register are to have the privilege of going on the Irish Register and those who through the Irish Board may pass on to the Irish Register are to have the privilege of passing on to the existing Register, "and all the rights and privileges which those on that Register may possess;" but the important and numerous body of chemists and druggists not pharmaceutical chemists are to continue excluded from Ireland.

It is impossible to suppress the inquiry whether the promoters of the Bill are in good faith going for a measure in the interest of the United Kingdom, or for that which, in common phraseology, is known as a job. We hope for the former, feeling confident that, if the subject be impartially approached and considered, it will be seen that the true course is that which the existing body proffers in a liberal spirit; that, is the extension of itself over the area hitherto unoccupied (unoccupied only because the occupation has not been invited), and the welding of the great body of chemists and druggists throughout the United Kingdom into one Society without competing interests, with like sympathies and energies, and only one set of expenses.

The leading facts bearing upon the subject have been embodied in a paper, of which a print will be found at page 951, and to that we invite especial attention, regarding as possible, and indeed, probable, the necessity for every chemist and druggist giving individual consideration to the subject, and contributing the weight of his judgment to the matter in hand.

If Ireland is resolved to create a separate body, and have separate pharmaceutical legislation, there would appear to be no hardship in confining the effect of that legislation and the whole work and effect of the new body to Ireland; so that in the probable event of an Irish gentleman desiring to commence business in England as a chemist and druggist, he shall be left to demonstrate his capacity by the ordinary mode of passing the examination which his brethren in England are subjected to. A foreigner or colonist coming to England with the highest diplomas finds them of no avail; and if Irishmen will insist upon being, in a manner, foreigners within Great Britain, they should stand as foreigners, and not, on the one hand claim to isolate themselves, and on the other hand claim to invade a class of Britain.

DRUGGING OF ANIMALS.

On Monday last a Bill "to make the administration of poisonous drugs and compounds to horses and other animals a punishable offence," bearing the names of Sir John Astley, Mr. Chaplin, and Mr. Rowland Winn, was read a first time in the House of Commons. It will be remembered that at the meeting of the Council of the Pharmaceutical Society, on the 5th instant, a communication from Sir John Astley was read, suggesting that sulphuric, nitric, and hydrochloric acids, the sulphates of iron and copper, and several other articles of a similar character, should be placed in Part 1 of the Schedule of Poisons, a suggestion to which the Council did not feel able to accede. At the time of going to press the Bill had not yet been printed.

PHARMACY IN VICTORIA.

We regret to learn from the Report of the Council of the Pharmaceutical Society of Victoria, just received, that political complications and the illness of the late Chief Secretary, have balked the hopes of the pharmacists of that colony that before this time the Legislature would have granted them a Pharmacy Act. The nature of the Bill which the Society has urged the Government to bring forward has been described in a former volume* Another effort is, however, to be made, and, should the reply of the Government to a Deputation be favourable, the President of the Society will introduce the Bill, and it is hoped there will be little difficulty in carrying it through all its stages. We are not quite sure, however, that the members are so alive as they might be to the importance of active co-operation as an element of success in attaining the objects of such a Society. At any rate, although the balance at the bankers has increased, a praiseworthy attempt to establish "evening meetings" collapsed through the meagre attendance and languid interest taken in them.

If we may judge from its second annual report, the Victorian Chemists' Assistants' Association is more vigorous than the senior society. During last year it established a reading-room supplied with a selection from the leading pamphlets and periodicals relating to chemistry and pharmacy and the allied sciences published in England, America, France and Germany. The library already contains more than 150 volumes, and the nucleus of a museum has been formed. Chemistry classes have been successful and well attended, and several papers have been read before the Association by members. On the occasion of the second annual meeting, Baron Ferdinand Mueller, the Government Botanist, who has been elected patron, delivered an admirable lecture on the services rendered to science by pharmacists, which we hope to print in a future number.

* Vol. iii., p. 960.

HASTINGS AS A HEALTH RESORT.

Some short time since we noticed in a contemporary journal an inquiry as to the present sanitary condition of Hastings originating from the circumstance that a lady, who was desirous of taking change of air there, had been warned that small-pox was raging in the place. In referenee to this subject the report of Mr. Ashenden, the Medical Officer of Health for Hastings, has just reached us, in which it is stated that the inspector has reported to him five cases of infectious disease, and that measures have been taken to prevent their spread. He also states that in three instances notices were received by him reporting cases of infectious disease, which upon inquiry were found not to exist. Attention is particularly called to the small mortality from zymotic disease, there having been only seven deaths during the past quarter against thirty-three — chiefly from croup and whooping-cough—during the corresponding quarter of 1874. At the present time it is stated that there is an almost entire absence of any sickness of the same class.

A donation from Mr. Peter Williamson and a bequest by the late Professor Proctor have enabled the Board of Trustees of the Philadelphia College of Pharmacy to issue the regulations for the award of a scholarship and a prize in connection with the next and following courses of lectures at that institution. The "Peter Williamson Scholarship," consisting of matriculation and lecture tickets will be awarded annually to "one needy and deserving student," who may be elected by the Board of Trustees. "The Proctor Prize" will be annually awarded to the most meritorious graduate in pharmacy, provided that he, in the opinion of the Board, is deserving of such prize—which may consist of a medal, books, or instruments.

The subject which had been chosen by the Paris Academy of Medicine for the Orfila prize of the present year, 2000 francs in value, was "De l'aconitine et de l'aconit." Two memoirs were sent in, neither of which, however, has been deemed worthy of the prize, and it has been decided to continue the subject for the competition of 1876.

It will be interesting to botanists to learn that the new Judge, Mr. Nathaniel Lindley, Q.C., appointed to succeed Mr. Justice Huddlestone in the Court of Common Pleas, is the only son of the late Dr. Lindley.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The thirteenth and concluding meeting of the session was held at the Royal Institution, May 20, 1875. The President, Mr. A. H. Mason, F.C.S., in the chair.

After the routine business, Mr. E. Davies made some remarks on salicylic acid, explaining Kolbe's process for its manufacture from phenol, and exhibited a sample which he had made by that process. In his opinion the very slight solubility of salicylic acid in cold water, 1 in 1000, and its non-volatility were much against its value as an antiseptic.

The President exhibited the milligrade thermometric scale introduced by Mr. John Williams, F.C.S., and explained the principle as follows:—Mercury freezes at 40° C., and boils at +360°, in other words, there is an interval of 400° C. between the melting and boiling of mercury. This space is divided into 1000°: thus 2° C. become 5° Milli., so the proportion between the two scales is very simple. Multiply C. by $2\frac{1}{2}$, and add 100, and you have the *M* number. Proportions of various scales: 5° C. = 9° F. = $12\frac{1}{2}$ M.; 50° M. is not far from 0 F.; 150 M. is about 62° F.; 200 M. rather above blood heat. Certain advantages are at once apparent, the degrees are much smaller than those hitherto in use, thus avoiding the necessity of fractions; again, practically, minus degrees are avoided—for it is very seldom we require to take temperatures under the melting point of mercury, still it is at a glance known what temperatures are under 100; again, as the higher numbers are approached, you know that you are reaching the limit of thermometric registration, and therefore the mind is able to grasp the true comparative temperature better than by other systems.

A discussion followed in which the principal objections raised were, that the zero and 1000° could not be directly estimated, and that owing to the unequal expansion of mercury at various temperatures, to fix two points by the boiling and freezing points of water, and from these mark off higher and lower degrees, would present no difference from the method now used.

The President then read his valedictory address. He commenced by stating that thirteen meetings of the Association had been held during the past session, and then gave a short summary of the papers which had been read. Incidentally, he referred to an opinion he had expressed in his address at the commencement of the session, that pharmacy was a science and an art, to which opinion, he said, objections had been taken. In its support, however, he quoted the following words of Professor Hofmann at a meeting of the Pharmaceutical Society, held in April last. Professor Hofmann had said:—"It would seem that chemistry, which owed its origin to pharmacy, was now, after having almost forgotten this early association, returning in a measure to the source and fountain-head accepting as it did most gratefully the endless variety of subjects which the researches in pharmacy and the natural sciences allied with it were daily presenting for inquiry." He (the President) would therefore maintain that the strides of progressive knowledge had given to pharmacy a place amongst the sciences; and it was an art far more than a mechanic's art if viewed in all its true bearings, although he admitted that conventionally amongst pharmacists and chemists were included those who simply *read* pharmaceutical products and chemicals either in the compounding of medicines or to supply human wants. With respect to the history of the other business of the session, the President continued:—"Your Council decided at the commencement of the present session to vary the provision for our general meetings by making alternate evenings of a more conversational character, and hoped by doing this to induce younger members to come forward to the front ranks. Four such meetings have been held. Two in the Gallery of Art—at which, after the formal business had been transacted, the members were invited to inspect microscopes and objects likely to be of interest to them. There was at first an impression that these meetings were intended for students only, as suggested last session, the attendance, therefore, was very small. Two meetings were held here; at the first, Mr. Abraham read a short paper entitled 'Some Notes on the Starches of Commerce,' and, with illustrations exhibited under his splendid microscopes, showed how easy a matter it is to detect adulterated starches, or to distinguish true wheaten starch, from the flattened oriform shape of its granules. We learned from this paper that a very small proportion of the starch powder of commerce is of the orthodox standard. I have every confidence that these meetings will be much more appreciated if continued another session, as the attendance at the last was much larger, and the expressions of approval by those who were present was encouraging. Our best thanks are due to Messrs. Abraham, Davies, Murphy, Armstrong, and Redford, for exhibiting microscopes and other objects of interest, explaining them to those present, and then contributing to make the intermediate meetings successful. The discussions which have taken place have been quite up to the average of previous sessions; they have been interesting, legitimate, and well maintained with that gentlemanly courtesy with which alone they should be. We have had several contributions of importance to our museum and library, and your thanks have been duly accorded to the donors. Eight members, and 3 associates have joined our Association which at present numbers 131 members, and 19 associates. Though I have so far been able to report favourably of work done, which I hope I may say will bear comparison with any previous session, I regret that my efforts have not been rewarded with the encouragement I could wish—'All that glitters is not gold.' The attendance at our meetings has been small—comparatively very small, and although this is an evil which is shared by most kindred associations, it is a matter of regret to me that the members have not felt the provision which has been made sufficiently attractive for them to attend. I admit that there have been many difficulties in the way; the weather on each of the evenings of our earlier meetings was most inclement; there have been many attractions of a scientific nature provided elsewhere—perhaps during no previous session have there been so many, the Science Lecture Association and the Corporation Free Lectures being more numerous. Again, our members are scattered over a large area, and, perhaps, our meeting room is not sufficiently central. However, I am thankful for great mercies, with only small audiences, and can only all the more appreciate the presence of those who have helped to bring our session to a successful issue. I have another grievance—our School of Pharmacy has simply proved a failure, the classes have not yet terminated, but I am sorry to say that the attendance has been so small that either the Association has filled her mission in providing these classes, or there is room for great alteration. I am inclined to think we make a mistake in having a proviso that a minimum number of students must join before the classes are held—it causes a feeling of uncertainty amongst intending students. Your Council discussed the desirability of withdrawing this proviso by providing fees for the teacher and looking for remuneration from the students. I regret that it did not see its way to obviate the difficulty, at least, not in such a way as our very able teacher, Mr. Davies, could see his way to accept. Mr. Davies, however, voluntarily removed the proviso, and the classes have been held. There are here also difficulties to contend with; many students have a long distance to come, and it is difficult to arrange a suitable hour which shall be convenient to all concerned. I trust your Council will yet see its way to announce that next session the pharmacy classes will be held irrespective of the number of applicants, for I cannot help thinking there should be a want for such a school in this town, and this may now be felt more since it has been ruled that pharmaceutical chemists in business are eligible candidates for the office of public analyst. I trust my successor will be more successful in this matter. Amongst several of our members there is a feeling that our meetings should be more scientific, that there are other scientific chemists in the town who should be induced to join us, and that these members who do not attend should be provided for in this way. I am inclined to sympathize with this, and think that the idea of holding strictly scientific meetings alternately with those which shall be of a conversational nature, with a short paper provided of special interest to pharmacists, would be more advantageous. At the same time we must not overlook the fact that the Association originated with the pharmaceutical element; by it the excellent museum and library have been formed, and with this there is a grand nucleus for further development. One difficulty I am thankful to say has been quite settled during the present session, *i.e.*, the admission of trade questions. A distinct association has been formed with this object, confined to retail traders only; several members have joined, and although they have appointed an official secretary, the urgency of their formation has proved such, that they have not since called a single meeting to accomplish their objects. The President concluded his address by thanking the members of the Association for the kindness and courtesy shown to him during his term of office.

A vote of thanks to the President for his valuable address was proposed by Dr. Nevins, and seconded by Messrs. Redford, and Armstrong. The motion was carried by acclamation, and the meeting closed.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Meeting of Executive Committee,

The Committee met at 10 a.m., on the 19th inst., at 17, Bloomsbury Square. Professor Bentley, Vice-President, in the chair.

The minutes of the previous meeting were read and confirmed.

Professor Attfield announced that as a result of the invitations to membership he had issued last summer, not only had five hundred candidates been elected at the Annual Meeting in August, but about four hundred additional names had since been received.

The Committee then duly elected the four hundred candidates.

Mr. Louis Siebold, editor of the 'Year-Book,' attended the Committee and presented a report from which it appeared that he had quite recovered from the illness which had caused delay in the issue of the current year-book, that materials for the next year-book had already been arranged and posted so far as was possible to a recent date, and that the whole of the manuscript of that volume would, he was sure, be laid on the table at the next annual meeting.

In connection with the Bell and Hills library fund, Mr. Hills suggested that if the Bristol Pharmaceutical Association accepted the usual grant of books, they should, if practicable, be obtained, bound, and presented in time for them to be placed on the table at the annual meeting of the Conference.

Mr. Schacht undertook to make inquiries, and, if possible, carry out arrangements by which Mr. Hills' suggestion should be carried into effect.

Ordered, that the salary of Mr. R. H. Davies, the assistant secretary, be increased from £25 to £40, dating from the commencement of the current year.

Professor Attfield reported that since the commencement of the Conference year he had received 2328 subscriptions, of which 1800 had been sent in response to a first application, 392 after applying a second time; 136 members had required three applications, and 422 subscriptions still remained unpaid. The total number of members was about 2750. He had been endeavouring to interest colonial pharmacists in the Conference, and as a result several Australian chemists had joined, many of whom had requested to be supplied with back volumes of the 'Year-Book,' and had offered to contribute any local information required in aid of research. The 'Year-Book,' 1874, had been sent to every member who had paid the subscription.

The date of the approaching annual meeting for 1875 was announced—Tuesday, August 24, and Wednesday, August 25; and the usual meeting of the Executive Committee on the evening of Monday, August 23, at Bristol.

The meeting for 1876 will probably be held in Glasgow; for the British Association for the Advancement of Science will assemble there in that year, and an invitation to the Conference from the Glasgow Chemists and Druggists' Association has already been received.

CHEMICAL SOCIETY.

Thursday, May 20, 1875. Professor Abel, F.R.S., President, in the chair. After the usual business of the Society, Mr. A. H. Smee read some "Notes on Milk in Health and Disease." From the results of numerous experiments, he finds that when cows are fed on sewage grass the milk soon goes putrid, and the butter made from it is soft and yeasty and rapidly becomes rancid. He also noticed the outbreaks of typhoid which had occurred in various places owing to sewage water having been used to cleanse the dairy utensils or to reduce the quality of rich milk to the lowest standard permitted by law. A long and interesting discussion followed, after which Mr. W. H. Deering read a paper "On some Points in the Examination of Waters by the Ammonia Method," in which he proposes certain modifications to facilitate the application of the Nessler test and eliminate incidental errors. There was also a communication from Professor H. Howe, "On some Nova Scotian Triassic Trap Minerals." The meeting was afterwards adjourned until Thursday, June 3, for which the following papers are announced:—"On the Effects of Pressure and Cold upon the Gaseous Products of the Distillation of Carbonaceous Shales," by J. J. Coleman; "On the Agricultural Chemistry of Tea Plantations of India," by Dr. Campbell Brown; "On the Structure and Composition of Pseudomorphic Crystals, having the form of Orthoclase," by J. A. Phillips; "On Nitrosyl Bromide, and on Sulphur Bromide," by M. M. Pattison Muir; "On the Action of Chlorine on Pyrogallol," by Dr. Stenhouse and Mr. Groves; "On some new Derivatives of Alizarin," by W. H. Perkin; "On some Metallic Derivatives of Coumarin," by Robert Williamson; "Note on the Action of Chlorine on Acetamide," by Dr. E. W. Prevost; "On the Action of Dilute Mineral Acids on Bleaching Powder,' by Ferdinand Koffer; "Note on Sulphate of Narceine and other Narceine Derivatives," by Dr. Wright and Mr. Beckett.

PHILADELPHIA COLLEGE OF PHARMACY.

The seventh meeting of this College for the present session was held on April 20th, the President, Mr. Dilwyn Parrish, in the chair.

Amongst the donations to the library and cabinet was a copy of the 'Year-Book of Pharmacy,' and a specimen of a new variety of cinnamon, which is mentioned on page 477 of Flückiger and Hanbury's 'Pharmacographia,' under the name of China cinnamon; it was in unscraped quills, and had a saccharine and pungent cinnamon taste. A sample of the same in powder was likewise exhibited; it was much darker in colour, but of a stronger cinnamon flavour than the ordinary powdered Chinese cinnamon.

The President presented a bottle of "crab orchard salt," and Mr. G. W. Kennedy remarked that in Tennessee this salt, but of a darker colour than the specimen, was sold to be used in place of Epsom salt.

At the request of the President, Mr. R. V. Mattison gave the following information respecting "crab orchard salt:"—

"Crab orchard salt is obtained from a tract of land in Lincoln county, Ky., about three miles wide and fifteen long, called the 'Epsom Belt.' Wells are dug in the ground, and the rain, percolating and lixiviating the soil, which contains a large percentage of the sulphates of sodium, potassium and magnesium, collects in these wells, and is from thence evaporated in iron kettles, and brought into the market in barrels. As found commercially, it consists of varying proportions of organic matter and water, from 15 to 40 per cent., with balance of the above alkaline sulphates and some sodic chloride. The insoluble portion (I have obtained 30 per cent. upon solution and filtration) consists of silicaceous and organic matter, with about one-tenth of one per cent. of ferric oxide.

"A short time ago the product of this belt of land was leased or purchased by a stock company (Col. Shelby, Dr. Blackburn and others), who now control the salt, and have raised the price of it from 23 and 27 cents to 63½ and 75 cents, selling it only in bottles. Regarding Dr. Blackburn's statement that 'a large quantity of artificial salt is sold, and that it is very injurious,' we agree to both statements. First—there is a very large quantity of artificial salt sold. Second—the sale of this artificial salt *is* very injurious, but *only* to the *pecuniary* interests of the company, and not, as Dr. Blackburn, who in the interest of the company desires to impress people with the belief that it is injurious to their health. It is no more so than Epsom salt, or similar purgatives."

Dr. Pile presented a handsome specimen of crystallized bromide of sodium.

Dr. Miller presented three samples of oil of cedar; pure German, cedar of Lebanon for perfumery, and a commercial sample of a strong turpentine in odour; also, Cochin ginger-root and a powder from it; this root is devoid of the coating of lime adhering to bleached Jamaica ginger, but yields a whiter powder; also, a sample of North Carolina and of Texas *serpentaria*. Professor Maisch remarked that the former was the produce of *Aristolochia serpentaria*, Lin., and the latter of *A. reticulata*, Nuttall. The United States' market is now almost exclusively supplied with the latter variety, which is known as Red River snake-root, and is sold for half the price of the former. Dr. Miller also stated that stavesacre was sometimes sold for the seeds of *Delphinium consolida*, Lin.; the latter are much smaller and darker in colour.

Liquor Potassii Citratis.

Mr. Augustus Hohl read a paper in which he referred to the great difficulty experienced in keeping this solution —which in the United States is largely used in medicine —fresh and clear. Many formulæ which he had tried yielded products that always turned turbid and flocculent in a short time. The following, however, he recommended as not open to this objection:—

1. ℞. Citric Acid . ℥i. Distilled Water f℥viii. Dissolve and Filter.	2. ℞. Bicarbonate of Potassium . ʒxi. Distilled Water f℥viii. Dissolve and Filter.

Two solutions are thus obtained ready for use; and when liq. potass. citr. is ordered, all that is necessary is to mix equal parts of the two, allow it to effervesce, and the preparation, fresh and clear as crystal, is ready for use.

The above quantities are double those of the 'United States' Pharmacopœia.'

Wine of Tar.

Mr. J. B. Moore read a paper in which he recommended the following formula for this preparation:—

℞.—Tar, pure	℥xvi., troy.
Glycerin	
Sherry Wine	
Honey	āā f℥viii.
Acetic Acid	f℥i.
Boiling Water	O vi.

Mix the glycerin, sherry wine, honey, acetic acid and boiling water together, in a stone jug or other suitable vessel of the capacity of a gallon. To the mixture add the tar, and shake the whole vigorously for several minutes. The vessel is then to be tightly stopped and placed upon a stove or in a water-bath, resting upon folds of paper, and the mixture digested, for an hour or two, at a temperature of from 150° to 160°. During the digestion, the mixture should be frequently well shaken. When the digestion is completed, the mixture is to be set aside to macerate, in a warm place, for a few days, it being well shaken occasionally during the process. Lastly, strain through muslin, and filter the strained liquid through paper.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture V.

(*Concluded from page 898.*)

Alum is a powerful astringent, producing constipation, and sustaining a persistent dyspepsia so long as it is being swallowed. Nitric acid is an astringent, exerting also a physiological action on the liver. Sulphuric acid is an astringent; and butyric acid, as I found in an original research which I once conducted with it, causes a congested or inflammatory condition of the whole track of the mucous membrane.

Thus each one of these agents added to the alcoholic drinks increases the evils that are likely to arise from the alcohol itself. Let us admit that the added evils are small, nay, I had nearly said, infinitesimal, when considered by the measurement of one administration. But who can measure by that standard? When once the taste for one of these unnatural substances is acquired it grows by what it feeds on, and that which was infinitesimal at the beginning becomes after long continuence a serious charge for the body to bear daily.

The spirit in common use that is most subjected to the chemicals I have named is gin. Gin has to be made cordial, to be sweetened, to be rendered creamy and smooth, to be flavoured, to be made biting to the palate, to be beaded, and what not else. To be made "cordial" it must be charged with oil of juniper, with essence of angelica, with oil of bitter almonds, with oil of coriander, and with oil of carraway. To sweeten it, it must be treated with oil of vitrol, oil of almonds, oil of juniper, spirits of wine and loaf sugar; to "force down" the same it must be further treated with a solution of alum and carbonate of potassa. To be rendered creamy and smooth, it must be sweetened with sugar, and lightly charged with a small quantity of garlic, Canadian balsam, or Strassburg turpentine. To give it piquancy, it must have digested in it shreds of horse-radish. To be made biting to the palate, it must receive that touch of caustic potash of which I have spoken.

As you see the habituated gin-drinker partaking of his favourite drink you observe, often, that he enjoys it the more if it be what he calls "pearly," or "beaded." He holds up the precious liquid in his glass, and as he sees the oily fluid as beads roll down the side, leaving each a creamy train behind it, he rejoices in his treasure. It is *crême de la crême* of gin. Those wicked pearly drops are, to his flushed eyes, the proofs of the purity and excellence of what he would probably tell you was, without mistake, the genuine article. The genuineness consists

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts*.

in the fact that our enthusiastic friend's gin has been beaded by the addition of the following artistic mixture :—An ounce of oil of sweet almonds has been added to an ounce of oil of vitrol. These have been rubbed together in a mortar with two ounces of loaf sugar until a paste has been formed. The paste has next been dissolved in spirit of wine until a thin liquid has been produced ; and this, added to one hundred gallons of gin, has given the fine pearly bead that is so much admired.

Redding, in his history and description of modern wines, narrated in his day the many receipts that were openly published in the then existing publicans' guides and licensed victuallers' directories for the artificial manufacturing of wines, and for modifying spirituous liquors. I have gone for my information to a similar work of the present day, 'The New Mixing and Reducing Book,' which is, I understand, one of the handbooks of the retailer, the same to him as the pharmacopœia is to the druggist, and to be followed in all the varied arts as implicitly. I cannot leave this book without reading from it a quotation that bears directly on the health of the poorer classes, who indulge in gin.

"Gin, it may be observed, is of all the spirits ordinarily kept by a publican the one which, when cleverly managed, yields him the greatest and securest profit. The reason of this is that there is hardly any definite selling strength for gin, especially if it be sweetened. Within very wide limits no complaint is made by customers on the score of weakness, provided only the gin is creamy, palatable, and sharp tasted. But the slightest taint, or the slightest fault of colour, or a sensible difference in the usual flavour, will lead to dissatisfaction and loss of custom. Strong or unsweetened gin is in comparatively little request, and then with few exceptions only amongst the respectable or monied classes. At least three-fourths of the spirit sold over the counter of a public-house consists of sweetened or made-up gin ; and as the sugar greatly alters the character of the liquor and deadens the original strength, it is possible for the retailer to consult his own interests by a liberal addition of water without in any degree exciting the disapprobation, or injuring the health of those who patronize his establishment.

"As a tolerably safe general rule there will be no occasion to fear dissatisfaction when sweetened gin is not brought below 35 or even 40 per cent. U.P. It is then nearly five times as strong as old ale. Much more is thought of a pleasant warming aromatic taste or smack than of simple alcoholic strength. But as the most careful man may sometimes overshoot the mark in reducing, it is advisable to know how to restore the requisite degree of pungency and sharpness, without having recourse to the use of so expensive an agent as spirits of wine. Supposing, then, that by accident the strength of a parcel of gin has been lowered rather too far, a good and cheap remedy is the following :—For 100 gallons, 1 ounce of cassia, ½ ounce of chilies. Steep for a week in a pint of spirits of wine ; then mix well with the gin."

The other spirituous liquors, rum, whisky, and brandy, are less falsified than gin. Rum is occasionally adulterated with an essential oil like butyrin and with butyric acid, these two substances being present in some natural rum, giving to it a special flavour and taste. Whisky is modified by blending, so as to communicate qualities of smoothness and softness. The yellowish colour given to whisky is produced by pouring the spirit into sherry casks, or by stirring it up with the lees of wine. These refined whiskies are prepared for the rich and sumptuous ; for the poor it is recommended that they should be treated with the spirit they understand best ; a sharp and potent drink, that brings the tears into the eyes, and makes the throat smart as it goes down.

Brandy, except when treated with fusel oil, is not, I believe, adulterated with any injurious compound. But it carries with it naturally a peculiar ether, which gives to it a special odour. This ether, a specimen of which is on the table, is very heavy when compared with ethylic ether. Its specific gravity is 862, taking water at 1,000, and its boiling point is 479° on Fahrenheit's scale. It is all but insoluble in water, to which, however, it communicates its peculiar odour. It exerts on the body an injurious influence; it causes nausea, thirst, and pain in the stomach. It seems also to arrest the due secretion of bile.

Secondary Physiological Action of Simple Alcohol.

I leave now the consideration of the evils arising from the action of the different extraneous substances that are present in alcoholic drinks to resume the study of the action of ethylic alcohol itself when it is free of any such combinations. I have to consider under this head the effect of the consumption of alcohol in its slow and progressive course, in what may be called its secondary manifestations of effect upon those who for long periods of their lives submit themselves to its influence.

I have shown that in the course of acute intoxication from this spirit there are four degrees or stages, each degree marked by different series of phenomena. In the secondary, or, technically speaking, chronic intoxication, from the same agent, there are in like manner four distinct degrees, each presenting distinct phenomena. A minority of persons who habitually take alcohol escape with impunity from injury. Some of these escape because they only subject themselves to it on a scale so moderate they can scarcely be said to be under its spell. If they take it regularly they never exceed an ounce to an ounce and a half of the pure spirit in the day ; and if they indulge in a little more than this, it is only at recreative seasons, after which they atone for what they have done by a temporary total abstinence. Others take more freely than the above, but escape because they are physiologically constituted in such manner that they can rapidly eliminate the fluid from their bodies. These, if they are moderately prudent, may even go so far as to indulge in alcohol and yet suffer no material harm. But they are a limited few who are thus privileged, if the term may be applied to them. The large majority of those who drink alcohol in any of its disguises are injured by it. As a cause of disease it gives origin to great populations of afflicted persons, many of whom suffer even to death without suspecting of what they suffer and unsuspected. Some of these live just short of the first stage of natural old age ; others to ripe middle age ; others only to ripe adolescence.

Deterioration of the Body under the First Degree.

The first degree of the secondary action of alcohol is evidenced in those who by constant habit imbibe an alcoholic stimulant to the simple extent of producing arterial relaxation, and of setting the heart at liberty to perform an increased series of motive contractions. They do not, as a rule, receive what is commonly called an excess of any alcoholic drink, but they become trained to a sensation of want for it, to an appetite which, while all seems to go well, they have no desire to resist, though they may keep it within what they conceive are its due limits. Such persons confine their libations to four or six ounces of alcohol per day, a couple of glasses of sherry or of ale at luncheon, three or four glasses of wine at dinner, one or two at dessert, and a mixture of spirit and water before going to bed ; such is a common and a "temperate day," but reckoned up it means at least from four to six ounces of alcohol. The primary effect of such a quantity we know. Continued daily it induces a new physiological and altogether unnatural condition, in which the sense of acquired necessity enforces desire, until at last the spirit is made to become a positive requirement of the organic and the mental life. Every extra effort must be preceded by the resort to the stimulant. Every prolonged weariness must be relieved by the same measure; but when the effect of the measure has speedily subsided, there is left a greater exhaustion than before. Another resource to the artifical aid completes the exhaustion, and makes it pass into dullness and drowsiness without natural and sound sleep, and with an unbearable sense of after prostration.

For many years, in the young and adolescent, this alcoholic life may be carried on without any evidence being rendered of the progress of physical deterioration. In the young the processes of assimilation, of secretion and of excretion, are in their full activity, and the poisonous agent with which the blood and tissues is saturated is disposed of so readily and promptly, it does not stay long enough in contact with these parts to vitiate them. This is a very homely way of putting the fact, but it is scientifically true. The young, therefore, seem to escape, and I believe that up to the close of the first term of the natural life, that is to say, to the close of that period of full growth and developement which extends to thirty years, they sometimes escape so successfully that if they could but stop in their course at that point they might go through the remaining terms of existence without any important modification of function.

Unfortunately it is the rarest of events that a person artificially stimulated by alcohol to the period named gives up the practice. The majority are utterly ignorant of the dangers that are ahead, and the sense of support to which they have been educated by the practice leads them on to pursue it with even a greater reliance upon it than before, and with a feeling of more urgent demand. In a word, the sensation that they cannot do without it, the sensation of lowness and depression when it is by any accident withheld, and the contrast of lightness and activity when it is regained, are so powerful, in their influences upon the mind, there is no resisting the belief of the absolute necessity.

But when the body is fully developed; when the extra vital capacity which attended youth is expended in growth and development; when all the organs have assumed their full size and activity; when the balance of secretion is so nicely set in all parts that not one secretion can be disturbed without a disturbance of the whole; when the spring of the elastic tissues is reduced; when the lungs cannot fail ever so little in their function of throwing off the gaseous products of combustion without a vicarious extrusion of gases into the alimentary canal; when the completed organic moving parts become encumbered with fatty matter interposed between them, or laid out around them; then the effect of alcoholic spirit begins to be realized. The fluid is now retained longer in the living house; is decomposed less quickly; is thrown out by primary or secondary elimination less speedily.

The action of alcohol under these new conditions, so favourable in every sense to the series of changes it is capable of effecting, is twofold. The action in the first place is purely mechanical. We are aware that it leads to temporary paralysis of the vessels of the minute circulation, and that upon this the heart responds with a quicker propelling stroke. Thus the vessels throughout the whole of the body are dilated, and are held in a state of unnatural relaxation and unnatural tension. Under this persistent pressure their diameters change in course of time, and the whole of the marvellous webwork of blood, upon which the organs of the body are constructed, is deranged, in its mechanical distribution, over its extended surface. During this time, too, the function of the heart becomes perverted. The heart is truly an automatic organ, but it is still an organ which feels none the less severely the effect of stimulus. If it make to-day an unnatural number of one hundred and twenty-five thousand strokes, it cannot to-morrow sink back, from absence of its stimulus, to the normal one hundred thousand without evidencing some disturbance of action, some feebleness, some hesitation, or some palpitation. In fact, as it is an organ which by its own stroke feeds its own structure with blood, it is the first to suffer from irregular supplies of blood. Thus under alcohol the nutrition of the heart is mechanically modified. Whipped into undue work, it becomes, like the muscles of the blacksmith's arm or the opera dancer's leg, of undue size and power; and in proportion as this evil increases the necessity for the stimulus it calls for grows more urgent.

In turn this extreme power and force of the heart tell upon the vessels that are fed by its impulsive stroke, and so all the organs that are constructed upon those vessels appreciate with abnormal sensitiveness the whip of the stimulus, and the languor when the whip is withheld.

Of itself this extreme sensitiveness of the heart is sufficiently momentous, but the ultimate results upon the body at large are perhaps more important than the pure local change that is instituted in that perfect and elaborate pulsating mechanism. The heart not only becomes enlarged, but its various valvular and other mechanical parts subjected to undue strain are thrown out of proportion. The orifices in it, through which the great floods of blood issue in their courses, are dilated. The exquisite valves become stretched, and prevented from assuming their refined adaptations. The minute filamentous cords which hold the valves in due position and tension are elongated, and the walls of the ventricles or forcing chambers are thickened, or as we say, technically, are hypertrophied. Throughout the whole of its structures the central throbbing organ is modified both in its mechanism and in its action.

But such central modification cannot possibly go on long without the institution of other changes at the opposite extremity or circumference of the circuit of the blood. At one moment the vital organs feel the pressure of the too powerful stroke of blood; at another moment they are suddenly aware of an enfeebled stroke. The brain is, for the instant, conscious of a flicker of power; it is like the faintest flicker of gas, which is observed when, by an accident, the pressure is disturbed at the main, but it is there, and the person who experiences it is cognizant of its central origin. So matters progress often for months, or for years, without further evidence of subjective or objective sign of increasing evil. The worst evidence that exists is, probably, the necessity for a more frequent repetition of the stimulus under additional stress of work or excitement.

While these changes in the simple mechanism of the circulation are in course of advancement, there are also in development certain other changes which are much more delicate and minute, yet not less important. These consist of direct deteriorations of structure of the organic tissues themselves. We are, at the present time, only on the borderland of a new knowledge on this subject, and I myself am, in this matter, a mere outpost wandering wonderingly, and trying to observe what is going on, but as yet, though thus advanced, unprepared to speak with so much precision and fulness of detail as I would desire. The following, however, simply spoken, seems near the truth in respect to the degenerative changes of organic structure from the continued use of alcohol. Alcohol produces physical deterioration by destroying the integrity of the colloidal matter of which the tissues are composed. I have explained that all the organic parts are constructed out of colloidal substance; that every part, including the blood vessels, to their minutest ramifications, are composed of this colloid material arranged in different forms and plans to suit the design of the part, whether it be a tube, like an artery, a bundle of cross-cut fibres like a muscle, or a refracting globe like the crystalline lens of the eyeball. That these parts should be kept in their integrity, in the midst of their diversity, the ultimate structure of which they are composed must be held in proper measure of construction with water. Disturb the relationship that should exist between the colloid and its combining water, and the character of the colloid is at once changed. Here, for example, is a colloidal fluid, called albumen. I pour a little of it on to a glass plate as a thin watery film. I spread over it a little finely powdered caustic soda, by which I remove and fix some of the water which previously held it as a liquid. Now observe what has occurred. The thin liquid is transformed into a transparent membrane which possesses elasticity. Again, into this little porcelain cup I pour a small quantity of the same solution, and then I drop into the solution a bead of soda and soon I can lift the solution from the cup in a solid mass, shaped like a concavo-convex transparent lens. I could multiply these facts indefinitely, but I am anxious to indicate only one particular fact, viz., that alcohol and its derivative aldehyd possess also by their affinity for water, the property of destroying the integrity of the colloidal form of matter. Thus they solidify, or render pectous the colloidal structures. Here is a solution of albumen. I add to it alcohol. The albumen is rendered thick or pectous. Here is a solution of casein; I add to it aldehyd; the casein is rendered thick or pectous.

Animal tissues subjected to alcohol can be perverted to any degree, and in the most diverse and apparently contradictory ways. I can hold blood permanently fluid with alcohol; I can solidify it with the same agent. I can reduce the size and modify the shape of the blood corpuscles, and I can so modify those fine and delicate animal membranes which dialyse or allow to pass through them the saline matter of the blood and secretions, that the process of dialysis shall be impeded, and that which should pass through shall be left in combination with the membrane. I can destroy the elasticity of the blood vessels in the same way, for that depends upon the presence in them of a gelatinous colloid substance called elasticin.

When, therefore, alcohol holds long-continued contact with the perfectly developed colloidal tissues, its action upon them to produce physical deterioration is simply inevitable, and from this cause arise those fatal lesions of local organs which mark the different phases and stages of alcoholic disease. The commencement of the change sometimes shows itself visibly on the surface of the body. The vessels of the face become permanently enlarged and suffused with blood. In cold weather, the blood circulating imperfectly through these vessels, and, not fully aërated, gives to the skin that dull leaden hue which is so characteristically significant of prolonged indulgence; in hot weather, the blood circulating more freely and purely, gives to the skin a red hue, and often a deep red blotch, which is hardly less demonstrative.

In this stage of alcoholic disease eruptions upon the skin occur to declare the injurious action of the spirit upon the colloidal gelatinous textures. The epidermis or scarf skin is imperfectly thrown off; it dies upon the surface, but owing to deficient vascular and nervous tone beneath, it is not replaced so quickly as is natural. Thus the dead *débris*, in form of scale and sometimes with fluid beneath, accumulates; the superficial nervous surface, which should be protected by the newly formed epidermis, is exposed, and irritation and pain follow as a consequence.

These evils. in these the slighter stages of alcoholic disease, are often connected with others, which are perhaps passing, but which give rise to very unpleasant phenomena. There is what is called dyspepsia or indigestion, to relieve which the sufferer too frequently resorts to the actual cause of it as the cure for it. There is thirst, there is uneasiness of the stomach, flatulency, and a set of so-called nervous phenomena, which keep the mind irritable, and make trifling cares and anxieties assume an exaggerated and unnatural character. From the earliest period in the history of the drinking of alcohol these phenomena have been observed. "Who," says Solomon, referring to this action, "Who hath woe? Who hath contentions? Who hath babbling? Who hath wounds without cause? Who hath redness of the eyes?"

What modern physiologist could define better the steady and progressive effect of alcohol upon those who even under the guise of temperate men trust to it as a support? And yet these evils are minor, compared with certain others I have to bring before you in my next and concluding lecture.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Sale of Food and Drugs Bill.

On the consideration of this Bill in the House of Commons on Friday, May 21, several verbal amendments were introduced, and an amendment by Mr. Sandford, providing that the retail dealer shall have right of action against the wholesale dealer, was also agreed to.

An amendment was afterwards inserted on the motion of Mr. Sclater-Booth, adding to the 9th clause a provision "that no person shall hereafter be appointed an analyst for any place, under this section, who shall be engaged directly or indirectly in any trade or business connected with the sale of food or drugs in such place."

In clause 13, Dr. Cameron moved an amendment providing that samples of articles alleged to be adulterated should be marked and sealed by the analyst. On a division the amendment was rejected.

Some verbal amendments were agreed to.

On Monday, the 24th inst., the Bill was read a third time.

Prosecution under the Adulteration Act.

Adulteration of Milk.

At the Swansea Court, on the 6th inst, William James, milk contractor to the Swansea Union Workhouse, was convicted of adulterating the milk supplied by him. At a former hearing the defendant appears to have stated that a sample of the same milk had been analysed and reported by Mr. Stoddart to be pure. The case was therefore adjourned that a portion of the sample produced by the prosecution might be analysed by him. Mr. Stoddart now reported that in this sample there was a deficiency of 15 per cent. of solids, which agreed with the report of the town analyst. The Stipendiary, after expressing an opinion that the sample forwarded by the defendant was not of the same quality as alleged by him, strongly censured his conduct and inflicted a fine of £10 and costs, amounting altogether to £15 13*s*. 6*d*.

Prosecution of an Oilman for the Sale of Poison.

Mr. W. V. Aldridge, oil and colourman, of Islington Green, having been summoned by the Pharmaceutical Society of Great Britain for the penalty of £5, incurred by him under the provisions of the Pharmacy Act for selling by retail oxalic acid, he not being a registered person, has paid the penalty and costs into court.

Supposed Poisoning by Arsenic.

On Monday, the 24th inst., an inquest was held at Fishtoft, near Boston, Norfolk, on the body of Thomas Green, who died on the 17th inst. from the effects of arsenic taken in tea on the morning of Thursday, the 15th. The deceased immediately after partaking of the meal was seized with intense pain. He was promptly attended by Dr. Tuxford, who was satisfied that the symptoms were those of poisoning by arsenic. The wife of the deceased and his son were also taken ill, but recovered. A *post-mortem* examination was made of the body of the deceased, in which all the symptoms of irritant poisoning were present. At the adjourned inquest Dr. Lowe, county analyst, deposed that the deceased died from the effects of arsenic. The evidence adduced failed to show that the deceased had lived on bad terms with any one; and, although the coroner considered that arsenic could not have come by accident into the tea, the jury returned a verdict to the effect that there was no evidence to show who had administered the poison which caused death.—*Times*.

Reviews.

TYPHOID FEVER; ITS CAUSE AND PREVENTION. Illustrated by the Recent Epidemics in Crosshill and Eaglesham. By EBEN. DUNCAN, M.D., Fellow of the Faculty of Physicians and Surgeons, Glasgow; Surgeon to the Deaf and Dumb Institution. Glasgow: James Maclehose. 1875.

The subject of the propagation of typhoid fever by means of infected milk has, of late, attracted considerable attention; and although the profession has had ample opportunities of examining the merits of the evidence adduced in support of the theory, the public at large has been debarred from forming any definite opinion, owing to the technical character of the discussion. It will be readily admitted that the co-operation of the public is essential towards the lessening of preventible disease, and this co-operation can be obtained only by educating it as to the causes which produce, and the means which may be taken to prevent the spread of contagious diseases.

It is with this object that Dr. Duncan has related in plain, intelligible language the history of the origin, progress, and termination of a recent epidemic of typhoid which he has traced to a poisoned milk supply; and he has "endeavoured, as much as possible, to avoid technicalities, so that the public may judge as to how conclusions on such a subject are arrived at."

We congratulate Dr. Duncan on the manner in which he has performed his task, and we are of opinion that the general reader has much reason to be thankful to him for such a lucid exposition of a difficult and involved problem.

LECTURES ON SKIN DISEASES, delivered at St. Vincent's Hospital, by E. D. MAPOTHER, M.D., Professor Royal College of Surgeons, late Examiner in Surgery, Queen's University, Dublin. With Illustrations. Second Edition. Dublin: Fannin and Co. 1875.

Notwithstanding the existence of a host of works on skin diseases, this little volume asserts its right to appear in a second edition, and we hope it will find a ready welcome among students and young practitioners in England. It is far from being a complete and systematic skin manual, nor does it claim to be "a special treatise on skin diseases," but contains a simple description of certain diseases which are of common occurrence and of easy diagnosis, together with a short but interesting account of cerebro-spinal meningitis, the syphilitic and scrofulous diathesis, and an appendix on baths, watering places, disinfection, etc.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Ueber die chemische Analyse der Potasche. Von G. C. Wittstein. From the Author.

Ueber die chemische Untersuchung der fossilen Kohlen (Braun- und Steinkohlen) für praktische Zwecker. Von G. C. Wittstein. From the Author.

Ueber die chemische Analyse resp. Werthbestimmung des Graphites. Von G. C. Wittstein. From the Author.

MAY'S BRITISH AND IRISH PRESS GUIDE and Advertiser's Dictionary and Handbook. 1875. London: May and Co. From the Publishers.

Obituary.

Notice has been received of the death of the following:—

On the 14th May, 1875, Mr. Thomas Barford Castell, Chemist and Druggist, of Plaistow, Essex, aged 46.

On the 17th May, 1875, Mr. Joseph Pitts, Chemist and Druggist, of Windhill, Yorkshire, aged 62.

On the 19th May, 1875, Mr. William Thomas Taylor, Chemist and Druggist, of Bristol, aged 42.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE DECREASE IN THE NUMBER OF PHARMACEUTICAL CHEMISTS.

Sir,—In the report of the Council presented at the annual general meeting of the Society is a paragraph calling attention to the fact of a decrease to the extent of sixteen in the numbers of the "pharmaceutical chemist members," and all those connected with our Society must unite with the Council in lamenting "that so many stop short at the grade of associates." At the same time it appears to me that the reason of this falling off in numbers is traceable to the very small advantages enjoyed by the Major men over those who have only passed the Minor Examination, and it is certainly very difficult to make out a good case when recommending young men to "continue in their onward course until they have attained the highest rank," if they request you to state the benefits they may expect to derive from so doing. It is, of course, very easy to remind them of the honour they will obtain from affixing the mystic letters P. C. to their names, but they will probably reply that "le jeu ne vaut pas la chandelle," and it is certainly extremely doubtful whether anything like a thousand persons outside the Society can appreciate the differences between pharmaceutical chemists and members and associates of the Pharmaceutical Society.

The admission of chemists and druggists in business prior to 1868 as members was only just and natural, but that associates who have become such by examination since that date should be granted all the privileges of pharmaceutical chemist members as soon as they go into business on their own account seems hardly fair towards those who have expended the additional time and money requisite for passing the Major. Whilst fully aware that many chemists and druggists are quite equal and even superior to some pharmaceutical chemists as trades- or professional men, I consider that the Pharmaceutical Society would advance both its own interests and also those of pharmacy in general by granting higher privileges to the latter than are enjoyed by the former class.

Should the project of extending the exemption from serving on juries be carried out, there will cease to be any practical benefit derivable from the Major qualification, and it is after all useless for the Council to expect any increase in the numbers of "pharmaceutical chemist members," unless there is some more than titular advantage attaching to the rank of pharmaceutical chemist.

URTICA.

May 25, 1875.

DISPENSING CHARGES.

Sir,—I am not one to trouble myself about the peculiarities of my neighbours, but a case came under my notice to-day which may not be uninteresting to some of your readers.

A prescription, written by a physician of standing, was presented to me to be dispensed. The following is a copy:—

℞ Potassii Bromid. . . . . ℥j.
Ammon. Bromid. . . . . ʒiiss.
Sp. Ammon. Aromat. . . . . . . ʒij.
Aquæ ad . . . . ℥xvj.
℥ss. ter die.

I may say that my prices are a little under those of the leading London firms, to whom in every other respect I endeavour to be equal.

As I am noted for being a high charger, my patron came quite prepared to pay me half-a-crown, but fancy his astonishment when I said four shillings. I was offered three shillings, or the prescription would be taken to where it had been dispensed before; contrary to my usual custom I offered to take three and sixpence, or decline having anything to do with it, and after much altercation I was allowed to dispense it at that price.

It seems that the physician recommends his patients to to take their prescriptions to a certain chemist who charges half the usual price for the medicine; the advice was acted upon in this instance, and what do you think, sir, was the charge? One shilling!

The same gentleman, in illustration of the difference in chemists' charges, mentioned a case in which a neighbour of mine, not noted for being a high charger, had charged eighteen pence for what a leading chemist (an occasional correspondent of yours) in the same town had charged sixpence. Possibly the latter gentleman had the alternative of taking that price or seeing the prescription taken to the establishment of his "cutting" neighbour. I have no comment to make, but I wonder if this is the system by which we are to make ten thousand pounds in twenty-five years.

A North Countryman.

SAXIFRAGA TRIDACTYLES ONE OF THE CARNIVORA.

I trust "Botanist" will pardon me if I, an outsider in the discussion between himself and Mr. G. C. Druce on the carnivorous propensities of *Saxifraga tridactyles*, venture to suggest that he is rather hasty in drawing his conclusions. First he asks, is the plant known to the latter gentleman? and insinuates that it can scarcely be one of the raptores on account of its diminutive size. May I ask "Botanist," does he know any of the Droseraceæ, either Rotundifolia or Longifolia? That *Drosera rotundifolia*, in common with other raptores (whatever "Botanist's" opinion may be), derives some nourishment from the decomposition of dead insects admits of little doubt, and yet it is a diminutive plant, its rosette of leaves rarely exceeding 2½ inches in diameter. With regard to the probable strangulation of a bluebottle fly, I do not think it likely any more than "Botanist." But are bluebottles the only insects in creation? I have seen insects, whose muscular power was very many times greater in proportion to their size than man, completely overpowered after a hard struggle with the hairs of the spoon-shaped leaf of *Drosera rotundifolia*; and from the first moment of contact they exhibited every appearance of terror. I think this argues that the fluid secreted by these leaves contains some other power than that of simple adhesiveness, and that a proportionately large insect may thus be overcome. Indeed, I have seen insects completely asphyxiated, if not quite dead long before the leaf had curled up sufficiently to exert any pressure on the body. He also asks some "advanced believer" to oblige him with the alimentary canal or digestive organs of one of these plants for examination. He seems to imagine that these two are absolutely necessary for the assimilation of food, but if he examines some of the lowest forms of animal life he will find that they are not indispensable. Take, for instance, the Amœba or Proteus animalcule. There is no permanent mouth, no stomach or alimentary canal of any kind, no respiratory or excretory organs, and even no distinct aperture for the extrusion of indigestible food. It has no nervous system or organ of sight or hearing, only having a slight susceptibility to light, not more marked than in most of the free moving Diatoms, and its method of feeding is likened to sinking a stone in a lump of dough. I think that Drosera, whether plant or animal, is a more highly organized being than the Amœboid animalcule. And as for the last observation in "Botanist's" letter, I may ask him if he perceives any immediate increase in the stature of a growing boy after his dinner. I have heard of people seeing the grass grow, but always thought it a figure of speech. I suppose I was mistaken.

A. H. Baldwin.

Clifton, May 15, 1875.

W. F. C.—(1) "The widow of a chemist and druggist lately deceased" could only legally carry on the business of her late husband if she be, and so long as she may remain an "executor, administrator, or trustee of the estate," and the business be conducted by a person registered under the Pharmacy Act, 1868. (2) The provisions of the Pharmacy Act apply only to the "poisons" enumerated in the Schedule A, and such as may be added thereto by the Council of the Pharmaceutical Society.

Lickiss.—(1) Copies of Dr. Richardson's lectures on Alcohol may be had on application at the house of the Society of Arts, John Street, Adelphi, price 2s. (2) Yes. (3) The Cantor lectures are delivered before the Society of Arts, and were endowed by the late Dr. Cantor.

X. L.—Yes, provided that the preparations mentioned contain no poisons included in the poison schedule under the provisions of the Pharmacy Act.

G. Watt.—*Stellaria Holostea.*

H. J. Blathwayt.—(1) Scrophulariaceæ. (2) Rosaceæ. (3) Compositæ. (4) Yes. The answers might have been obtained readily by referring to the index to Babington or any similar book.

J. M. Fairlie.—As the report of the meeting referred to was an official one, furnished by the Honorary Secretary of the North British Branch, we think it is proper that any proposal to supplement or correct it should be submitted to that official before being published in the Journal.

Reade Bros.—We do not think that the word "unknown" is introduced into the Pharmacy Act in any incomplete or dubious sense. We are of opinion that, as in the Arsenic Act, the word is meant to imply such knowledge as would enable the vendor to speak regarding the purchaser's name and identity, so that, in case of accident, he should be able to furnish the name and whereabouts of the purchaser to the authorities, and depose to his identity on his being brought before a tribunal.

T. Field.—The omission referred to is in accordance with the decision officially announced more than twelve months previously and continually since then, viz., that "after the 31st day of December, 1874, the medical Latin will be discontinued" in the Preliminary examination. We do not think, however, that your previous ignorance of this fact should prove to be to your disadvantage.

"*Cymru.*"—(1) Yes, an apprentice may obtain books from the Library, in accordance with the regulations, a copy of which may be obtained on application to the Librarian. (2) The success of such an association would depend mainly upon the assistants and apprentices themselves. (3) Apply to the publisher. (4) No, if the article is worth reading as you intimate, it will not be thought too much trouble to turn to the last volume for it. (5) No. (6) Not necessarily.

G. C.—The question is one that should be submitted to a professional analyst.

"*Registered Apprentice.*"—We do not know; apply to the publisher of the book, Mr. Van Voorst, Paternoster Row.

J. W. Lloyd.—We are indebted to you for your enclosure, and shall be glad to receive at any time any intelligence that you may think would be of interest to our readers.

S. Newbury.—See a "Chapter on the Microscope," by Mr. Pocklington, in vol. ii. of the present series of this Journal, pp. 441 and 482.

"*Alresford, Hants.*"—The label forwarded would necessitate the use of a stamp.

T. H. W.—The Act 29 and 30 Vict. c. 64, s. 8, provides, that "no person shall use methylated spirit, or any derivative thereof, in the manufacture, composition, or preparation of any article whatsoever, *capable of being used* wholly or partially as a beverage, or *internally as a medicine.*" Sulphuric ether and chloroform are specially exempted from this provision.

"*Douglas*" and "*Oxygen*" are referred to the rule respecting anonymous communications.

G. P.—By rectification.

ERRATUM.—The following is the exact form of the resolution proposed by Mr. Urwick at the Annual General Meeting:—

"Resolved,—That the report of the Council now read be received and adopted, and printed in the Journal and Transactions of the Society."

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Cleaver, Mr. G. W. Fowler, M. R., V. V. V., W. T. S., S. C., "An Apprentice," "Ilex."

We are compelled to defer answers to several communications.

EXPERIMENTS UPON THE ALKALOID OF JABORANDI—CRYSTALLIZATION OF ITS SALTS.

BY A. W. GERRARD,

Teacher of Pharmacy, etc., University College Hospital

In a communication to the *Pharmaceutical Journal* of May 1st I described a process for the preparation of the alkaloid of jaborandi. I also stated that, judging from its characteristics, it appeared to me somewhat doubtful whether it would yield itself in a crystalline condition. Subsequent results have, however, I am pleased to say, dispelled my doubts. A quantity of the alkaloid weighing forty-five grains was prepared. To this distilled water was added and dilute sulphuric acid drop by drop until the alkaloid was nearly dissolved and the solution was neutral. The solution was set aside to evaporate slowly. At the end of three days it had become of a syrupy consistence with no appearance of crystallization; in three days more the portions adhering to the side of the capsule presented a granular appearance; a portion placed upon a glass slide and examined under the microscope showed with a high power a few prismatic crystals. After four days' further waiting it failed to yield itself as a definite crystalline substance. I now prepared a fresh portion of the alkaloid, which I divided into two parts; one was neutralized with hydrochloric acid, the other with nitric acid, and set aside. In twenty-four hours they were examined; the nitric acid solution had yielded a mass of fairly well-defined colourless crystals, with a substratum of light brown coloured matter; the hydrochloric solution presented no crystals. At my earliest opportunity I submitted the crystals of nitrate to Dr. Sidney Ringer, who was glad to receive them for the purpose of applying the therapeutic test which should be final as to their identity with the active principle and alkaloid. I append the report of Mr. L. S. Jameson, Dr. Ringer's assistant.

"At 1·45 P.M., gr. ss. of crystals of nitrate of pilocarpine was given to patient; his temperature 99·4, and pulse 104, dinner having been taken one hour and a half previously. No visible effect till 2·30 P.M., when face and chest became more flushed, and a slight perspiration broke out over the same parts. In about five minutes the whole body was covered with a profuse perspiration, the patient at the same time spitting a large quantity of saliva; temperature 98·8, pulse, 100, and no effect upon the eyesight. The salivation and sweating continued till 7·20 P.M., both much diminishing during the last three quarters of an hour. After this patient got up and dressed himself, feeling very thirsty, otherwise perfectly well.

"No difference in sphygmographic tracing taken before and during sweating."

Following is a report of its action upon the eye:—

"At 11 A.M. a drop of solution of nitrate of pilocarpine, gr. i. to ℥i., put into each eye; in about twenty minutes pupils were contracted to about the size of an ordinary pin's head. No pain or uncomfortable sensation produced.

"Before administration patient could not read more than a word here and there of 4½ Snellen's Test Types, when held at the end of the bed, a distance of five feet.

"When pupils contracted to above size she could read the whole paragraph continuously and with ease four feet beyond the end of the bed.

"Same results obtained in another case when the same solution was used, but distances at which patient could see were not measured."

Professor Attfield has kindly undertaken to make a combustion, etc., of this substance as soon as I am prepared to submit to him a sufficient portion in a purified condition; meanwhile, I trust to be enabled to continue my experiments upon this interesting alkaloid, which promises to be an important addition to materia medica.

Since writing the above the hydrochlorate has completely crystallized.

THE CHEMICAL EXAMINATION OF CARNAUBA ROOT.

BY EDWARD LAWRANCE CLEAVER, F.C.S.

A small quantity of Carnauba root having been placed at my disposal a short time since, through the kindness of Messrs. Symes and Co., of Liverpool, I proceeded to examine it in order to ascertain whether or not it contained any easily isolated active ingredient.

The sample sent to me was in pieces from 12 to 18 inches long, of about the thickness of the little finger, consisting essentially of two parts, the external or cortical part, being very friable, easily separated and powdered, and having a mawkish slightly bitter taste; the internal being hard and tough, extremely difficult to powder, and totally devoid of bitterness or other flavour.

A portion of the powdered root was well boiled with water, and the liquid poured off, the residue was again subjected to a similar process, and the liquids mixed and evaporated to one half. The decoction thus obtained was of a brown-red colour, with a slightly bitter taste, and peculiar odour. I then divided the liquid into three parts and proceeded as follows:—

The first part was evaporated to dryness, and the residue treated with water slightly acidulated with sulphuric acid. To different portions of the liquid thus obtained I then added the usual reagents used when testing for alkaloids, namely, phosphomolybdic acid, iodine in iodide of potassium, iodohydragyrate of potassium, and ammonia. In each case, after the test tubes containing the liquid had been set aside for three or four hours, a precipitate was obtained.

The second part was evaporated to dryness and treated with alcohol and the resulting solution after filtration was left to evaporate spontaneously, but I was not able to detect the presence of any crystalline matter even under the microscope.

The third portion was treated with reagents, and gave the following results:—

Ferric Acetate.—Dark green at first, gradually changing to brown, and depositing a precipitate.

Iodine.—Not any blue coloration.

Acetate of Lead.—Dirty brown precipitate.

Fehling's solution.—Reduced by boiling.

These results although indicating the presence of some alkaloid were certainly unsatisfactory, and all further attempts that I made towards the preparation of a definite crystallizable principle from the aqueous decoction were abortive, apparently owing to the presence of some resinous material which prevented crystallization.

A portion of the aqueous decoction was next treated with solution of subacetate of lead, until it ceased to precipitate; the precipitate was collected, washed, suspended in water, and decomposed by passing sulphuretted hydrogen through the liquid. This, on evaporation, left behind a strongly acrid reddish-brown extract, which on treatment with water yielded its acridity to that solvent, leaving a mass which gave indication of containing some variety of tannic acid, but the quantity was not enough to allow me to fully determine its constituents, and the small portion of original material that I had prevented me from repeating that process.

I then tried exhaustion with dilute acid, and, on the addition of alkali, a precipitate was obtained, which, however, proved to be totally insoluble in either of the following reagents, viz., alcohol, ether, chloroform, benzol, bisulphide of carbon; and, on further continuing its examination, I found it to consist of phosphates of magnesium and calcium. The marc left after exhaustion with dilute acid was of a bright red colour, proving it to contain some principle that was reddened by acids.

From the behaviour of the aqueous decoction with iron salts, I concluded that the root contained a variety of tannic acid, and some extractive matter, which possibly prevented crystallization of the entire principle, and I then tried the following process in hopes of at last obtaining some definite result:—

Half a pound of the finely powdered root was mixed with two ounces of slaked lime, and made into a thin paste with water. It was then evaporated to dryness over a water-bath, and afterwards exhausted with strong alcohol. Sulphuric acid was then added to acid reaction, and the resulting precipitate of sulphate of calcium filtered off. The alcohol was then distilled off, and the remaining liquid set aside. After some time a light coloured amorphous deposit separated out, which, when dissolved in spirit, gave the reaction for the alkaloid, and had a bitter taste; the quantity was, however, too small to decide anything definite about it.

A portion of the liquid from which the deposit had settled was treated with ammonia and boiled; this also give a precipitate, which, on solution in spirit, gave results as before.

A second portion of the liquid was then diluted with water, when a precipitate of dark resinous material was obtained. This dissolved in spirit with a magnificent red colour, which was destroyed on the addition of alkali and reddened again by acids, thus showing it to contain or to be the colouring matter of the bark.

These experiments prove that Carnauba root does contain an alkaloid, but that it is present in so small a quantity as to render it imperative to work on large quantities of material for its successful isolation. This I hope to be able to do at some future time when the supplies of the root are more plentiful, which time, according to Messrs. Symes, is not far distant.

Carnauba root also contains an acrid resinous body, a red colouring matter, a variety of tannic acid, and I think a small portion of volatile oil.

1, Devonshire Terrace, Marloes Road, Kensington, May 24th, 1875.

FLUORESCENCE AS A MEANS OF DETECTING ADULTERATION.*

BY C. R. C. TITCHBORNE, PH.D., F.C.S.

The following note will be interesting as illustrating how the fluorescence of any substance may be used for its detection in the presence of a non-fluorescent substance:—

About seven years ago, I made use of this phenomenon for the detection of turmeric when present in mustard in a report upon the commercial aspect of that substance.†

Lately it has been referred to, by one of the public analysts in England, as a method by which turmeric may be detected, and as it is so extremely delicate in its results, and yet so easy of application, I have thought it desirable to draw attention to the general principles upon which this phenomenon of fluorescence may be used for such purposes, and also with the view of laying claim to the idea.

If the adulterant is fluorescent, and the substance into which it is introduced is non-fluorescent, we have at once a ready means of examining any number of samples with much more delicacy than the usual chemical reactions will give. Thus, let us take the one to which we have already referred, the mustard of commerce.

The seeds of the black or white mustard yield a yellow, colouring matter, soluble in spirit of wine, which is devoid of fluorescence. Turmeric is always present in the inferior qualities of this condiment because the actual adulterant is wheaten flour or rice, the turmeric being necessary to bring the white adulterant up to the same shade as the ground mustard seeds, therefore the samples vary from 0·5 per cent. to 0·05 per cent. of turmeric. Now, with such minute quantities of turmeric the akaline test is very unsatisfactory—in fact, all chemical reactions are unsatisfactory—when dealing with such a minimum of adulteration.

But the great elegance of this fluorescent test consists in the fact that, within reasonable limits, *the more dilute the solution the more strongly* does the fluorescence test come out. The non-fluorescence of the colouring matter of all substances that are adulterated with a fluorescent substance should, in the first instance, be exactly and scientifically determined. This is easily done by any one who has the necessary arrangements. In the case of the mustard yellow, Mr. H. Draper kindly examined it for me, by the light of the spark formed between two steel wires (such a spark being the best for the purpose).

The steel points were placed in connection with a four-inch intensity coil and a small leyden jar was interposed in the circuit. The battery used consisted of three Groves elements. In examining by this method, ordinary glass vessels must be discarded, because even the strongly marked fluorescence of turmeric is more or less masked by the blue fluorescence of the glass.

In a quartz cell (two plates of quartz in a frame of gutta percha), these observations can be carried on with the greatest accuracy. Mr. Draper's observations prove that, whilst the colouring matter of the true seeds gave no fluorescence, the presence of so small a quantity of turmeric as ·005 per cent. could be readily detected.

Before we are justified, however, in using this phenomenon as the test for the presence of any substance, it is necessary to put it to a crucial examination, such as that detailed above, to find out how far the particular substance under examination is capable of giving fluorescence. But it is not at all necessary that we should submit it to the light of a spark in the practical application of the test. The fluorescence of an ordinary white glass flask is not observable under the ordinary diffused light of a laboratory, but the ordinary fluorescent substances (so called) are easily recognized under such conditions. It is only necessary therefore to form a tincture of the substance to be examined. The observation of Mr. Horner,‡ who finds

* From the 'Proceedings of the Royal Irish Academy.'

† *Medical Press and Circular.*—"Report on the Adulteration of Mustard." Vol. viii. New Series.

‡ *Philosophical Magazine*, Sept., 1874. See before, p. 282.

that fluorescence is wonderfully developed by castor oil, may be made use of with great advantage. A drop of castor oil that has been passed through adulterated mustard, upon a filter, appears green when dropped upon a black plate in ordinary daylight. If the mustard is pure, no coloration will be perceived. I have met with some specimens of "saffron" (the stigma and style of *Crocus sativus*) which give a fluorescence. They were evidently adulterated, because the flowers of saffron give no fluorescence. This saffron is a most expensive drug, and is therefore very liable to adulteration.

CHLOROFORM AS A TEST BETWEEN CHEMICAL AND PHYSIOLOGICAL FERMENTS.*

BY A. MÜNTZ.

The difference between ferments endowed with life and ferments consisting of a nitrogenous non-organized substance has been long established. Dumas has applied to the latter the characteristic term, "ferments non reproductibles;" they have, in fact, nothing characteristic of life, and are no more capable of multiplying than any other definite chemical substance. The common denomination applied to these two classes of agents of transformation cannot, therefore, be justified by the similitude of their mode of action upon substances subject to their influence.

It is sometimes difficult, in the presence of certain transformations, to decide whether there is or is not an intervention of organized beings, and the doubt cannot always be cleared up by microscopic observation, since there are living organisms which, either through their smallness, their resemblance to non-organized corpuscles, or the value of their index of refraction, escape the eye of the microscopist. One character sometimes forms a distinguishing mark between these two kinds of fermentations, but it is rather uncertain. Ferments endowed with life have their maximum of activity at a temperature varying between 25° and 40° C., whilst the generality of chemical ferments have this maximum situated sensibly higher, at a temperature where life is only with difficulty manifested. As a certain interest attaches just now to the distinction between those two orders of phenomena, confounded under the name of fermentation, the author has sought for an agent which will allow of their being clearly distinguished. In a memoir recently presented to the Academy of Sciences, he states that chloroform entirely fulfils the desired conditions: because it prevents absolutely all fermentation concomitant with life, whilst it is absolutely without influence upon the chemical class of ferments. The experiments upon which the author has based his conclusions appear to admit of a wider application.

(1) 200 cubic centimetres of milk with 5 c.c. of chloroform added, remained four months without curdling; no organism appeared in it. The butter was partly dissolved in the chloroform and precipitated with it to the bottom.

(2) 200 c.c. of fresh wine, with 2 c.c. of chloroform added, remained two months, at a temperature of 25° to 30° C., without undergoing ammoniacal fermentation; no organisms appeared in it.

(3) 10 grams of cane sugar, dissolved in 200 c.c. of water, in the presence of chalk, cheese, and 3 c.c. of chloroform, did not manifest the lactic fermentation at the end of four months; no organism was formed in the liquor.

(4) Flesh, gelatine, starch mucilage, and other alterable substances, in the presence of water and a small quantity of chloroform, were preserved upwards of three months, notwithstanding they were submitted to a temperature of about 30° C. No living being, animal or vegetable, was formed in the liquids.

(5) The alcoholic fermentation of sugar in the presence of beer yeast was completely arrested from the moment chloroform was placed in contact with the solutions.

The above experiments showed that the fermentations concomitant with life are not manifested in the presence of chloroform. Those that follow show, on the other hand, that chemical fermentations are neither prevented nor retarded by the same agent.

(1) 2 grams of dry malt, containing originally 0·05 gram of glucose, were brought into contact with 40 c.c. of water and 5 c.c. of chloroform. At the end of fifty hours there was formed 0·52 gram of glucose. In a parallel experiment without chloroform there was developed in the same time 0·54 gram of glucose.

(2) 10 grams of bitter almond meal, containing originally 0·006 gram of hydrocyanic acid, were placed in contact with 300 c.c. of water and 5 c.c. of chloroform. At the end of seventy hours there was developed 0·032 gram of hydrocyanic acid. In a parallel experiment, without chloroform, exactly the same quantity of hydrocyanic acid was developed.

(3) Some very liquid starch mucilage, containing originally about 0·915 gram of glucose per 100 c.c., was brought into contact with saliva and a considerable quantity of chloroform. After fifteen hours the liquid contained 0·120 gram of glucose per 100 c.c. The same mucilage, without chloroform, yielded with saliva 0·110 gram of glucose in the same time.

(4) Flour of mustard seeds, which contained only traces of the oil, in contact with water and chloroform developed an odour as strong as that with which pure water was used.

(5) 100 c.c. of a 5 per cent. solution of cane sugar marked in the saccharometer 33·0 to the right. Forty-eight hours after the addition of 3 grams of yeast and 5 drops of chloroform, this liquor, without the disengagement of a single bubble of carbonic acid, was almost completely inverted, marking at that time 9·5 to the left. In this experiment therefore the yeast produced its chemical action—inversion—due to a soluble matter that it contains which is analogous to diastase and its congeners; but it did not produce the alcoholic fermentation, which is a physiological action, concomitant with life.

Although in the course of his researches the author did not study in a special manner the symptoms of anæsthesia in the lower organisms, he found that after beer yeast had been under the influence of chloroform for several hours, it never appeared to resume its action upon saccharine matters with the same intensity when the chloroform had been removed. The lactic ferment appeared more capable of recovering its ordinary powers. Prolonged contact with the chloroform induced death.

M. Müntz suggests that this property of chloroform will permit the study from a fresh point of view of virus and other matters of animal origin, which are apt to give rise to disorders in the animal organism, since it would be possible by means of chloroform to distinguish between the virus which appears to act in the manner of diastase and its analogues, and the altered liquids producing the symptoms of septicæmia which were attributed to vibrions.

* *Comptes Rendus*, vol. lxxx., p. 1250.

PHARMACISTS AS SCIENTIFIC INVESTIGATORS.*

BY BARON F. VON MUELLER, PH.D., M.D., F.R.S.

You are all so well aware of the functions expected form pharmaceutic science as one of the main auxiliaries of medicine that it might appear superfluous to dilate at all on the professional positions and any of its duties, which are devolving on you, and are to be maintained and elevated by you. At all events it might be most appropriate, on this first occasion of my meeting you, to encourage your progress by a few words on the great services rendered in times past to the natural sciences by some of

* Lecture delivered before the Victoria Chemists' Assistants' Association.

those celebrated men who arose from the same profession as your own. In instancing some of the discoveries which emanated from the study and laboratory of pharmacy we cannot go back to times when no strict limitation as yet existed of pharmacy as a distinct profession, when, indeed, the investigation and preparation of chemical substances and organic compounds for therapeutic use formed an integral ordinary part of the medical practitioner's work. Among those who, in the early days of a distinct recognition of pharmacy, distinguished themselves prominently was Marcgraf, a Prussian gentleman, who, about 120 years ago, discovered magnesia and alumina, and first showed the identity of beet and cane sugar (1747), perhaps little foreseeing at the time what an enormous influence this discovery would exercise in generations afterwards by raising a local supply of sugar in countries far outside of the tropical zones, and by providing thus also additional means for the rotation of crops through most nutritious stable food, and for facilitating the due maintenance of the fertility of any arable soil. Soon subsequently arose a still greater genius in pharmaceutic science, Carl William Scheele, a German by birth and descent, a Swede by fame. While an apothecary's assistant in Malmö and Stockholm he discovered fluoric, boracic, hydrothionic, tartaric, citric, and oxalic acids. He analysed first the constituents of bones. In Upsala, still merely an assistant, he became acquainted with the great renovator of zoology and phytology, Linné, and also with Bergmann, so famed for his extensive analyses of minerals and crystallographic researches on them, and here (about 1774) it was, where he made the important discovery of chlorine, solely and also independently of the British divine Priestley, and Lavoisier, the latter soon slain as a victim of the atrocities of the first French revolution, while Priestley encountered the furious hatred of fanaticism and jealousy, at a far more recent time than either Galileo, Brahe or Kepler, and was indeed obliged to take refuge in the transatlantic states. Scheele also discovered nitrogen, before he had even established a pharmaceutical business of his own, which took place at the age of thirty-five, and then followed his discovery of baryta, manganese, prussic acid, and some other most important chemical substances. His luminous career, however, was cut off at the early age of forty-four. Some of the researches of Scheele, and subsequently of Davy, led to the first steps towards photography. Vauquelin, who may be regarded as the founder of the qualitative organic analysis, was at first a pharmaceutist; his great countryman, Fourcroy, who was the son of a chemist, had the merit of introducing the new weights and measurements in France, and also of improving vastly chemical nomenclature. Chaptal, born in 1756, passed from the pharmaceutical to the medical career, was minister of home affairs under the first Napoleon, and was raised by Louis XVIII. to a peerage as Count Chanteloup, in acknowledgment of his great chemical discoveries, so well applied to industries and agriculture. Dumas, born in 1800, an ornament to the science of this century, was first a pharmaceutical chemist of Alais. We owe to him many essays on organic chemistry, atomic weights, substitutional proportions, and other chemical compounds; he also was minister of France, holding the portefeuille of trade and agriculture for two years. He has given us a great work, 'Traité de Chimie appliquée aux Arts,' in eight volumes. Had he never done anything else than drawing Pasteur into his luminous path, he would deserve our thanks for all time. I must pass on briefly to other great Frenchmen, such as Pelouze, Pelletier, and Brogniart, who were by descent or early occupation connected with the pharmaceutical profession; Pelletier being the discoverer of quinine and many other alkaloids. Brogniart still adorns the science of France, and became the principal founder of vegetable palæontology since the earlier part of this century. Of his friendship, and that of another leading palæontologist of this age, the venerable Gœppert of Breslau, who also was active in the pharmaceutic profession during his earlier years, I may well be proud. Forchhammer, in the duchy of Schleswig, was brought up for the pharmaceutical career. A generation afterwards I spent several years in the very house in which this famed geologist and oryctologist received his first education for the natural sciences. His extensive comparative analysis of seawater, also of many algæ, may be known to many in this room. He was Sir Roderick Murchison's stronghold when the latter investigated the geology of Scandinavia. Oersted, the friend of Forchhammer, the brother of a Danish prime minister, the illustrious discoverer of electro-magnetism, was the son of a pharmaceutic chemist and passed himself through the years of pharmaceutic apprenticeship; he even conducted for some time a pharmaceutic business of his own. He was the founder and first director of the Polytechnic School of Copenhagen, and an extensive and ingenious writer on the natural sciences in relation to religion and poetry, not to mention the various original contributions towards physical and chemical science. It is a pleasing recollection to me to have met this leading discoverer and also Forchhammer, at the meeting of the German Association of Medical Men and Naturalists, held in Kiel, in 1846. In Britain also arose some brilliant spirits through early though sometimes brief engagements in the pharmaceutic career, viz., Sir Humphry Davy, who acted as assistant to a surgeon and chemist at the commencement of his studies, whereby probably the first impulses to his investigations were given, although they soon extended to physiological subjects, such as respiration. Without him we might not have had the early discovery of the metallic bases of the alkalies in 1807, nor his safety-lamp for mining, nor his numerous applications of chemistry to agriculture, nor his almost poetic teachings; and more, perhaps, no Faraday would have guided us onward had it not been for Davy.

Sir David Brewster, great through his labours in optics, the founder of the British Association, first, also, if my memory carries me safely, for on it I must mainly rely in this address, imbibed his love for the sciences which he adorned while in the modest occupation of the pharmaceutic *atelier*. Baron von Liebig commenced his world-famed researches in a pharmaceutic laboratory at Heppenheim, where he worked for about a year; and perhaps the great worker through fully half a century, for the lasting benefit of mankind, would have been lost to us had not mere chance brought him first, though very briefly, to your own profession. I need not dwell here on his immensely extending organic chemistry, which through him passed into a new era, while through the practical applications of his inventions agricultural, physiological, and technological chemistry passed also into a new state. I am proud to possess several letters on scientific subjects, addressed to me by this great man. The family of the Gmelins might be regarded as almost a pharmaceutic one through several generations. I cannot in these cursory remarks refer to many of the very numerous men of science, which sprung from this family. One of them was the celebrated traveller, Samuel Gmelin, who went with Pallas, Güldenstedt and Lapuchin, for the advancement of natural history, through so much of Russian Asia, under the enlightened auspices of the Czar, from 1733-43. George Gmelin traversed with Behring much of Siberia, the results being lasting works on the fauna and flora of that wide tract of country. John Gmelin issued the thirteenth edition of Linneus' 'Systema Vegetabilium,' though engaged also as professor of medicine and chemistry. Ferdinand Gmelin advanced pathology much in the first half of this century. Christian Gmelin is the great chemical author of more recent date. Leopold Gmelin stands also prominent among the chemists of the century. Carl Gmelin published a large work on the flora of the Grand Duchy of Baden. Perhaps still more familiar to us here are the works of Heinrich Rose on analytic inorganic chemistry; he followed in the first instance the profession of his father and grandfather, who were pharmaceutic apothecaries. Gustav Rose, the brother of the above-named famed analyst, has widely advanced mineralogy, and was with Ehrenberg the companion of Baron von Humboldt in his travels through Russian Asia. Buchner, the disciple of Trommsdorf, was one of those who raised pharmacy to a science; he conducted for many years an important journal of pharmacy, originating from his adoption of your profession. Poggendorf, born in Hamburg, entered also the pharmaceutic career, through which many discoveries in chemistry and galvanism took place. As editor of the 'Annals of Physics and Chemistry,' from 1824 to 1867, he issued the colossal series of 134 volumes.

Pettenkofer, educated by his uncle, an apothecary at Munich, was for a long time pharmaceutic chemist to the royal family of Bavaria. We owe him the best method of obtaining gas from wood, researches on the cholera-poison, on ventilation and on important sanitary measures. Wittstein, whose translated works on the preparation of chemicals used in medicine will be in the hands of most of you, embraced also your profession. A translation of his meritorious new work on organic analysis and on the chemical constituents of plants, is prepared by myself, and would ere this have appeared, had fair support been given to my position among you in this colony during late years.

In illustration of what has been done by the profession of pharmacy for chemical and allied sciences, I have singled out these few representatives among those who advanced leadingly on that path of discovery; many others have toiled along, but as may be imagined, pharmaceutic gentlemen of high education have vastly promoted also other branches of knowledge. As might be supposed from their peculiar training, they have much advanced botany and also occasionally zoology. In both directions for instance Retzius, one of your profession, was active at Lund during the end of the last and beginning of the present century. He left his fame as an inheritage, well maintained by three sons, all professors of medicine, and distinguished for literary attainments. Ecklon, who lived for some time in the town of Husum, where I spent part of my youth, and who for many years was a chemist's assistant in Northern Germany and at Capetown, has rendered largely known the vegetation of Capeland, Caffraria, Hottentot Land, and other parts of South Africa, not merely as an exploring traveller, but as a phytological writer also. Rabenhorst, of Dresden, for forty years a persevering and successful mycologist, was long under engagements simply as an apothecary's assistant. Schacht, celebrated for his anatomic and other microscopic investigations concerning plants, made some of the first discoveries, which drew Schleiden's attention to him, in spare hours, at a chemist's shop.

Nees von Esenbeck, a meritorious botanic writer, was first in active service as a pharmaceutist. Martius, the great Brazilian traveller and naturalist, the author of numerous works, grandest among them that on palms, was the son of a pharmaceutic gentleman in Bavaria, and his brother, while continuing his father's business, became a leading author on materia medica. His friendship will not be oblivious to my memory. Among the three greatest of living bryologists, two are pharmaceutic chemists, namely: Hampe of Blankenburg, and Mitten of Hurstpierpoint in Sussex; both remained true through a long life to their adopted profession. Of the three living greatest of algologists, also, two are pharmaceutic gentlemen, namely: Kuetzing of Nordhausen, and Sonder of Hamburg; the latter, one of my oldest scientific friends, continues to conduct his original business up to this time, and it is therefore most praiseworthy that he was able, so circumstanced, to elaborate and publish, in co-operation with the late lamented Dr. Harvey, three large volumes of the flora of South Africa. But where am I to pause? There are numerous others, whose noble example should emulate you to raise here also the pharmaceutic standing. The strides of progressive knowledge have given pharmacy a place among the sciences; it is far more than a mechanic's art, if we view it in all its true bearings. An association, such as you have so thoughtfully formed, is well calculated to bring your profession to a deserving recognition. Well may you also aid here in progressive science, where a new country, with numerous of its latent resources, affords you multifarious opportunities to enter the field of independent discovery promisingly for success.

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.*

BY J. BURDON SANDERSON, M.D., V.P.R.S.,

Jodrell Professor of Physiology in University College, etc.

LECTURE III.

(*Continued from page 870.*)

There are two contagious diseases besides small-pox, in respect of which there is reason to suppose that specific organic forms exist either in the blood or in the affected tissues—namely, relapsing fever and splenic fever. I propose to take splenic fever first.

Splenic fever is a malignant highly contagious disease of cattle, distinguished by the extreme rapidity of its course and fatal termination. It is interesting to us on account of the fact that it is characterized by the existence in the blood of organisms which, from the investigations of trustworthy observers, seem, though like common bacteria in form, to have such marked peculiarities of their own, that they may be regarded as specific. These bodies were discovered in 1855, or perhaps earlier; but their significance is still matter of dispute, there being great difference of opinion (even among those who admit that they are characteristic of the disease) as to the part they play in the morbid process.

The disease may be communicated by any means which involves the transference of a portion of the blood of a diseased animal to the living tissue of an animal previously healthy. It is not known that it can be propagated by any other way; for animals kept in the closest proximity to diseased ones, and placed under the most favourable conditions for infection through the air, are not infected.

The most striking feature of the disease is its extremely rapid progress and its short duration: in the so-called apoplectic cases, a few hours; in the more ordinary ones, a day or two. A sketch may be given in a few words of the disease as it presents itself in acute cases in cattle. An animal, which perhaps for the previous day has declined food and shown signs of general disturbance, begins to shudder and to have twitches of the muscles of the back, and soon afterwards becomes weak and listless. In the meantime, the respiration becomes frequent and often difficult, and the temperature rises to three or four degrees above the normal; but soon convulsions, affecting chiefly the muscles of the back and loins, usher in the fatal collapse, of which the progress is marked by complete loss of power of moving the trunk or extremities, diminution of temperature, mucous and sanguinolent alvine evacuations, similar discharges from the mouth and nares, and death. In the horse, the disease presents similar characters, but is much less acute. The local affection is more frequently recognized during life, so that the case is often recorded as one of "acute splenic tumour."

Of the phenomena revealed by dissection, those which relate to the blood, to the circulatory and lymphatic systems, and to the spleen, are by far the most important. In the blood, the colourless corpuscles are increased, especially in the horse. In the mucous membranes, general infiltration is one of the most marked results of the disease. In cattle it is excessive, and affects the whole course of the intestine, the cavity of which is found

* Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal.*

to be full of sanguinolent transudation. In the horse it localizes itself in the stomach and duodenum, and presents itself in the form of circumscribed inflammatory tumours or thickenings of the mucous membrane. As, in these tumours, the inflamed tissue dies in the middle and sloughs out, leaving an ulcer, they are called carbuncles. The ulcers are called "typhous ulcers," and the whole disease in the horse is often designated "typhus."

The discovery that in the blood of animals affected with splenic fever rod-like bodies are found in the liquor sanguinis was first, I believe, made by Pollender, who, in the year 1855, described them as "fine, apparently solid, straight unbranched objects." He stated that they possessed no proper motion, differing in this respect from ordinary bacteria, leaving the question of their nature, as well as that of their relation to the contagion of the disease, open. A year or two after the publication of Pollender's paper, Brauell published the first of his very extensive series of researches on the contagion of splenic fever, in which he not only confirmed Pollender's discovery, but, by experiments in which he communicated the disease to animals under a great variety of conditions, acquired for pathologists the greater part of the accurate knowledge they now possess on the subject. He contented himself, however, with demonstrating that the organisms found in the blood in splenic fever were characteristic of the disease, without maintaining that they were, or that they were not, the *causes* of its virulence; and, indeed, was disposed to attribute more importance to them as diagnostics than as agents in the morbid process.

Three years later, the bodies in question were rediscovered by Delafond and Davaine, who, in claiming a priority which did not belong to them, no doubt did so in ignorance of the good work that had already been done in Germany. The existence of the rods as a characteristic of the circulating blood in animals affected with splenic fever, is a fact now admitted by all pathologists who are conversant with the disease. It is, however, remarkable (and at first sight difficult to understand) that many observers have expressed doubts as to their being organized living beings. Thus, Leisering at first took them for fragments of fibrin or for bits of tissue; others thought that they were blood-crystals. The statement made by Professor Bruckmüller of Vienna, and repeated by others, that Virchow at one time regarded the bacteria of splenic fever as blood-crystals, appears to be an erroneous one, founded on a misquotation of an oral communication.

The rods have been most carefully studied by Bollinger in his recent 'Researches in Comparative Pathology.' Each rod is about as long as the width of a blood-corpuscle. Along with the rods spheroids can always be found, which are no doubt forms of the same organism—parts of the same continuous development. As regards their structure, examination with high powers shows that each rod is made up of spheroids, each spheroid consisting, like an ordinary micrococcus, of a central darker part with a more transparent envelope. The most remarkable fact relating to them is, that they disintegrate rapidly from the moment that the blood becomes putrescent. As they disappear, the actively moving rods and spheroids, which indicate the commencement of the septic process, take their place, but there is no continuity of development between the two kinds of organisms.

The principal source of doubt as regards the part played by the rods in the contagious process of splenic fever has been the observation first made by Brauell, that, in the early stage of the disease, no rods are found in the blood; and that nevertheless such blood possesses the contagious property. This question has been lately investigated very fully by Professor Bollinger, on the basis of experiments made expressly for the purpose. From the results of these experiments, it seems certain, (1) that blood without *rods* may yet be contagious; (2) that animals infected by it contain the rods in their blood in as great numbers as others. Are the rods, therefore, intimately associated with the contagious material—the contagium? or is their appearance a merely collateral phenomenon—a symptom of the disease?

(*To be continued.*)

THE IRISH PHARMACY BILL.

DEPUTATION TO THE CHIEF SECRETARY FOR IRELAND.

The Sub-Committee appointed by the Council of the Pharmaceutical Society to confer further with Sir Michael Hicks-Beach regarding the Irish Pharmacy Bill, with especial reference to his suggestion for an *ad eundem* qualification, had an interview with him on Thursday, and informed him of the views entertained by the Council as expressed by the petition presented to the House of Commons, and handed him the following paper upon the subject of the proposed *ad eundem* qualifications:—

"Regarding the suggestion in favour of degrees or examinations *ad eundem*, it would appear that those which exist do so exist only at the universities, they being ancient institutions governed by similar laws and administered by persons appointed by the same authorities.

"It is practicable, and would appear to be free from objection, for two separate Societies to approach something like arrangements for *ad eundem* degrees by arranging that persons holding the degree of either shall be admitted to the highest examination of the other without having to proceed by stages; but for an arrangement of that kind further Parliamentary powers are not required by the Pharmaceutical Society of Great Britain, because the existing charter and Acts confer adequate powers, and the bye-law, No. 16 of section 10, sufficiently provides for the case, so that the Council of the British Society could arrange with the Council of the other Society for those persons who may hold the certificates of the one Society being admitted to the benefit of that bye-law on the one hand, and a similar bye-law on the other hand.

"*Ad eundem* arrangements should be a growth or fruit of mutual regard, and mutual regard cannot prevail between an existing body and one which may or may not come into existence—the body which may arise may grow into public esteem, and thus reciprocal feeling of respect and regard may arise (they cannot be created by Act of Parliament)—when they exist, the natural outgrowth may be expected."

Sir Michael Hicks-Beach expressed a determination to carry the Bill in its integrity, subject only to a modification to be devised by him, having for its object to exclude all persons who may be placed on the existing register in right of being on the Irish Register, from participation in the funds of the Pharmaceutical Society of Great Britain. The petition of the Society against the Bill is printed on p. 978.

THE MIDLAND COUNTIES CHEMISTS' ASSOCIATION AND THE IRISH PHARMACY BILL.

On Thursday a special meeting of the Executive Council of the Midland Counties Chemists' Association was held at the rooms, New Street, Birmingham, to take into consideration the Irish Pharmacy Bill. Mr. T. Barclay, of Birmingham, presided. After a lengthy discussion it was unanimously resolved that the subjoined resolution should be sent to the following members of Parliament, namely, Messrs. Bright, Dixon, Muntz, Newdegate, Bromley-Davenport, H. Allsop, Walker, Bass, and S. C. Allsop. The resolution is as follows:—"That the proposed measure, in its present form, is prejudical to the interests of the public, and unjust to the chemists of Great Britain, as it would give undue advantages to Irish chemists who might desire to commence business in Great Britain, and, at the same time, mislead the public as to their qualifications. The Council would strongly urge the extension to the whole kingdom of the laws which now within Great Britain regulate the qualifications of chemists and also of the sale of poisons, and, therefore, earnestly request that you will oppose the Bill in its present form."

The Pharmaceutical Journal.

SATURDAY, JUNE 5, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE IRISH PHARMACY BILL.

DURING the past week, the proposed legislation affecting pharmacy has naturally occupied a foremost position. A great deal of the attention of Wednesday's Council was devoted to the subject, and throughout Great Britain a warm interest has been displayed, and numerous petitions have been presented to Parliament, generally in favour of the views entertained by the Council as those views appear by our report of the proceedings. Further, Mr. SALT has given notice that when the motion for the second reading of the Bill comes before the House he will move that it be read that day three months.

We are not aware of any petitions to Parliament from Ireland or elsewhere in favour of the Bill, and the only evidence of Irish interest in the measure of which any trace has become apparent has been the arrival of a deputation consisting of some eminent apothecaries (three licentiates of the Irish Apothecaries' Hall, two gentlemen from Belfast, and one from Cork) practising not as medical men, but as pharmacists merely, in fact, holding a position the same as that of a pharmaceutical chemist in Great Britain, whose views (so far as they have been expressed) appear to be in favour of an extension of the Society's operations to Ireland, with a limitation that no qualification below that of pharmaceutical chemist shall be recognized within that part of the United Kingdom.

The ways of politicians are mysterious to the uninitiated, but unfortunately it is the case that HER MAJESTY'S Government have introduced and therefore become somewhat pledged to a measure materially affecting British pharmacy, without any previous communication upon it with the Pharmaceutical Society of Great Britain, and so far as can be traced without the ascertained approbation of any medical body of either part of the United Kingdom.

The practical result of the latest interview with HER MAJESTY'S Chief Secretary for Ireland is that the right honourable gentleman takes a stand and has expressed a resolve in favour of "the Bill, the whole Bill, and nothing but the Bill," with a modification that is unimportant by comparison with the leading features of the Bill; for the practical result of it is that the existing Society having created and obtained within Great Britain the exclusive right to and, in a sense, a property in the title "pharmaceutical chemist," and having accomplished a great work which has materially benefited the country not only for the better health of its population but for the improvement of its foreign trade in drugs and chemicals, is through an enforced reciprocity with a possible Society, as yet nameless and non-existent, to have its work "watered" and embarrassed.

To a Society within Ireland, with its operations limited in sphere and confined to that kingdom, the Pharmaceutical Society of Great Britain cannot as a Society have objection, whatever may be the ideas of individuals upon the broad public question of expediency; but that the work which has been done within Great Britain should be imperilled and that the name or style, which has a value only through the action of the Society, should be appropriated appears to be a form of wrong against which every well-thinking man should use his utmost strength.

Those who know the objects and the work of the Pharmaceutical Society of Great Britain are well aware that its loftiest aim has been to advance scientific pharmacy by promoting an uniform system of education, and that associated with it there has been the object of the Benevolent Fund; and none within the pale of the Society have uttered a word against the generous extension of the Benevolent Fund as well as other objects of the Society to Ireland; but Sir MICHAEL HICKS-BEACH, whilst refusing the broad matters of principle pressed on his attention by the Society, has, out of his own sense of justice, said that he will so modify the Bill that the Irish Society and those holding its degrees shall not, as of right, place a hand upon the funds of the existing Society. We are reminded of SHAKESPEARE'S words, "He who steals my purse steals trash . . . . . but he who filches from me my good name robs me of that . . . . which makes me poor indeed."

For the cause of pharmacy it is to be hoped that some outspoken voice will come from Ireland in favour of right and against wrong; but however that may be, the Society has done and will continue to do its best for its mission, and it is for each member of the body within his sphere to bring an individual opinion and weight into the scale.

THE DRUGGING OF ANIMALS BILL.

THE Parliamentary Committee of the Council of the Pharmaceutical Society met on Thursday morning to consider the Bill introduced to the House of Commons by Sir JOHN ASTLEY, which proposes to render the administration of poisonous drugs to horses and other animals by unqualified persons a penal offence. A copy of the Bill will be found at page 981 of this Journal.

It will be seen that the third section goes far beyond the purpose of the Bill as set forth in the preamble, and applies not to the administering but to the selling of poisons, a proceeding perfectly unnecessary, as the selling is already fully regulated by the Pharmacy Act. But although Sir JOHN ASTLEY has taken the trouble to re-enact the 17th section of the Pharmacy Act, and to make Schedule A of that Act the foundation of his Schedule of Poisons, he has, by the construction of his Bill, made the more stringent provisions of registration of sales and knowledge of purchaser apply alike to all poisons. It is needless to say how this would inconvenience not only the sellers, but the public, if applied to Part 2 as well as Part 1 of the already established schedule; but when we look through the newly proposed poisons the mischief becomes so glaring that it must surely be apparent to every man who knows anything about the uses of the mineral acids and metallic salts. All additions to the Schedule of Poisons must rest with the Council of the Pharmaceutical Society, and have the approval of the Privy Council, and this interference in the matter is both uncalled for and likely to produce confusion. A paper strongly setting forth these views was drawn up by the Committee, and the Vice-President and Mr. SANDFORD, accompanied by the Assistant-Secretary, Mr. RICHARD BREMRIDGE, proceeded to the Home Office, and laid it before Sir HENRY SELWYN-IBBETSON, who promised the attention of the Government to the matter.

The Bill was put down for second reading on Thursday, but did not come on. Sir W. HARCOURT has given notice to oppose it.

THE TRUE GAMBOGE PLANT.

ABOUT ten years since the late Mr. DANIEL HANBURY, in a paper read at an Evening Meeting of the Pharmaceutical Society, stated that from an examination of numerous specimens of a plant which had been introduced into Singapore from Siam as the true gamboge-tree, he had come to the conclusion that it was a variety of *G. Morella*, differing from the typical variety in having pedicellate instead of sessile male flowers. This variety he described and figured in the *Transactions of the Linnean Society*, as *Garcinia Morella*, var. *β. pedicellata*, and it is quoted as the source of the official gamboge in the British Pharmacopœia. In the recently issued volume of the 'Flora of British India,' however, the variety has been suppressed by the late Dr. THOMAS ANDERSON, who worked up the Guttiferæ, Mr. HANBURY's figure of the variety being quoted apparently as accurately representing the species.

Some further important contributions to our knowledge of this genus have nevertheless confirmed Mr. HANBURY's judgment, and Dr. HOOKER, who had been temporarily misled by Dr. ANDERSON's suppression of var. *pedicellata*, in a paper published in the last (April) issue of the botanical portion of the *Journal of the Linnean Society*, expresses an opinion that Mr. HANBURY's plant is so different in the habit of the male inflorescence from all the forms of *G. Morella* with which he has compared it that it should be regarded as being even specifically distinct. Its leaves also differ from those of all varieties of *G. Morella* in their more ovate form and larger size and the fruit is larger. Dr. HOOKER suggests that the species "should bear the name of *G. Hanburyi*, after our eminent pharmaceutist."

PHARMACY IN JAPAN.

FROM a note published in the *British Medical Journal* on the authority of the Dutch *Pharmaceutsch Weekblad* it would seem that the latest Western fashion in which Japan has indulged is an adulteration panic. It appears that with a view of preventing the adulteration of drugs imported from Europe a laboratory had been established by the Japanese Government in Yedo, another in Kiyoto, under the superintendence of Dr. DWARS, and a third at Osaka, under Dr. GEERTS, for the examination of drugs and the practical instruction of Japanese youths in pharmacy. The Japanese Government has also ordered that any druggist who has in his possession sulphate of quinine or iodide of potassium in an adulterated state shall be punished for a first offence by a fine of 50 yan, or about £5.

CONTINENTAL CONGRESSES.

THIS year's Congress of the French Association for the Advancement of Science will be held at Nantes, from the 19th to the 26th of August. Circulars have been issued inviting persons who desire to read papers before the Congress to communicate at once with respect to the subject upon which they wish to treat to one of the Local Secretaries, MM. COLOMBEL, LAENNEC and MALHERBE fils, of Nantes, or with M. GARIEL, Secretary to the Council, 76, Rue de Rennes, Paris.

On the 19th of September, the International Medical Congress for 1875 is to commence at Brussels, under the auspices of the Belgian Government. Of eight sections one is allotted to Pharmacology. The questions down for discussion in this section are—(1) The establishment of a Universal Pharmacopœia, and (2) Is it necessary to extend the employment in medicine of chemically definite immediate principles, and thus to multiply the preparations included in the Pharmacopœias? Some of the subjects of the other sections also will present points of chemical and pharmaceutical interest.

THE sum of £500 has been included in this year's Estimates as a salary for an Assistant Director of the Royal Gardens at Kew. The *Gardener's Chronicle* believes that Professor W. T. THISELTON DYER is to be appointed to the new office.

MR. GEORGE BENTHAM, F.R.S., the late President of the Linnean Society, has been elected a Corresponding Member of the French Academy of Sciences.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 2, 1875.

Present—Messrs. Atherton, Baynes, Betty, Bottle, Brown, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Owen, Rimmington, Robbins, Sandford, Savage, Schacht, and Williams.

Mr. Thomas Hyde Hills having been voted to the chair, the minutes of the previous meeting were read and confirmed.

Election of President.

The first business was the election of a President for the ensuing year, and a ballot having been taken, Mr. Hills was re-elected.

Mr. Hills, in thanking the Council for the honour it had conferred upon him in electing him for the third time, said he thought it was a bad precedent to elect the same gentleman for three years successively, except under very special circumstances, and he should have preferred that the choice should have fallen on some one else. However, he would place himself in the hands of the Council, though he hoped the same thing would not occur again.

Election of Vice-President.

On the first ballot, Mr. Savage obtained the largest number of votes, but he declining to serve,—a second ballot was taken, and Mr. Bottle was re-elected.

Mr. Bottle cordially thanked his fellow-members for the honour which they had quite unexpectedly conferred upon him, and said that in accepting this position for a third time he could only do so upon the express understanding that he would not accept re-election after the expiration of the present term of office.

Election of Treasurer.

Mr. Sandford said he had often acted as chairman on the occasion of the annual election of officers, and on more than one occasion he had known a treasurer to be elected without the formality of a ballot, when they had the services of a gentleman who appeared to be particularly qualified for the office. He would therefore propose that Mr. Williams be re-elected treasurer.

The motion was carried by acclamation.

Mr. Williams briefly acknowledged the compliment.

Election of Secretary and Assistant Secretary.

Elias Bremridge was re-appointed Secretary and Registrar, and Richard Bremridge, Assistant Secretary and Deputy Registrar.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Draper, James William ....London.

Chemists and Druggists.

Bard, Henry ....Exeter.
Lambert, Thomas ....Bradford, Manchester.

ASSOCIATES.

The following having passed their respective examinations and being in business on their own account were elected "Associates in Business" of the Society:—

Minor.

Hodgkinson, Charles................London.

Modified.

Clark, John ....Sheffield.
How, Randal Edward ....Oxford.
King, Abraham.....................Dunstable.

The following having passed the Minor examination were elected "Associates" of the Society:—

Bridgewater, Francis Foster ...Deal.
Stanley, Thomas ....Alcester.

APPRENTICES.

The following having passed the Preliminary examination were elected "Apprentices or Students" of the Society:—

Glegg, John ....Edinburgh.
Jones, John ....Liverpool.
Minnitt, Walter ....London.
Neale, Edgar........................Faringdon.
Page, William Hawkins ....Colchester.
Prosser, Francis....................Milford Haven.
Shenstone, James Chapman......Colchester.
Wallbridge, Henry Alfred ......London.

Several individuals were restored to their former status in the Society upon payment of the current year's subscription and a fine.

John Herbert being duly registered as a pharmaceutical chemist was granted a diploma stamped with the seal of the Society.

The names of Henry Greasley, of 163, Blackburn Road, Accrington, Lancs., and John Jolliffe, of 10, Barandon Street, Lancaster Road, Notting Hill, were restored to the register of Chemists and Druggists.

The Conversazione.

Votes of thanks were unanimously passed to the Lords of the Committee of Council on Education, for their kindness in allowing the use of the South Kensington Museum for the Annual Conversazione; and to the official staff of the museum for their services on the same occasion.

Appointment of Committees.

Mr. Schacht suggested that a more efficient part in the work of the Committees could be taken by each member of the Council if more of the Committees met on the Tuesday afternoon preceding the Council meeting. He had alluded to this subject more than once before, but he was still convinced that an improvement could be made.

Mr. Robbins said the Finance Committee met on the Tuesday afternoon, but there was not one country member upon it.

Mr. Greenish said it was absolutely necessary to appoint a sufficient number of London members to carry on the business of the Society. He was very glad to see country members on the Committee, but if, as sometimes happened they only attended occasionally, they came quite new to the business, and instead of being an assistance were really a hindrance.

After some further observations from Mr. Williams, Mr. Savage, Mr. Schacht, and Mr. Atherton, the following Committees were appointed:—

General Purposes.—The whole of the Council. To meet as occasion may require.

Finance.—Messrs. Cracknell, Greenish, Hanbury, Owen, and Robbins. To meet at 3.30 o'clock on the day preceeding the meeting of the Council.

Benevolent Fund.—Messrs. Atherton, Brown, Frazer, Greenish, Mackay, Owen, Rimmington, Robbins, Sandford, Schacht, and Shaw. To meet at 5 o'clock on the day preceeding the Council meeting, as occasion may require.

Library, Museum, and Laboratory.—Messrs. Betty, Greenish, Hampson, Hanbury, Robbins, Sandford, and Williams, with power to add to their number. To meet the second Wednesday in the month at 11 a.m.

House Committee.—The same as Library, Museum, and Laboratory Committee. To meet as occasion may require.

Law and Parliamentary.—Messrs. Atherton, Baynes, Betty, Brown, Greenish, Hampson, Hanbury, Mackay, Owen, Rimmington, Robbins, Sandford, Savage, Schacht, and Williams, with power to add to their number. To meet at 6.30 p.m. on the evening preceding the Council meeting, or as occasion may require.

Mr. Robbins suggested that the work of the Law and Parliamentary Committee really belonged to the General Purposes Committee, which never met at all.

Mr. Hanbury thought Mr. Robbins' suggestion was a very good one, and that the Committee, consisting of the whole of the Council, might appoint a sub-committee to attend to parliamentary or any other particular business.

The Vice-President thought this could hardly be done under the bye-laws.

Mr. Brown said the Parliamentary Committee could appoint a Sub-Committee to attend to legal business or any other matter of detail.

Pharmaceutical Education.—On this Committee being mentioned,

Mr. Brown suggested that it would be better not to appoint it but to summon the General Purposes Committee when any question of education arose.

Mr. Schacht said there were several matters referred to that Committee which had not yet been reported upon. He did not know whether it was wise to abolish the Committee until that was done.

The Vice-President remarked that the Committee was already defunct, unless re-appointed, and could not bring up any report. If necessary, the matters referred to that Committee could be relegated to the General Purposes Committee.

The suggestion was then agreed to.

Evening Meetings.—The President, the Vice-President, the Professors, and the Editor were appointed a Committee to make arrangements for the evening meetings.

The President and Vice-President are *ex officio* members of all Committees.

Appointment of Editor and Sub-Editor.

Dr. Paul was re-appointed Editor, and Mr. F. Passmore Sub-Editor of the Journal and Transactions of the Society for the ensuing year.

Local Secretaries.

The Secretary said there were this year 311 towns entitled to elect local secretaries; 10 which previously enjoyed the privilege were not now eligible, not being parliamentary boroughs, and not having 3 resident members or associates in business; and there were 15 towns not on last year's list now eligible. There had been 12 changes by nomination, and in 131 towns there was no nomination, whilst in 4 towns the members had nominated persons not connected with the Society. He thought it was very desirable for the Council to nominate one or two gentlemen to go through the list with him, as it was rather an invidious task to undertake, in some cases names of persons having been suggested who did not appear eligible. For instance, for one town a gentleman was named who did not reside there.

Mr. Rimmington suggested that where the members in a town did not take the trouble to elect a local secretary, none should be appointed.

The Secretary said that was his feeling, but it was sometimes inconvenient to the Society not to be represented in particular localities.

On the motion of Mr. Sandford it was resolved :—

> "That the list of persons nominated as local secretaries now presented be referred to the Library, Museum and Laboratory Committee for completion, and that the Committee be requested to report thereon to the Council at its next meeting."

The Standing Orders.

The Vice-President bore testimony to the excellent manner in which the business of the Society had been managed in the committees during the past year, most of which he had attended. He said he did not remember one occasion on which there had been a delay of more than five minutes in order to form a quorum. He then moved that the standing orders for the regulation of the proceedings of the Council, a copy of which had been laid on the table, be adopted for the ensuing year.

Mr. Schacht said if it was agreeable to the Council he would now bring forward as an amendment the motion of which he had given notice:—

> "That members of Council having intention to introduce any motion of which notice has not previously been given, shall announce the same at the commencement of the day's proceedings."

If the amendment were approved it would, of course, be added to the standing orders. He would not detain the Council with a speech on the subject, his motion being founded on the principle that it was always desirable to know pretty well the business which was likely to come forward, in order that if the proceedings should be extended to an unusual length, those who were anxious to take part in any particular discussion would take care not to leave before it came on. It had been suggested by Mr. Brown that the motion would be more acceptable in the following form, which he was willing to accept :—

> "That no motion, unless in relation to subjects arising out of the minutes or introduced by the President, shall be brought forward unless previous notice has been given in the usual manner, or the intention declared at the commencement of the proceedings."

Mr. Frazer seconded the motion.

Mr. Sandford said it was competent to the Chairman to adjourn to the next meeting any motion of which previous notice in writing had not been given, and he feared that even in the modified form suggested the motion might be attended with inconvenience. For instance, a member might not be able to attend at the commencement of the business; he might, in fact, be attending to some matters of importance on behalf of the Society, and be unable to come in until 1 o'clock, and might then ask the Council to pass a resolution in reference to the business on which he had been engaged.

Mr. Frazer thought it hardly fair to the Chairman to impose upon him the invidious duty of postponing a discussion.

Mr. Hampson did not think the resolution at all necessary, as the standing orders provided for all emergencies. The President had authority to exclude the reception of any resolution if previous notice had not been given of it, or if it did not properly arise out of the business under consideration.

Mr. Schacht said cases had occurred in which resolutions had been passed of which no notice had been given.

Mr. Williams thought that in cases of grants of money notice of motion should always be given, but such had not invariably been the case.

Mr. Brown had had some difficulty with respect to this notice of motion. He could quite see that cases might arise, and no doubt had arisen, where such a rule would be of advantage, but on the other hand it might be found inconvenient in some cases, and on the whole he thought they had better leave themselves in the hands of the President.

The amendment on being put was lost.

Mr. Schacht said he would only now ask that the principle involved might be considered a part of their unwritten law.

The Vice-President thought that would answer the purpose.

Library, Museum and Laboratory.

The Committee reported that at its meeting held on the 12th of May, Professor Attfield had reported there had been 97 entries in his class since the commencement of the session, 53 being now at work. The Curator had reported that the average attendance in the museum for the past month had been—in the morning, 16; in the evening, 3; visitors in the morning, 1; evening, 1. He reported the reception of a fine specimen of iron alum from Mr. Morson, and also some fine specimens of Brazilian drugs from Messrs. Cyriax and Farries. The Librarian had reported that the average attendance at the library and conversation room had been—in the day, 22; evening, 8; conversation room, 5. The circulation of books had been

—127 in town; and in the country (to 25 places), 38. The Committee recommended the purchase of the following books for the library:—Bentley and Trimen's 'Medicinal Plants;' Sachs' 'Text-Book of Botany,' translated by Bennett and Dyer; and Normandy's 'Commercial Handbook of Chemical Analysis,' by Noad.

The report and recommendations were received and adopted.

Finance.

A report was read from from several members of Council who had acted as a Finance Committee, and sundry accounts were ordered to be paid. Some conversation ensued as to the indifferent quality of the refreshments supplied at the late conversazione by the contractor at the South Kensington Museum, when the Secretary stated that he believed it was open to the Council to go to any other contractor and make arrangements.

Mr. Robbins was very glad to hear it, for he had understood quite the contrary.

The Irish Pharmacy Bill.

The Secretary was about to read the minutes of a special meeting of the London members of Council called to consider this matter, when

Mr. Schacht asked if the matter had not been distinctly referred to the Parliamentary Committee to watch the Bill.

A considerable discussion ensued on the question whether the members who had met to take action in this matter had been the Parliamentary Committee or the London members of Council, and the Secretary also read the correspondence which took place with the Chemists and Druggists' Association of Ireland in the autumn of last year. He then read the minutes of what had taken place last month, including the deputation to the Chief Secretary for Ireland, a report of which has already appeared in the Journal, p. 951, and also a petition and circular which had been sent round to all the local secretaries in order to obtain signatures thereto.

Mr. Atherton moved, and Mr. Brown seconded:—

"That the report of the proceedings of the Special Committee on the Irish Pharmacy Bill be received and adopted."

Mr. Sandford moved an amendment, that the words "and adopted" be omitted. He could not help thinking that the Committee, whether regular or irregular, had taken a very strange proceeding, for, if he read aright the report of the deputation, they had broken faith with Sir Michael Hicks-Beach. Sir Michael had put before the deputation certain propositions, and it had promised to consider them, upon which he promised to suspend action until the deputation again saw him. He, therefore, thought the members of the deputation had behaved discourteously, to say the least of it, in sending out this petition, and that they ought to have suspended action until they had considered in council the propositions of the Chief Secretary for Ireland.

Mr. Hampson, as one who was present at the interview, said there was no understanding come to of the kind, but it was clear that the proposition of Sir Michael Hicks-Beach was of a very indefinite character and not sufficient to warrant a delay in opposition to the Bill. A question of policy had to be considered, time was pressing, and it was the duty of the Committee to carry out the resolution passed almost unanimously by the Council in October, and to oppose the Bill by all proper means.

Mr. Flux said the report of the deputation in the Journal, he thought, conveyed a slightly wrong impression by the full stop being inserted after the word "certainly" in the sentence where Sir Michael Hicks-Beach said he would not bring on the second reading on the Monday evening. It gave a more forcible impression than would follow from that gentleman's manner. More than that, after they left the room, he sent a message which seemed to convey that he had not given any distinct pledge on the subject. In one other point he thought the report slightly modified the expression, where it said that the establishment of a separate society for Ireland was a point upon which he should hardly think of giving way. His impression was that the Chief Secretary said "cannot give way."

Mr. Hanbury said that his memory confirmed that of Mr. Flux.

Mr. Williams said the messenger from Sir Michael Hicks-Beach came to him with a message that Sir Michael would be glad to see three or four members, as soon as convenient, to re-consider and talk the matter over again. He told the messenger in reply, that it would hardly, he thought, be right for a further deputation to wait on the Chief Secretary, until the Council had met and authorized their line of conduct. With reference to the petition and circular, he must leave the Solicitor to explain that part of the business.

The amendment was then put and lost.

The President was about to put the original motion, when

Mr. Schacht said he wished to have another opportunity of opposing it. It appeared from the motion which had been read, that the deputation had committed itself in certain broad phraseology to the principle that it would be desirable to extend the operation of the Pharmacy Act to Ireland, and to that he should offer the strongest opposition. If they could go back to the time when no Pharmaceutical Society existed in England, no one would have expected Parliament to place in the hands of any non-existing body the power of regulating the whole proceedings of pharmacy. Certainly, they would never have asked them to grant to A. B. or C. D., persons comparatively unknown, the power of declaring who should or should not carry on the business of pharmacy in England. The history of legislation in England did not take that form; but, first of all, there was a Society formed, and the great men, whom they all knew by name, associated themselves together, did a great deal of work, and gave a guarantee to the world that they were qualified to carry out the regulations which the Act of Parliament afterwards gave them power to enforce. But, until that was done, no government could have given such power into their hands; and yet that was the very thing they were going to propose to do in Ireland at present.

Mr. Williams said that was what they were opposing.

Mr. Schacht said that they were palpably endorsing the same thing in saying they were prepared to establish a Board of. Examiners in Ireland. There were not the materials there to carry on a society that there were in England or Scotland, and, therefore, to pledge themselves to at once extend the operations of this Act to Ireland was a step he could not sanction for a moment. The Committee had not contented itself with opposing what was wrong; if it had he should have been ready to endorse its action; but it had proceeded to enunciate not only for itself, but for the whole body, which for the moment it was supposed to represent, sentiments which had never been fully discussed in the Council or elsewhere, and certainly had never been adopted. He had heard two or three discussions upon this subject, which had always run in this direction, that if the Irish pharmacists were anxious that the provisions of the Act should extend to that country, then the Society was willing to discuss the question with them. It was always assumed that the Irish element generally was anxious in the matter, but Sir Michael Hicks-Beach stated most plainly, that the Irish pharmacists wanted, not to be connected with the British Society, but to have an independent one of their own. He thought the Committee had acted most unwisely in endeavouring not only to create a wrong impression as to the general feeling of English pharmacists, but in going to the extent of using the machinery of the Society, by sending out a petition and circular, asking to get it immediately signed by pharmacists throughout the country, and sent up "the day after to-morrow," thus endorsing views which had never been fully discussed. He thought such action was decidedly wrong, and he hoped the word "adopted" would not be recorded.

Mr. Savage could not agree with the view of Mr. Schacht on this matter. The apothecaries of Ireland were a great body, at present trying to gain ascendancy, and it seemed important that the Pharmaceutical Society of Great Britain should do all it could to protect pharmacists. For after all there had been a great many pharmacists in Ireland, who, although they were not numerically strong, had still some influence and power, and ought not to be placed under subjection to the apothecaries. The propositions emanating from the Society of Chemists and Druggists were for the most part good, and the question was, Should they, as a Society, desire to have the same influence in Ireland as they had in Scotland—whether there should be two bodies which might be antagonistic or not in harmony with each other, or whether there should be but one for the whole United Kingdom?

Mr. Hampson said Mr. Schacht objected that they knew nothing of Irish pharmacists, but it was these very Irish pharmacists of whom it was said they knew nothing who might come over to England under this Bill and claim the privileges of the Society. It was surely their duty to protect their own interests and to prevent such a Bill passing. They knew the danger of letting an obnoxious Bill get into Committee, and, therefore, they considered it the best policy to stop the progress of the Bill altogether, and to endeavour to bring about a better understanding both here and in Ireland by means of interviews with Irish pharmacists and others in order that a Bill might be framed for introduction hereafter which would satisfy both countries.

The Vice-President called attention to the formal resolution of the Council on the 7th of October last: "That it is desirable to extend the provisions of the Pharmacy Act to Ireland." He, therefore, considered the London members were carrying out the resolution of the Council in their opposition to the Irish Bill, and in all that they had done.

Mr. Schacht thought the general opinion was, supposing Irish pharmacists desired co-operation, then the Council was willing to meet them, and extend the Pharmacy Act to Ireland.

Mr. Williams said the Committee rather confined itself to opposing the present Bill, because it thought the Bill was one which could hardly be made satisfactory by any amount of manipulation. It was apparently intended by the Government not to form a society like their own, but a society of Government nominees, probably to receive payment from the State. It appeared to him the Government was to appoint a Board of Examiners who would practically be perfectly independent of the British Society—in fact his belief was that the nominees so appointed would probably be medical men—and yet men who were examined by such a Board would claim to come to England and be placed on the Register of Pharmaceutical Chemists. It was this which led him to urge that the Committee should oppose the Bill *in toto*. There ought to be either two societies mutually supporting each other, or they could extend the Pharmaceutical Society, under proper conditions, to Ireland. They were quite willing to have supported a society in Ireland if properly constituted, and if before placing their examinees on the English register there were some efficient control over the examination by the British Society; but until that was allowed they must oppose the present Bill. That was the view which the Committee impressed on the Chief Secretary. The petition had been adopted in deference to the views of the Solicitor.

Mr. Flux said he should certainly have regretted very much if any advice he had given after the return of the deputation to the Chief Secretary had led to a step which could have been considered by that gentleman as discourteous. He would always avoid everything of that character if possible, more especially with Sir Michael Hicks-Beach; but the grounds upon which he recommended the course pursued were these, that the legislative powers were with the Government, and not with the Society, and therefore they could not discuss abstract propositions in a legislative sense. They could only consider that which was actually before them, namely, the Bill as printed, which contained the vicious principles which had been pointed out by several speakers. The persons to be appointed as examiners were to be appointed by the Government, and the Society, when formed, was to have the power of pouring into Great Britain, not chemists and druggists but pharmaceutical chemists; whilst the preamble to the Bill went to show that what was wanted in Ireland, was a class of persons who should be compounders and sellers of medicine. In this state of affairs the formal resolution of the Council in Octo- last was come to, and the next question was how to give effect to it. It was evident the Society could not avoid considering the Irish question. After it had passed a resolution that it was desirable to extend the Pharmacy Act to Ireland, it seemed to him that the condition would be realized if Ireland were incorporated with the remaining portion of the United Kingdom (which was the natural state of things). It might be said that the best way would be to let the Bill go into Committee, and then attempt to modify it, and introduce such changes as were necessary; but it must be remembered they had no power of modification, and, if it passed a second reading, they had no effective control. Therefore, he considered it best to oppose the Bill, and, having to consider how that could best be done, he had drawn up a form of petition which had been sent for consideration by country members.

The President said he should not make any apology for what he had done; he had done it in the interest of the Society, and should do it again under similar conditions. He agreed with Mr. Sandford that according to the report in the Journal it did appear discourteous on their part not to have communicated again with Sir Michael Hicks-Beach, but under the circumstances it was impossible.

Mr. Schacht asked what was the reason adduced by the Chief Secretary for Ireland why there should be a separate society in Ireland.

Mr. Flux read an extract from the report in the Journal.

Mr. Schacht said that showed that the Irish pharmacists were opposed to a union with that society.

Mr. Frazer said he did not stand on technicalities and therefore should not complain of the informal manner in which the Committee had acted, though he thought it would have been better for them to have signed their individual names instead of using the official paper, and so on. It was very rarely he found himself in the position of supporting any measure brought in by the present Government, but on this occasion he thoroughly went with them—this was an Irish Bill for the Irish people, and he thought they were entitled to get it. Many gentlemen seemed to take it for granted that they were not going to have the same examinations in Ireland as in England, but there was no evidence to that effect.

The President said there was to be only one examination.

Mr. Frazer: So much the better. There was no evidence that they wished to reduce the standard of examination, and from the preamble he gathered that the intention of the Government was to largely increase the number of pharmacists. The statement of one or two of the members was that the pharmaceutical standard must be raised and brought up to the standard of the Major examination; but that was higher than the existing examination for Apothecaries, and therefore they could not suppose the Government was going to meet the present deficiency by heightening the standard. It was said also that no provision was made for meeting the expenses, but the Bill stated that the fees were to be charged for examination. Then it was said that this country would be flooded by Irish chemists; but, as he read the Bill, after they had paid their fees for examination in Ireland, before they could become members of the Pharmaceutical Society, they would have to pay their fees in this country. He believed it would be far better to have separate societies. The only thing in favour of opposing the Bill was in order to suspend it for a year, so that a better measure might be brought forward that would suit both countries.

Mr. Betty could not understand Mr. Frazer's logic, as he said he wished to support the Bill, and yet he should like to see it withdrawn.

Mr. Sandford said, when the Council expressed its willingness to extend the operations of the Society to Ireland, it was under peculiar circumstances. At the time the Pharmacy Act of 1868 was passing through Parliament, there was an effort made by the Irish members to extend the Act to Ireland; but one reason for not doing so was, that they felt it would jeopardize the Bill, and of those who opposed having anything to do with Ireland, their Secretary was then the loudest. Last year another Bill was introduced, which proposed to extend the operation of the Society to Ireland, and Mr. Mackay and himself were called before the Committee to give evidence. They then expressed their willingness to go to Ireland, but by no means their desire to do so, and the evidence they gave to that effect was entirely in accordance with the instructions they had received from the Council. He could not see why they should oppose the Bill *in toto*. They were told by Sir Michael Hicks-Beach that acting on the recommendation of the Select Committee he was determined to have a separate society for Ireland, and seeing that he was so determined he rather thought the best plan would be to try and make this Bill what was wanted. He did not see any advantage in having the same society in two places, and no doubt pecuniarily it would be a loss. Looking at the Medical Act it would be found that the Medical Council had one register of all men qualified in the three kingdoms, but it had the power to send delegates to all examinations, and, before any one was placed on the register, the Medical Council must be satisfied he had passed a sufficient examination. He should decidedly object to the present Bill as it was, but he thought it might be amended, in accordance with the suggestion thrown out by the Chief Secretary, by means of *ad eundem* examinations. There was some little confusion about that term, for, although they knew what an *ad eundem* degree was, they did not know much about an *ad eundem* examination which was a term he had never heard before. But still there was a clear offer to give to English pharmacists the power of establishing examinations for men who came from Ireland and asked to be put on the register. The Bill did not give any ascendancy to the apothecaries. Mr. Flux said if they allowed it to pass the second reading they would have no power over amendments in Committee; but the fact was they must go into Committee before amendments could be introduced. The principle of the Bill was that there should be a separate society for Ireland, and if there were to be reciprocity there must be equal examinations. He knew that Irishmen said their examinations should be as good or better than the English, and that they would have none but pharmaceutical chemists of the highest class. His fear was if there was only one examination and they wanted more chemists, as was stated in the preamble, that examination would degenerate into something not above the English Minor, and he should suggest the adoption of two examinations, as in England. He would also suggest that a power should be given the Society in England over the examinations in Ireland, though he said that very guardedly. The Medical Council now sent visitors to all the examining boards which they recognized, and this Council might do the same thing; there should be a Government assessor, and a member of the Council might attend and satisfy himself that the examinations were thorough and well conducted. The mode of action with regard to the Medical Council was this: if it sent a visitor to an examination, and he thought the examination was not what it should be, he at once reported to the Privy Council, which body, if it thought the complaint well founded, suspended the action of the examining board and no degree could be conferred by it until the matter was put straight. The same thing might be done with regard to the English and Irish examining boards.

Mr. Hampson asked whether that machinery had ever been called into operation.

Mr. Sandford thought most likely it had, though he could not speak positively. At the present time the Medical Council was trying to get one identical examination throughout England, but that would not extend to Scotland or Ireland. He thought they had now an opportunity of settling an Irish question in the way which the Irish people would like, and in a way which would be advantageous to themselves; and he hoped therefore the Council would not oppose the Bill *in toto*. The Council had never given authority for the preparation of a Bill of their own, and he was sorry such an offer had been made to the Irish Secretary.

Mr. Betty thought, instead of criticizing the details of the Bill, the Council would be guided by the general principles which had always been understood to actuate them since first this matter came forward, and which were given expression to before the Select Committee of the House of Commons by Mr. Sandford and Mr. Mackay. Since that time there had been a universal understanding that it was their duty, and at a fit time they would make an effort to carry out what was understood would be done at the time of the passing of the Act of 1868, namely, extend the operation of the Act to Ireland. He was sorry that a gentleman who had so ably stated those views before the Committee should now come and support a Bill utterly opposed to them. Mr. Betty then read extracts from Mr. Sandford's evidence before the Committee to the effect that establishing separate Societies would lead to confusion, that reciprocity would be less desirable than union, and that union would be the best.

Mr. Schacht said they could not have union, it was only on one side. He would propose as an amendment:—

"That the opposition of this Council to the Irish Pharmacy Act be limited to those clauses that convey to pharmacists registered in Ireland the privileges of pharmacists in England.

Mr. Sandford suggested the addition of the words, "unless similar examinations can be established and insured."

Mr. Hampson said that the standard of the examinations could not be guaranteed.

Mr. Schacht said among other reasons for his amendment was the fact that this Society possessed a considerable amount of property, and he did not see why that property was to be shared with a body of men who said they did not want to have anything to do with them. It would be a different thing if Irish pharmacists were desirous of union.

Mr. Atherton said as a local secretary he had received a few days ago the petition to which he was requested by the Committee to obtain signatures against this Pharmacy Bill. He should like to know what would be the position of those like himself in case the motion now before the Council was negatived.

Mr. Hampson said they were only beginning now to discuss and comprehend this question. They opposed the Bill because they believed it to be a mistake, and if the two countries could come together and fully discuss the matter—and they had been in communication with two or three gentlemen representing the Irish Apothecaries who practised pharmacy—he had no doubt they would arrive at a common understanding. There was a deputation, he was informed, now in London from the chemists and druggists of Ireland, who appeared to be totally ignored by the apothecaries, and the object of opposing the Bill was to get it withdrawn, so that all these various parties might be brought together, and, if possible, some common basis arrived at.

Mr. Savage said that at the time it was proposed that the British Pharmaceutical Conference should go to Ireland, they learnt that if they went to the apothecaries the chemists would ignore them, and if they fraternized with the chemists the apothecaries would have nothing to do with them. Therefore, they did not go.

Mr. Williams said he had seen some of the gentlemen from Ireland, and had acquired a great deal of knowledge of Irish pharmacy from them. It appeared there were three parties in Ireland; first, the apothecaries, who had passed an excellent examination, not only in pharmacy, but also in medicine, midwifery, and other subjects. With a few exceptions, these gentlemen were willing to give up the medical part of their diploma, and to confine themselves to pharmacy, and would be glad to be received into the Society. Then there was another body belonging to Apothecaries' Hall, who, he understood, wished to retain their medical as well as their pharmaceutical degree. Lastly came chemists and druggists who were simply sellers of drugs, and he was informed had no knowledge of dispensing or pharmacy in its proper sense. As far as he could gather they would be willing to accept a modified examination for gentlemen of this class. They also thought the only plan was to withdraw the present Bill that there might be time to consider the matter between this time and next year, and bring in another which would be satisfactory to all parties. He might add that the fee for passing the examination at Apothecaries' Hall was fifteen shillings.

Mr. Frazer having seconded the amendment, it was put to the vote and lost, only Mr. Schacht, Mr. Frazer, and Mr. Sandford voting in favour of it.

The original motion was then put and carried, the same three gentlemen voting against it.

Mr. Betty moved :—

"That a deputation, consisting of the president, vice-president, the treasurer, and Messrs. Hampson and Betty wait on the Chief Secretary for Ireland as soon as an appointment could be made."

He took it that these gentlemen would represent to the Chief Secretary the views which had been expressed that morning and, as he understood, they would oppose the Bill as it was *in toto*, but if it were to be carried at all that it should be a purely Irish Bill, and not attempt anything in the way of reciprocity with England.

After some discussion the resolution was carried,

Mr. Hampson then moved :—

"That the petition from this Council, which has just been considered, be sealed and presented to Parliament forthwith."

At the request of Mr. Hampson, the Solicitor read the Petition as follows :—

"To the Honorable The Commons of the United Kingdom of Great Britain and Ireland in Parliament assembled—

"The humble petition of the Pharmaceutical Society of Great Britain

"Sheweth,—That your petitioners have considered 'A Bill to constitute a Pharmaceutical Society, and to regulate the qualifications of Pharmaceutical Chemists in Ireland, and to establish certain relations between the Pharmaceutical Society of Great Britain and Ireland' now before your Honorable House.

"That your petitioners regard the proposals of the said Bill as likely to prove injurious to the interests of Great Britain and not likely to advance the interests of Ireland.

"That your petitioners regard as desirable in the interests of the United Kingdom the extension to the whole of the kingdom of the laws which now within Great Britain regulate the qualifications of Pharmaceutical Chemists and Chemists and Druggists, and also the Sale of Poisons.

"Your petitioners therefore pray that the said Bill now in your Honorable House may not be passed, and that a Bill may be passed which shall extend to the whole kingdom the laws which now within Great Britain regulate the qualifications of Pharmaceutical Chemists and also the Sale of Poisons.

"And your petitioners will ever pray, &c."

The Vice-President seconded the motion.

Mr. Schacht moved as an amendment :—

"That no petition against the Irish Pharmacy Bill be presented by this Council."

He said that his ground of objection was that it did not simply content itself with opposing the present Bill, but went on to advocate something else which he objected to.

Mr. Frazer seconded the amendment, but on a vote being taken, it was negatived. The original motion was then put and carried.

The seal of the Society was then affixed to the Petition.

Drugging of Animals Bill.

Mr. Sandford said there was another Bill just introduced into the House of Commons, the second reading of which stood for the next evening, its object being to make it a punishable offence to administer certain drugs to horses and other animals. Not only so but it re-enacted a great part of the Pharmacy Act, 1868, and subjected the poisons included in Part 2, of Schedule A, together with some substances not at present included in the schedule at all, to restrictions as to sale applying at present only to poisons in Part 1 of the Schedule.

The President thought the consideration of the Bill should be referred to the Law and Parliamentary Committee.

The Vice-President said the introducer of this Bill had clearly gone a great deal further than he intended, because some of the articles enumerated were frequently given by grooms, or those having the care of horses, and were of the greatest assistance, and often saved the life of a valuable animal.

The Solicitor said, as this was a matter which related to horses, it would be pretty sure to attract attention in the House of Commons, and it seemed too absurd to have any chance of passing.

Mr. Baynes thought they ought to lose no time in opposing it, and should not assume that its absurdity would be an obstacle.

It was then resolved :—

"That the Law and Parliamentary Committee be requested to take such steps as they may deem necessary to oppose the Drugging of Animals Bill."

Benevolent Fund.

Several members of the Council, acting as a Benevolent Fund Committee, had held a meeting to consider applications for relief, and recommended the following grants :—

£20 to be placed in the hands of Mr. Owen for the purpose of assisting to put into the London Orphan Asylum at Watford, the child of a widow, whose case has been reported before.

£10, being a second grant, to the widow of a chemist and druggist.

£7 10*s.* towards enabling a former member to emigrate.

Several other applications had been considered and deferred for further consideration. The Committee also reported that there were at present, sixteen annuitants, seven men, and nine widows; that there were four candidates who were unsuccessful at the last election, since when two more names had been added to the list of approved annuitants. They recommended the Council to elect four annuitants in October next.

Mr. Brown moved, and Mr. Robbins seconded, that the report and recommendations of the gentlemen acting as the Benevolent Fund Committee be received and adopted, which was carried unanimously.

Election of Four Annuitants.

It was moved by Mr. Brown, seconded by Mr. Robbins, and resolved:—

"That it is expedient financially to elect pensioners on the Benevolent Fund in October next, and that four pensioners be elected accordingly.

The Secretary said he wished the Council would take into consideration the advisability of giving a greater interest in the way of votes to those who subscribed to the Benevolent Fund.

Report of Examinations.

May, 1875.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major	1	1	0
Minor	8	2	6
Total	9	3	6

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Minor	7	4	3
Modified	1	0	1
Total	8	4	4

Preliminary Examination. — One certificate of the College of Preceptors was received in lieu of the Society's Examination.

The Glasgow Memorial.

Mr. Frazer moved the resolutions of which he had given notice in reference to the Glasgow memorial as follows:—

"That after the 1st January, 1876, candidates for the various examinations of the Society shall continue to have the option of entering on these on the present footing; or, on that of foregoing their right, in case of failure, to receive back any part of the fee for the respective examinations; in the latter case those students who adopt it shall have two additional opportunities of passing for the fee so retained.

"Further:—That students who pass with credit in two subjects in the Preliminary and Minor Examinations, and in one subject in the Major, but who fail to pass in all the subjects of each examination, shall be credited with the subjects in which they do pass, and so be, on their second appearance, examined only upon those subjects in which they failed to pass on their first examination.

"Again:—That this Council, in regard to the views advocated in the Glasgow memorial, recommend that in future nominations, the Edinburgh Council in sending up names of gentlemen to constitute the Scotch Board of Examiners should, as far as possible, make the selection from a larger area than they have hitherto been in the habit of doing.

"And finally:—This Council also recommend that the Council of the North British Branch take into consideration, in deference to the expressed wish of their Glasgow brethren, the desirability of holding at least occasional examinations in Glasgow, provided this can be done without incurring an undue expenditure of the funds of the Society."

He said it must seem strange that he should bring forward this matter, about which so much had been said, in the absence of Mr. Mackay, but he did so with the full concurrence of that gentleman, not in the terms of the resolution, but in its being brought forward now instead of deferring it until July, as he would willingly have done. He was happy to say that the personal matter was now entirely at an end between Glasgow and Edinburgh, the alleged want of courtesy having been entirely explained, the Edinburgh gentlemen being quite satisfied that no offence to them was intended. After referring to a personal matter affecting Mr. Fairlie, Mr. Frazer said he had not seen any of his Glasgow friends since the meeting with the exception of two, neither of whom were anxious that he should bring the matter forward, and one was in fact opposed to it, but as he had undertaken to bring the memorial before the Council, he did not like to interpose his individual opinion, and though he did not agree in all their views, he thought it only right to submit them in the form of the resolutions. After stating some additional facts to strengthen the position he had taken on a former occasion, that there was a great difficulty in obtaining apprentices and assistants, he read a letter from Mr. Currie supporting the views of the memorialists, and especially alleging that a slight alteration in the Minor examination would be a great relief to the candidates, and reduce the number of failures without impairing its efficiency. In conclusion he repeated that he was not to be understood as individually supporting the whole of the memorial or the resolutions in their entirety—indeed, he was opposed to the two last, and he yielded to no man in his appreciation of the respect for the members of the Examining Board in Edinburgh, with all of whom he was personally acquainted.

Mr. Williams seconded the motion *pro formâ* in order that it might be fairly discussed.

Mr. Cracknell said it appeared to be the opinion of Mr. Frazer that it was entirely owing to the examinations that there was so much difficulty in obtaining apprentices and assistants, but this he could not admit to be the case. He had made inquiries on this subject and found that throughout the provinces other trades and businesses found a like difficulty, much more so than formerly. He believed the true explanation to be that there is a growing disinclination amongst the educated classes to engage in retail business of any kind, whilst the market is flooded with clerks of all kinds at almost any remuneration. It was possible that the examinations might to some extent restrict the number of those engaged in their trade, but if this check did not exist many would enter it who were not educated in the proper manner. The alterations suggested in the first paragraph would give rise, in his opinion, to great confusion, and would not be at all desirable. It had been urged that, if candidates were allowed to forfeit their fees in the event of ultimate failure, the number of unprepared candidates presenting themselves for examination would be diminished; but he did not think this would be the case—at any rate, it would be only so in regard to the last examination. In regard to the second paragraph, he must, as a late examiner, say that he considered what was proposed very undesirable, and not only so, but impossible of adoption, because he knew it was adverse to the views of every member of the Board of Examiners. This subject had been thoroughly ventilated and discussed in both London and Edinburgh, and the system now proposed in the motion was condemned, he believed, without a dissentient voice on either Board. The Minor examination was intended to denote the competency of the candidate to carry on the business of a chemist and druggist, but it must do so as an entirety, and not deal with mere portions. What would be thought of a man who passed on the first occasion in two subdivisions of the examination, in two more after an interval of three months, in two more after another interval, and the remaining two at a final examination? The examination was really one entire whole, not a compound of various sections, and was only sub-divided for the convenience of the examiners. The object, he supposed, was to make the matter easier for candidates; but the fact was, it would only open the door to cram, a thing which he believed they would all deprecate. The third paragraph he understood was not really pressed, and he was happy to find that Mr. Frazer disclaimed any intention to impugn the action of the Scotch Board of Examiners. From what he had seen of those gentlemen he could safely say that gentlemen possessing higher integrity, or who acted more with a desire to do their best for the Society and for the candidates he had never met.

Mr. Hampson thought there was some inconsistency in the propositions now put forward. It was alleged that the standard of the examinations deterred men from entering the trade, and, to be consistent, their Scotch friends should commence an agitation to lower the standard, but this they did not propose to do.

The Vice-President said he could not give a silent vote on this question, especially having recently had the pleasure of visiting Edinburgh and Glasgow with his friends, Mr. Cracknell and Mr. Carteighe. A better set of pharmacists he would not wish to find than the gentlemen he met in Glasgow, and he could only regret that this little difference between them and their friends in Edinburgh had not cropped up then, as it might very probably have been calmly discussed and settled, and would then never have been heard of in London at all. He thought nothing could be more suicidal than to alter the examinations at the present moment; they had been altered recently, and had not yet had a fair trial, so that it would be most unwise to make any further change at present. With regard to the last paragraph, it was not a question of funds; they had authority to hold examinations in Edinburgh, in Glasgow, *or* elsewhere in Scotland; but they had no authority to hold them in more places than one; the word was "or," not "and," and if they were to go from Edinburgh at all, Aberdeen would have quite as good a claim as Glasgow. But then Manchester, Birmingham, Bristol, and other large manufacturing centres would have equal claims. On these grounds, without any disrespect to their Glasgow friends he thought it unwise to attempt the holding of examinations anywhere except at two metropolitan centres.

Mr. Baynes had sympathized to some extent with Mr. Frazer's views on the question of the examination, but only to the extent that he thought they had raised the standard rather too soon, and he should now firmly resist any departure from the present regulations. There was an idea afloat that it was intended in a few years still further to raise the standard of the examinations, and it was therefore of the utmost importance that it should be clearly understood that no change at all would be made.

Mr. Betty thought there was very little to be said in favour of the motion after the lucid exposition of the question which had been given by Mr. Cracknell, and he should hope Mr. Frazer would be content with the ventilation of the subject and not press the motion. The question of dividing examinations and passing in part at a time had been under discussion for the last ten years and the great majority of opinion was dead against it. The whole of the knowledge was required at one time not piecemeal.

Mr. Williams said that financially the examinations were not profitable, and therefore it was a very serious matter to sacrifice any portion of what was now received. It was a thing he could not agree to.

The Secretary read a statement he had prepared of the receipts and expenses connected with the Minor and Major examinations, showing that at some meetings of the Board there was a loss, and never more than a small surplus, without taking any account of clerks and establishment charges, which would, if added, show that a constant loss was incurred.

Mr. Frazer in reply said he contended that the examinations were a considerable source of gain to the Society; he estimated it, in fact, at upwards of £1500 in the year 1873. With regard to the question of partial examination when the candidate had already passed in certain subjects he knew positively that it had the support of almost the whole of the Edinburgh examiners, though they did not attempt to take action in the matter, knowing it was opposed to the views of the London Board. He could not discuss the merits of the question himself, not being prepared to do so, but he knew those were the views of the gentlemen who had considered it. Some gentlemen spoke as if he had advocated a lowering of the standard, but he had done nothing of the sort, though he had opposed the last change, thinking it a great mistake. The case of Ireland showed clearly what was the effect of having too stringent an examination; it simply drove men into the ranks of the medical profession. He quite agreed with Mr. Cracknell that there was a like difficulty in many other trades, but that was a reason why they should not throw more obstacles in the way of young men than were absolutely necessary.

Mr. Baynes suggested that the motion should be withdrawn, but

Mr. Frazer said he should prefer to take a vote upon it. It was accordingly put, but received no support beyond that of the mover himself.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' SOCIETY OF IRELAND.

The session of this Society came to a termination on Friday evening, the 30th ult. The classes which have been conducted by Professor Titchborne and Dr. Frazer have throughout been remarkably well attended. At the conclusion of the course the Society offered a prize of £2 2*s*. for competition in the chemistry class, to which Professor Titchborne generously added a second prize of a guinea. Several of the students competed for the prizes. The following were the successful candidates:—First prize, William Furlong, apprentice to Mr. Holmes, Upper Baggot Street; second prize, S. D. Chandlee, apprentice to the Apothecaries' Hall of Ireland.

Professor Titchborne reported as follows:—"The answering was generally very good, and five of the candidates scored very high."

A cordial vote of thanks was voted to Mr. Hayes, Hon. Sec., for his untiring zeal in the interests of the Society.

The following gentlemen have been appointed as Subcommittee to watch the interests of the Society in the passing of the Irish Pharmacy Bill, at present before Parliament:—Mr. E. M. Hodgson, President; Mr. W. Hayes, Hon. Sec., and Messrs. William Allen, J. T. Holmes, and Robert Simpson. The Bill is generally approved by the Society with some exceptions. So far as reciprocity with the Pharmaceutical Society is concerned the Society is quite indifferent. The opinion of the Society is that it would be well to continue two classes, viz., chemists and druggists and pharmaceutical chemists.

The Society is also anxious about the constitution of the proposed first Council and is of opinion that the members of the Society should be fairly represented there.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Irish Pharmacy Bill.

The second reading of this Bill, which had been set down for Monday last, was postponed until Thursday the 3rd inst. On Thursday, on the motion of Sir Henry Selwyn-Ibbetson, it was again postponed until Monday next, the 7th of June.

Mr. Salt will then move that the Bill be read a second time that day three months.

During the present week, petitions against the Bill from the following places have been presented :—

Abingdon ....Mr. John Creemer Clarke.
Ashby-de-la-Zouch...Lord John Manners.
Ashton-under-Lyne Mr. Thomas W. Mellor.
Banbury .... „ Bernhard Samuelson.
Banff .... „ Robert William Duff.
Barnsley............... „ W. T. W. S. Stanhope.
Barnstaple .... „ Thomas Cave.
Bedford .... „ Samuel Whitbread.
Bewdley & Stourport „ Charles Harrison.
Blandford ....Hon. William H. B. Portman.
Bridport...............Mr. Pandeli Ralli.
Burnley .... „ Richard Shaw.
Burslem .... „ Robert Heath.
Bury St. Edmunds „ Edward Greene.
Cardiff ....Lt.-Col. Jas. F. D. C. Stuart.
Chelmsford............Lord Eustace Cecil.
Cheltenham ....Mr. James Tynte Agg Gardner.
Chester .... „ Henry Cecil Raikes.
Congleton & Runcorn Hon. Wilbraham Egerton.
Crewe..................Lt.-Col. Egerton Leigh.
Deal ....Rt. Hon. E. Knatchbull-Hugessen.
Denbigh......... .....Mr. Watkin Williams.
Derby.................. „ Michael Thomas Bass.
Devizes ....Sir Thomas Bateson, Bt.
Devonport ....Mr. John Henry Puleston.
Doncaster .... „ Lewis Randle Starkey.
Dorking .... „ George Cubitt.
Dover ....Major Alexander Geo. Dickson.
Dumfries ....Capt. J. J. Hope Johnstone.
Dundee ....Mr. James Yeaman.
Durham ....Sir Arthur Edward Monck, Bt.
Edinburgh ....Mr. Duncan McLaren.
Falmonth .... „ David James Jenkins.
Gateshead .... „ Walter Henry James.
Grantham ....Sir H. A. H. Cholmeley, Bt.
Gravesend ....Captain Bedford Pim.
Great Yarmouth ...Sir Edmund H. K. Lacon, Bt.
Greenock ....Mr. James Johnstone Grieve.
Guildford ....Mr. Denzeil R. Onslow.
Heywood .... „ Edward Hardcastle.
Horncastle............Hon. Edward Stanhope.
Huddersfield ....Mr. Edward A. Leatham.
Hull .... „ Christopher Sykes.
King's Lynn ....Lord Claud J. Hamilton.
Knaresborough ......Mr. Basil Thomas Woodd.
Knutsford ....Hon. Wilbraham Egerton.
Leicester ....Mr. Peter Alfred Taylor.
Leighton Buzzard...Col. Richard Thomas Gilpin.
Leominster ....Mr. Richard Arkwright.
Lincoln ....Lt.-Col. Edward Chaplin.
Loughborough ......Mr. Samuel William Clowes.
Ludlow ....Hon. G. H. W. W. Clive.
Lyme Regis ....Hon. William H. B. Portman.
Macclesfied ....Mr. David Chadwick.
Manchester .... „ Edward Hardcastle.
Marlow .... „ Thomas Owen Wethered.
Merthyr Tydvil ...... „ Henry Richard.
Middlesborough ... „ Henry W. F. Bolckow.
Neath.................. „ Lewis L. Dilwyn.
Newbury ....Col. Robert J. Loyd Lindsay.
Newcastle-on-Tyne..Mr. Joseph Cowen.
Newcstle-undr-Lyme „ William Shepherd Allen.
Northampton......... „ Pickering Phipps.
Norwich................ „ Jeremiah James Colman.
Oxford .... „ Alexander William Hall.
Pembroke Dock ... „ Edward James Reed.
Penzance .... „ Arthur P. Vivian.
Perth ....Hon. A. F. Kinnaird.
Peterborough.........Mr. Thomson Hankey.
Pocklington .... „ Christopher Sykes.
Poole ....Hon. A. Evelyn Ashley.
Portsmouth ....Sir J. D. H. Elphinstone, Bt.
Rochdale ....Mr. Thomas B. Potter.
Rochester .... „ Philip Wykeham Martin.
Ryde ....Mr. A. D. W. R. B. Cochrane.
St. Ives .... „ Charles T. Praed.
Salisbury ....Dr. John Alfred Lush.
Scarborough ....Sir Harcourt Johnstone, Bt.
Selby ....Mr. Joshua Fielden.
Shepton Mallett ... „ Richard Horner Paget.
Shipley ....Lord F. C. Cavendish.
Shrewsbury ....Mr. Charles Cecil Cotes.
Slough..................Sir R. Bateson Harvey.
Southampton ....Rt. Hon. Russell Gurney.
Southport ....Rt. Hon. Richard A. Cross.
South Shields.........Mr. James Cochran Stevenson.
Stalybridge............ „ T. H. Sidebottom.
Stockport .... „ Charles Henry Hopwood.
Sunderland............ „ Edward T. Gourley.
Swansea .... „ Lewis L. Dilwyn.
Tamworth ....Rt. Hon. Sir Robert Peel, Bt.
Taunton ....Mr. Alexander Charles Barclay.
Tewkesbury .... „ William E. Price.
Tiverton... ....Sir John Heathcote Amory.
Uttoxeter ....Mr. Colin Minton Campbell.
Warrington .... „ Gilbert Greenall.
Warwick............... „ George W. J. Repton.
Watford ....Hon. Henry F. Cowper.
Weymouth............Mr. Henry Edwards.
Wigan ....Lord Lindsay.
Windsor ....Mr. R. Richardson Gardner.
Wolverhampton...... „ Thomas Matthias Weguelin.
Worcester .... „ Alexander Clunes Sheriff.
York .... „ George Leeman.

Petitions having also been presented from the following places :—

Cockermouth.	Plymouth.
Elgin.	Stratford-on-Avon.
Gosport.	Thirsk.
Leamington.	Whitehaven.
Montrose.	Yorkshire.
Petersfield.	

DRUGGING OF ANIMALS BILL.

The following is the text of the Bill to make the administration of Poisonous Drugs and compounds to Horses and other Animals a punishable offence, which has been read a first time in the House of Commons :—

Whereas it is expedient to make provision for putting an end to the practice of administering poisonous drugs and other compounds to horses and other animals by disqualified persons, and without the knowledge and consent of the owners of such horses and animals :

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

1. From and after the *passing of this Act* if any person other than a member of the Royal College of Veterinary Surgeons of Great Britain, or any person acting under his direction, shall give any horse or other animal any one or more of the several articles named or described either in Part I. or Part II. of the Schedule A. to this Act without the consent of the owner of such horse or animal, such person shall be deemed guilty of a misdemeanor, and shall on conviction thereof be liable for each offence to a penalty or sum not exceeding *ten pounds*, or to be sentenced to be imprisoned, with or without hard labour, for any term not exceeding *three calendar months ;* but nothing in this Act contained shall exempt any person from any heavier punishment to which he might be liable under any other Act, provided that no person shall be punished twice for the same offence.

2. The several articles named or described in Part II. of the Schedule A. to this Act shall be deemed to be poison within the meaning of this Act.

3. It shall be unlawful to sell any poison, either by wholesale or by retail, unless the box, bottle, vessel,

wrapper or cover in which such poison is contained be distinctly labelled with the name of the article and the word poison, and with the name and address of the seller of the poison, and it shall be unlawful to sell any poison to any person unknown to the seller, unless introduced by some person known to the seller; and on every sale of any such article the seller shall, before delivery, make or cause to be made an entry in a book to be kept for that purpose, stating, in the form set forth in Schedule B. to this Act, the date of the sale, the name and address of the purchaser, the name and quantity of the articles sold, and the purpose for which it is stated by the purchaser to be required, to which entry the signature of the purchaser and of the person, if any, who introduced him shall be affixed; and any person selling poison otherwise than is herein provided shall, upon a summary conviction before two justices of the peace in England, be liable to a penalty not exceeding *five pounds* for the first offence, and to a penalty not exceeding *ten pounds* for the second or any subsequent offence, and for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller; but the provisions of this section shall not apply to articles to be exported from Great Britain by wholesale dealers, nor to sales by wholesale to retail dealers in the ordinary course of wholesale dealing, nor shall any of the provisions of this section apply to any medicine supplied by a legally qualified apothecary to his patient, nor apply to any article when forming part of the ingredients of any medicine dispensed by a person registered under the Pharmacy Act, 1868: Provided such medicine be labelled in the manner aforesaid, with the name and address of the seller, and the ingredients thereof, be entered with the name of the person to whom it is sold or delivered in a book to be kept by the seller for that purpose; and nothing in this Act contained shall repeal or affect any of the provisions of an Act of the Session holden in the fourteenth and fifteenth years of the reign of Her present Majesty, intituled "An Act to regulate the sale of arsenic."

4. Penalties recoverable under this Act may be recovered in a summary way before any two or more justices of the peace in petty sessions assembled, and according to the provisions of any Act regulating the powers and duties of justices of the peace; and one-third of every sum of money recovered as a penalty under this Act shall be paid to the person who shall be the means of bringing to justice any person committing any offence against any of the provisions of this Act.

5. This Act shall not apply to Scotland or Ireland.

6. This Act may be cited as "The Drugging of Animals Act, 1875."

SCHEDULES.

Schedule (A.)

PART I.

Arsenic and its preparations.
Prussic acid.
Cyanides of potassium and all metallic cyanides.
Strychnine and all poisonous vegetable alkaloids, and their salts.
Aconite and its preparations.
Emetic tartar.
Corrosive sublimate.
Cantharides.
Savin and its oil.
Ergot of rye and its preparations.
Oxalic acid.
Chloroform.
Belladonna and its preparations.
Essential oil of almonds, unless deprived of its prussic acid.
Opium, and all preparations of opium or of poppies.

PART II.

Sulphuric acid	or oil of vitriol.
Nitric acid	or aqua fortis.
Hydrochloric acid	or spirits of salts.
Muriatic antimony	or butter of antimony.
Sulphate of iron	or green vitriol.
Sulphate of copper	or blue vitriol.
Sulphate of zinc	or white vitriol.

Schedule (B.)

Date.	Name of Purchaser.	Name and Quantity of Poison sold.	Purpose for which it is required.	Signature of Purchaser.	Signature of Person introducing Purchaser.

Alleged Adulteration of Vinegar.

At the Stone Police Court the adjourned proceedings against Mr. Thomas Slater, chemist and grocer, Stone,* taken at the instance of Major Knight, inspector under the Adulteration Act, for selling vinegar alleged to be adulterated, were resumed after an interval of two months. It will be remembered that the vinegar was purchased at the defendant's shop by Major Knight's assistant, and submitted to Mr. Scott, the county analyst, who certified that the vinegar was adulterated with lead so as to be injurious to health, and also with sulphuric acid. The result of the analysis was not satisfactory to Messrs. Hill and Evans, of Worcester, the manufacturers of the vinegar, and, having obtained the assent of the Bench, they determined that further analyses should be made. Accordingly the portion of vinegar remaining after Mr. Scott's analysis was sent to Dr. Thudichum, of London, and two independent samples of the same vinegar were forwarded by Mr. Slater to Dr. Letheby and Dr. Voelcker. At the last hearing of the case the last-mentioned chemists were present, and stated that the vinegar was perfectly free from lead, and from the noxious element of free sulphuric acid. Of combined sulphuric acid they found 112 grains per gallon, but that was a constituent of the water from which the vinegar was made, and was not at all injurious to health. They pointed out that unless the vinegar was tested with the utmost care the one element, which was perfectly innoxious, might be taken for the other and dangerous ingredient. Dr. Thudichum, on the other hand, though he was not then present, sent a certificate stating that the vinegar which he had received was adulterated with sulphuric acid so as to be injurious to health, but he made no mention of lead, one of the adulterants which Mr. Scott had found. Under all these conflicting circumstances the case was adjourned in order that Dr. Thudichum and Mr. Scott should be present, and have an opportunity of upholding the conclusions to which they had come. At the last hearing, as on the former occasion, Mr. C. Fulford, barrister, instructed from the office of Messrs. Hand, Blakiston, and Everett, appeared for the prosecution; and Mr. Underhill, barrister, instructed by Mr. Southall, of Worcester, for the defence. Mr. Fulford having opened the case, Mr. Scott was called, and stated that the results of his analysis were contained in the certificate which had already been before the Court. He found the vinegar to contain 119 grains to the gallon of monohydrated sulphuric acid, and containing that amount of sulphuric acid he thought it was unfit for human consumption. The witness was subjected to a long and searching cross-examination. By the first test he used what he found might either have been free or combined sulphuric acid, and in his expe-

* See before, p. 842.

rience he had known water so strongly impregnated with sulphates as to produce combined sulphuric acid. Whether that acid would be injurious to health or not would depend upon quantity. The specific gravity of the vinegar he analysed was 1·0168. Re-examined, witness said that some of the sulphuric acid was undoubtedly free to the extent of about thirty-six grains to the gallon. It appeared that Mr. Scott had sent a portion of the vinegar to Mr. Jones, the county analyst, asking him to test for lead, and Mr. Jones was called to state the result of his analysis. He stated that he found lead unmistakeably present, but the quantity of vinegar which he had to analyse was so small that he could not tell to what extent, though he believed there was quite half a grain to the gallon. Dr. Thudichum deposed that he had been employed by the Privy Council in analytical matters for the last eleven years, and had had a large experience in the analysis of wine and vinegar. He analysed the vinegar sent to him through Mr. Middleton, and found it to contain 111 grains of sulphuric acid to the gallon. He made no test to accertain whether the acid was in a free or combined state, but even if the acid was produced by sulphates in the water its presence to the extent of 111 grains would render that water unfit for ordinary purposes of consumption, and in his opinion also unfit to be used in the manufacture of any articles of food. He considered that anything above thirty-six grains of sulphates per gallon would be an adulteration, and the inference to be drawn was that the vinegar made from it would be injurious. This was the case for the prosecution, and Mr. Underhill addressed the Court for the defence. He referred to the celebrity which his clients' vinegar had attained, and to different occasions on which its purity had been called in question, the result always being that its character as a condiment was vindicated. He pointed particularly to the fact that Dr. Thudichum had not made the test spoken of by Dr. Letheby in order to detect the presence of free sulphuric acid, and, arguing that there was nothing in Dr. Thudichum's evidence to show that the sulphates were not contained in the water from which the vinegar was made, he quoted in opposition to Dr. Thudichum's statement that these sulphates were injurious, the opinions of several chemists of great reputation who had analysed the water at Messrs. Hill and Evans' factory, and had certified to its being in every respect eminently suitable for the purposes for which it was used. The fact was, the learned counsel said, like the Burton ales, the quality of the vinegar was enhanced by the character of the water. The Bench were then asked to consider whether the defendant, Mr. Slater, a respectable man, was likely to have tampered in any way with the vinegar, and the fact was pointed out that the specific gravity of the vinegar examined by Mr. Scott was the same as that sent by Mr. Slater himself to Dr. Letheby, which was some evidence that the vinegars were one and the same. Mr. E. H. Hill, a member of the firm of Messrs. Hill and Evans, was then called for the defence, and gave evidence bearing upon the manufacture of the vinegar. Dr. Letheby deposed that the specific gravity he found in the vinegar sent to him by Mr. Slater was exactly the same as that found by Mr. Scott—a fact which would point to the vinegars being the same. There was nothing in it which was in any way injurious to health or in any way detracted from the value of the vinegar. Sherry contained three or four times as much combined sulphate as the vinegar, and there was no evidence that the former article was injurious when taken in moderation. The water at Messrs. Hill and Evans' factory was one of the finest waters that could be used for the purpose. The Bench, after a short consultation with the clerk, said there was so much difference of opinion among the chemists that they had decided to dismiss the case, and they might say that they believed there was no imputation whatever upon the character of Hill and Evans' vinegar. They also considered that Mr. Scott, the county analyst, had done his duty in the case. Mr. Fulford asked the Bench to grant a case upon a point of law which he had raised during the hearing—viz., whether, assuming Dr. Letheby's statement to be correct, that the water from which the vinegar was made contained 112 grains of combined sulphuric acid, and was totally unfit for ordinary purposes of consumption, such water did not introduce into an article manufactured from it ingredients which were as much an adulteration as if the adulterating matter had been added. The point was important for this reason—that the defence in the present case having succeeded, what protection would there be, in the case of matters which were injurious, if it could be said that these matters were natural to the water? The Bench held that there was nothing to grant a case upon, as they had dismissed the summons upon the grounds of discrepancies in the scientific evidence.—*Grocer.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Official *versus* Officinal.

Sir,—Having for a long time been engaged upon a new etymological dictionary of the English language, perhaps I may be permitted to offer an opinion on the meaning of the terms "official," and "officinal." Officinal is certainly derived from the Latin "officina," which means, primarily, a workshop, a manufactory; secondarily, a shop or place where anything is sold. In pharmacy it has long been the term applied to such medicines or drugs, simple or compounded, as were required by the College of Physicians to be kept in the apothecaries' shops ready for use, or to be mixed up in extemporaneous prescriptions, so that the idea raised in the mind by the use of the word officinal, was "such as you will find at the shop." "Official" (Latin "officialis") means now an officer or an authorized and appointed person for the performance of official duties (*vide* Cicero, *De Officiis*). Magistrates, judges, and their decisions, writings, judgments, orders, etc., are said to be official as pertaining to an officer. This word "officialis," was certainly first introduced at the end of the thirteenth century, and was then limited to the person who acted as the bishop's deputy, or to an ecclesiastical judge appointed by him—but soon became extended. Now, as to the paper of Dr. Miller, I think Mr. Ince writes with great knowledge of the subject, but I venture, as an old Cambridge scholar, to observe that many learned philologists believe both the words officinal and official to spring from the same radix, viz., from *officio*, which, in early Roman literature, had the same meaning as efficio. No doubt some believe "officina," to be abbreviated from *opificina* which, like *opifex*, of course came from "opus" and "facio;" but *officio* comes also from *ob-facio*, as a radix, so that philologically, Dr. Miller may be right, though not having heard or read his paper, I cannot judge. But he is certainly wrong in the recognized meaning and distinct meaning of the two terms.

John Fredk. Stanford, M.A., F.R.S.

The Major Qualification.

Sir,—In last week's "correspondence" we were told that "it is very difficult to make out a good case when recommending young men to 'continue their onward course until they have attained the highest rank.'"

The writer mainly agrees with "Urtica" that he is right if such arguments as he names are alone to be taken into consideration. But as "a young man" studying after the attainment of this "highest rank," kindly allow me for one to say that the case the present writer makes out to himself is not exactly the honour of attaching to his name the distinctive letters "P.S." or "M.P.S.," or—as a sure guarantee to the public of business ability—the attractive title of "Pharmaceutical Chemist," though this, as years roll on, will be no mean advantage; understood in its fulness it will then be a sign of better qualification, instead of—as is too frequently the case now with the public—a name or *nom de plume*. The case the writer makes out to himself is rather something beyond or above these considerations—the pleasure, satisfaction, and benefit, or whatever one likes to call it, derived from the study of science and the practice of art, demanded by the "Major." The accumulation of such scientific and general knowledge is always a pleasing task to every genuine student (one who studies with other objects than "cramming up" for an examination) independently of honourable titles gained thereby. Surely if "knowledge is power"—as daily experience proves it to be—then gaining of knowledge is a reward in itself and in the end cannot but yield good interest. This at least is the experience of the writer who has good reasons for believing that it is the same of many others, and probably those who stop short of the highest grade are about the only exceptions. The notion about studying merely with the object of passing an examination for the sake of the title it brings (though not to be despised)—as though the gain of knowledge was of no subsequent use—without any higher aim, is erroneous in principle and the sooner it is eradicated from our minds the better will it be for the best interests of all concerned.

But a young man not possessing this higher title, only studying for it alone and unaided, save by books and his own experience, must not say too much or he may remind one of the maid who "counted her chickens before they were hatched." Be this as it may, certain he is that he will have derived great and lasting benefit from the study after the required knowledge,—found it to be a reward in itself,—the possession of which he regards as of greater value than the mere honour of signing himself "P.S." or "M.P.S." These titles are very good, but knowledge gained is better.

T. T.

Trowbridge, May 29, 1875.

Dispensing Charges.

Sir,—"A North Countryman" calls attention to the case of a physician who recommends his patients to a chemist who charges half price for dispensing his prescriptions. We are not altogether ignorant of such devices in the south. I live in a fashionable town where I am informed such prescriptions as the following are dispensed for a shilling:—

Potassæ Bicarbonatis	ʒij.
Tincturæ Cinchonæ Compositæ	℥ij.
Infusi Calumbæ	℥vj.
	M.

A young medical man, of undoubted ability, who seeks to establish himself here, and wisely resolves not to dispense his own medicines, has more than once applied to me to charge his patients at a reduced rate, that they may be (so he states) the better able to pay his fees. Such a course is impracticable. But having more mouths to feed daily than one figure can express, I have endeavoured to find a means of meeting the doctor's difficulty without compromising any principles. I have offered to dispense for him at a fair charge to the profession; and as he seems unwilling to incur responsibility I have proposed to transact his pecuniary business with his patients, by his making a gross charge for medicine and advice, which sum should be paid to me on his account, with a distinct understanding on the part of the patient of the nature of the transaction. Or I have consented to adopt any superior plan, provided always that there should be no secret understandings. It is evident from his repeated applications that he is at least not unwilling that I should dispense for him; but for a long time I have not even seen him. Occasionally his prescriptions turn up, and if the last I received (yesterday) is a sample, the chemist who enjoys his patronage has not much to be thankful for. It is as follows,—I give it literally—

"℞ Tinct. Sulph. . . . . . . gr. xvj.
Tinct. Lavand. Co. . . . ♏ xij.

ft. Pulvis (!) Say to be put to half a pint of rain water for a lotion." I should infinitely prefer that no arrangements at all should be made between chemists and prescribers, but if they are made they should be "understanded of the people." The remedy for such evils is genuine co-operation; but that virtue seems to have been monopolized by civil and uncivil public servants and working men.

Henricus.

Pharmaceutical Titles.

Sir,—Would you kindly allow me through your columns to seek information as to what is the proper contraction for "pharmaceutical chemist" when used as a qualification?

I observe on the voting papers issued for the election of members of Council "P. C." is used to distinguish this class, and your correspondent "Urtica," in last week's Journal, possibly following what ought to be an authority, likewise makes use of these letters; but, sir, I have understood that "P. C." has meant "Privy Councillor" since before the Pharmaceutical Society had existence. Again, numerous correspondents use "Ph. C.," and I am not aware that this contraction has had other meaning attached to it than that under consideration; but I seek information on this point, since I have seen "Ph. Ch." used in an inscription on a piece of plate presented to a well-known member of our Society by other members. If "Ph. C." has not been taken up by any other college or society, why add the superfluous "h?" and since "P. C." has been appropriated by a select and brilliant few, why seek to disturb their property?

Though, alas! the title "pharmaceutical chemist" in past times has failed to command the respect we could desire, there is now a brighter day dawning when the title will be coveted and used with pride; and it is fit that the contraction, which is sure to be used most frequently, should be decided on and adhered to on all occasions.

Perhaps some member learned in such matters will have the goodness to speak authoritatively on the subject.

G. L. Huet.

V. V. V.—Wagner's 'Chemical Technology,' or Knapp's 'Chemistry applied to the Arts and Manufactures.'

"*Biblos.*"—'The Materia Medica and Pharmacy of the Bible,' by J. T. Slugg (*Pharm. Journ.*, April 6 and 13, 1872).

"*Ilex.*"—You are recommended to submit your question to a professional analyst; try the public analyst of the district, if there be one.

G. Watt.—*Galium cruciatum. Veronica Chamædrys. Cardamine pratense. Polygonum Bistorta.*

G.—*Arabis hirsuta.*

F. W. E. Shrivell.—The name of the insect is *Hylobius abietes.*

"*Labiatæ.*"—*Pedicularis palustris.*

G. Dobson.—(1) *Alchemilla vulgaris.* (2) *Bunium flexuosum.* (3) *Lotus corniculatus.* (4) *Allium ursinum.*

C. E. W.—We think it would be unsafe to use such a label without affixing a stamp or previously consulting the inland revenue authorities.

"*Dentist, Middlesex.*"—We are not aware that any such regulation is coming into force. Apply at the College of Surgeons.

J. M. Fairlie.—In reply to your communication stating that you have no objection to our consulting the Honorary Secretary of the North British Branch respecting the publication of the 15th ult., we have to state that you appear to have misunderstood the suggestion we put forward last week. We have no intention of consulting that official on the subject, though our opinion is that the publication of your letter at least requires his concurrence, and that it should have been in the first place addressed to him rather than to the Journal.

"*A Major Student.*"—(1) The formula may be so represented. (2) Equation (*a*) represents the reaction.

T. Lunn.—The crystals consist almost entirely of chloride of potassium.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over our Editorial columns will prevent delay, and the consequent annoyance.

Communications, Letters, etc., have been received from Messrs. Swinn, Wills, Robson, D. Howard, Nichols, Garside, Druce, Reynolds, "Pharmacist," "A Poor Chemist," "Honor," J. B. S., W. H.

NOTES ON BRAZILIAN DRUGS.

BY E. M. HOLMES,
Curator of the Museum of the Pharmaceutical Society.

(*Concluded from page* 905.)

Erva do Rato.—This drug consists of leaves, but they arrived in so injured a state, that it is not possible to describe them. The leaves and fruit, in the state of powder, are used in Brazil to poison rats and mice. Dr. Barnsley attributes the drug to *Palicurea Marcgravii*, St. Hil. He states that it is a most deadly poison, and that a great number of mules and sheep are annually killed by eating it, death following in 5 to 8 hours after ingestion. According to Martius both this species and *P. nicotianæfolia* are powerful poisons, but the latter in small doses is used in veterinary practice for dysuria in horses and mules, while two other species, *P. officinalis*, Mart., and *P. densiflora*, Mart., possess diuretic properties, and are used in syphilis, rheumatism, etc. He states that their action resembles that of Digitalis in its effect upon the heart. There can be no doubt that the plants of this genus possess powerful properties, and are certainly worthy of scientific investigation.

Fruita de Gentio.—This drug consists of small baccate fruits of a yellowish colour, about the size of a filbert, and containing from 4 to 6 flat seeds immersed in dried pulp. Each seed is about half-an-inch in diameter, and one-eighth of an inch in thickness; the seed is notched at the base, with the micropyle forming a little projection in the notch; the nucleus is oval, and occupies only a small portion in the centre of the seed; the circumference of the seed, to the depth of one-eighth of an inch, consists of a hollow raised rim, so that the portion of the seed containing the nucleus is oval and depressed. The nucleus is exalbuminous, and consists of two flat, oily cotyledons, with the radicle near the hilum. The cotyledons are tasteless, but the pulp in which the seeds are immersed is extremely bitter. According to Dr. Barnsley, the fruit and seeds are used in the form of powder and tincture as a drastic purge, and are a favourite remedy with the lower class of Brazilians. He does not know the plant yielding the drug, but the characters above described show that the seeds probably belong to the Cucurbitaceæ.

Japicanga.—This is the rootstock or "chump" of some species of sarsaparilla. It has but a small portion of rootlets attached; these have a hard woody meditullium, a thin dark brown cortical portion, and are smooth externally. It has no distinct taste. According to Dr. Barnsley it is used in the province of Rio as a substitute for the sarsaparilla of the Amazons. He refers the drug to *Smilax glauca*, Mart. The name Japicanga, which is variously spelt Japecanga, Jupicanga, Inhapecanga, is a generic term for any kind of sarsaparilla in Brazil.

Jarrinha.—This drug occurs in slices about half-an-inch thick, and two inches in diameter; the meditullium is about one inch in diameter, and has a radiate appearance owing to the presence of a number of very narrow yellowish woody wedges which have thick white medullary rays between them, and the woody wedges when examined with a lens are seen to be full of large porous vessels. Outside of the meditullium is a horny portion a quarter-of-an-inch in thickness, and outside this layer is a soft corky layer of the same thickness. It has the peculiar camphoraceous odour common to several nearly allied species of *Aristolochia*. The taste is slightly acrid but not bitter. It is certainly the root of a species of *Aristolochia* and is attributed by Dr. Barnsley to *A. cymbifera*, Gom. (Mart.?). He states that the root is very useful for colicky pains, and that it is used as a tonic, and for gangrene. By the natives it is esteemed a sure remedy for snake-bites. It is very abundant in every part of Rio and S. Paulo. Several species of *Aristolochia* are used under the name of Sipo de Jarrinha or de Mil-Homens. According to Martius they are used for the same complaints for which valerian is used in this country, and are considered superior to *Aristolochia serpentaria*.

Pipi.—This drug is a long-branched woody root, about eighteen inches long, half-an-inch in thickness in the upper part, and tapering downwards to one-eighth of an inch. The root is pale brown and smooth externally; a transverse section shows a large white woody meditullium, filled with minute pores, but with the medullary rays indistinct, the cortical portion very thin, of a brown colour, and readily scaling off when the root is bent. The taste is slightly bitter, and causes a sensation of tingling when chewed.

Dr. Barnsley states that a tincture of the root forms an admirable remedy for chronic rheumatism, lumbago, and muscular paralysis, and that it is much used in the province of Rio by country physicians. Martius refers the plant yielding the root to *Petiveria tetrandra*, Gom. The leaf which accompanied the root is, however, not that of *Petiveria tetrandra*, Gom., but that of some twining plant with opposite leaves—probably belonging to the Malphigiaceæ.

Quina quassia.—This drug is a bark of a greyish colour externally, with a number of short pale brown transverse scars. The epidermis is very thin, and can be readily scratched off by the finger nail, leaving the white portion underneath exposed. The bark is fibrous, but is nevertheless very tough, and breaks with a rather short fracture. When cut transversely with a sharp knife the layer just inside the epidermis (mesophlœum) is seen to be irregular in outline and much whiter than the inner portion. The taste is intensely bitter.

Dr. Barnsley does not know to what order the plant yielding it belongs, but he having sent a portion of the plant with the barks, I have been enabled (with Professor Oliver's kind assistance) to identify it as the *Picrasma Velosii*, Pl., of the natural order Simarubaceæ.

With regard to this bark, which is not mentioned by Martius, Dr. Barnsley states that it is used in dyspepsia and in intermittent fevers, and that he has employed it in the latter with decided success. With the bark he sends a portion of white crystalline powder, which he says was given to him by a native forester and gold miner of the woods of S. Paulo, who was well acquainted with the medicinal herbs of that district, and who stated that he obtained it from this bark. This crystalline powder has been examined by Mr. S. Plowman, who finds it to be chiefly sulphate of quinine with a little hydrochloride. The barks of the Simarubaceæ are not known to yield quinine, hence it is probable that Dr. Barnsley has been imposed upon.

Saponacea.—This is a kind of soap berry, the fruit of a species of *Sapindus*, possibly of *S. divaricatus*, Willd., to which Guibourt refers the soap berries he received from Brazil,* and which is the only species mentioned by Martius.

* See 'Hist. des Drogues,' 6th edition, vol. iii., p. 591.

Dr. Barnsley states that he has made an excellent tooth-wash from them, and suggests that, perhaps, some species of this berry is used in making the London "Floriline."

Tayuyá.—This is a long slender root varying in size from quarter to one-third of an inch, scarcely branched, brown externally, internally of a paler brown, and full of large pores, which are easily visible to the unaided eye. The cortical layer is not very distinct. The taste is bitter.

Dr. Barnsley refers this root to *Trianosperma Tayuyá*, Mart., but Martius describes the root of that plant as being tuberous and turnip-shaped. The leaf sent with the root is apparently that of a *Trianosperma*; but as there are no tuberous roots with the *Tayuyá* received, it is probably the root of another plant of the same genus. An infusion, tincture, or extract of the root is used as a drastic purge. It has properties analogous to Elaterium. In the province of Rio it is a common plant.

Timbo.—This drug consists of a very large woody root or prostrate stem, three or four inches in diameter, and much branched. Externally it has a dirty-white colour, with numerous warts scattered over it, and is of a rough aspect, owing to depressions, scars, and a few transverse ridges; the smaller portions are, however, only wrinkled longitudinally. The central portion or meditullium of the root is yellowish white, with a number of fine horny concentric rings; the bark of the root is distinct, thick, and starchy, and of the same colour as the meditullium. The taste is not bitter. When chewed the root causes only a slight but persistent tingling of the tongue.

According to Martius it is the root of *Paullinia pinnata*, L., and possesses acrid and narcotic properties, acting especially on the kidneys and brain; he compares it to aconite and states that the negroes prepare a slow poison from it. Dr. Barnsley is inclined to think that the above-named plant does not produce it, but that it is the root of *Physalis heterophylla*, Nels. The leaves accompanying the specimen being imperfect it is impossible to say what the plant is, but the leaves are more like those of a Sapindaceous than of a Solanaceous plant. It seems to possess powerful poisonous properties which may perhaps be worthy of investigation.

Velamé or *Braço de Preguiça.*—This is the root of *Solanum jubatum*, Dunal. Through an oversight its description was not given under Braço de Preguiça. The root is in somewhat flexuose pieces, externally resembling belladonna root in colour, varying from half to one inch in thickness. Internally the root is woody, the meditullium being of a pale yellowish colour with very numerous medullary rays, which are not visible to the naked eye, but are readily seen with the aid of a lens. The cortical portion is very thin and seems to consist of several extremely thin layers; the outer layer when scraped with the nail or with a penknife shows that the under layers are of a pale lilac grey colour and chalky appearance. This character does not occur in any other root with which I am acquainted, and at once distinguishes this drug. It appears to be almost tasteless. It is used for the same purposes as the leaves described on p. 905. Martius does not mention either Velamé or Panacea in connection with *Solanum jubatum*, Dunal.*

* In Martius, 'Syst. Mad. Med. Brazil,' Braço de Preguiça is referred to *Solanum cernuum*, Vell. This is a synonym of *S. jubatum*, Dunal.

THE SALICYLATE AND CARBOLATE OF QUININE.*

BY JULIUS JOBST.

In a communication to the *Pharmaceutische Zeitung* (No. 11, 1875), Schering states that salicylic acid forms with quinine a salt insoluble in water, and soluble in alcohol, which is not crystallizable. The author of this paper, on the contrary, states that an aqueous solution of hydrochlorate of quinine gives in the cold with salicylate of ammonia (prepared from Kolbe's salicylic acid) a cheesy precipitate of salicylate of quinine, which can afterwards be obtained crystallized from alcohol in wonderfully fine perfect prisms in concentric groups. The same compound is formed when an alcoholic solution of quinine is mixed with an alcoholic solution of salicylic acid to complete saturation, and the alcohol is afterwards slowly evaporated.

The salicylate of quinine is anhydrous. A determination of the quinine by the author gave the formula $C_{20}H_{24}N_2O_2$, $C_7H_6O_3$. The salicylate of quinine dissolved in a small quantity of water upon the addition of some dilute hydrochloric acid, and was precipitated with ammonia. The resulting precipitate of quinine was collected upon a filter, and the quinine dissolved in the ammoniacal filtrate extracted by means of ether. The above mentioned formula required 70·12 per cent. of quinine. The first experiment gave 69·66 per cent., the second, 70·17 per cent.

Salicylate of quinine dissolves in 225 parts of water at 16° C., in 20 parts of 90 per cent. (by volume) alcohol at 13° C., and in 120 parts of ether at 16° C.

Since the crystallized salicylate of quinine could be so easily obtained, the author turned his attention to the carbolate, which has already for some time been in no inconsiderable demand for medicinal purposes, but which hitherto has only been met with in pharmacy in a pulverulent form, and of varying composition and properties. He reports that he has succeeded in preparing the carbolate of quinine, both from water and from alcohol in slender acidular crystals. Dried at 130° the carbolate gave the formula $C_{20}H_{24}N_2O_2$, C_6H_6O. This formula requires 77·51 per cent. of quinine. Three analyses gave respectively, 77·52, 77·32, and 77·88 per cent.

Carbolate of quinine dissolves in 400 parts of water at 16° C., in 80 parts of 90 per cent. alcohol at 13° C., and slightly in ether.

If it could be assumed that the quinine salts of salicylic and carbolic acids have a similar therapeutic action, then the greater solubility of the salicylate would gain for it the preference. In any case the author considers that henceforth for the carbolate only the definite crystallized compound should be used in medicine.

* 'Neues Repertorium für Pharmacie,' xxiv., 193.

THE CONSTITUENTS AND PROPERTIES OF THE GENUS POTENTILLA.†

BY JOHN M. MAISCH.

The genus *Potentilla* belongs to the natural order of Rosaceæ, tribe Dryadeæ, and comprises mostly herbs, together with some shrubby plants, which are indigenous mainly to the temperate zones of the old and new continents. The generic name appears to have been formed

† *American Journal of Pharmacy* [4], v., 109.

from *potens*, powerful, in allusion to the reputed medicinal properties of some of the species. At the present time there are but few drugs officinal in any of the pharmacopœias which are obtained from plants belonging to the Dryadeæ, the most important being kousso, the inflorescence of *Brayera anthelmintica*, Kunth, and tormentilla, the rhizome of *Potentilla tormentilla*, Sibthorp ; s. *P. erecta*, Nestler ; s. *Tormentilla erecta*, Lin.; s. *T. officinalis*, Smith. The former, which, by Endlicher, is placed in the suborder Spiræeæ, but amongst the Dryadeæ by De Candolle, contains in its dry condition, besides very little volatile oil, a considerable proportion of tannin, some koussin, resins, etc., to which it owes its taste, which at first is somewhat astringent, but afterwards bitter and to a certain degree acrid. The latter, tormentil, has, when fresh, a rather roselike odour, which is lost by drying, after which it retains an astringent taste, due to the presence of a considerable quantity of tannin, from which the so-called tormentil-red, the red colouring matter of the drug, which is likewise present to the extent of about one-sixth of the weight of the rhizome, is probably a derivative.

Similar constituents will doubtless be found in the roots and herbs of the plants which are botanically allied to the genus *Potentilla*, if we may be allowed to judge from their sensible properties. The following plants of the suborder Dryadeæ (De Candolle's tribes of Sanguisorbeæ and Dryadeæ) contain in their roots and herbaceous portions very little or no volatile oil, as is evidenced from their slight odour, but they possess a more or less marked astringent taste, in some cases accompanied by some bitterness: *Geum rivale*, Lin., and *G. urbanum*, L., or avens ; *Poterium sanguisorba*, Lin., and *Sanguisorba officinalis*, L., or burnet ; *Alchemilla aphanes*, Lærs (s. *Aphanes arvensis*, Lin.), and *A. vulgaris*, L., or lady's mantle ; *Agrimonia eupatoria*, Lin., or agrimony, and *Rubus villosus*, Aiton, and *R. canadensis*, Lin., the North American blackberry and dewberry, the rootbark of which is officinal in the U. S. Pharmacopœia.

Of the genus *Potentilla*, of which about one hundred species are enumerated, tormentil is the only one occasionally still used in medicine, though formerly several species now obsolete have been employed.

Potentilla anserina, Lin., silver weed, is indigenous to Europe and the northern portion of the American continent. Both the herb and the perennial root have a mild astringent taste, and are said to have been used by the Indians as an antidote to snake-poison; while in Europe, it was employed in diarrhœa, hemorrhages, pulmonary complaints, some hepatic disorders and in dropsy. The leaves are radical, interruptedly pinnate ; the leaflets, 9 to 19 in number, oblong, deeply serrate, silvery white and downy underneath.

P. fructicosa, Lin., shrubby cinquefoil, likewise inhabits the northern portions of the Northern hemisphere. The five to seven pinnæ are linear to lanceolate oblong, entire, silky underneath, and have a mild astringent and bitterish taste. They are used by some Siberian tribes like tea, and were formerly reputed to possess febrifuge properties ; externally, the leaves were used as a vulnerary.

P. rupestris, Lin., is a native of mountainous regions of Europe and Siberia. The radical leaves are pinnate, and the stem-leaves usually three-lobed ; they have an astringent taste and are used in Siberia like tea.

P. palustris, Scop., s. *Comarum palustre*, Lin., marsh-cinquefoil, occurs in cool, boggy localities of the Eastern and Western hemispheres. It is easily distinguished from the preceding and following species, which bear yellow flowers, by its dark purple petals. The three to seven leaflets are oblong-lanceolate, sharply serrate, hoary beneath, and have a somewhat astringent taste.

The species just mentioned have the leaves pinnate; in the following they are palmate, and mostly composed of five leaflets :

P. argentea, Lin., silvery cinquefoil, occurs in dry localities of the old and new world. The wedge-oblong leaflets are entire towards the base, deeply incised, and almost pinnatifid near the apex, green and smooth above, and silvery canescent beneath ; their taste is astringent.

P. tormentilla, Sibth., tormentil, a native of Europe, grows in meadows, and has obovate or wedge-lanceolate, deeply-serrate, green and somewhat shining leaflets, possessing an astringent taste, similar though somewhat weaker than the rhizome.

P. reptans, Lin., creeping cinquefoil, is a European and Asiatic plant, growing in damp localities. Its thin, creeping stems bear solitary flowers on long peduncles, and are of a golden-yellow colour; the leaflets are elliptical to oblong-obovate, sharply serrate, bright green and slightly hairy above, paler and somewhat pubescent beneath. The taste of the root and herb is sweetish and astringent. This plant (or the tormentil) was probably the *pentaphyllon* of the ancients.

As far as may be judged from the taste, and from the few published chemical experiments, all the species enumerated before contain some tannin, upon which the comparatively feeble medicinal properties mainly depend. The indigenous *P. canadensis*, Lin., the common ciquefoil, or five-finger, resembles the former in taste, and, like them, may be supposed to act like a mild astringent. In the January number of the *Charleston Medical Journal and Review*, however, this plant is highly recommended for other purposes. Dr. Wm. Hauser, of Bartow, Jefferson county, Georgia, writes of it as follows:—

"It is the best and most powerful *sudorific* I have ever found. And like all of its class, it is, under certain circumstances, diuretic also. Dr. Edwin Le Roy Anthony, son of Dr. Milton Anthony, founder of the Medical College of Georgia, assured me, many years ago, that he had cured gonorrhœa with it. But my purpose, in this short article, is to ask the attention of the medical profession to it in the treatment of peritonitis of any kind, but especially *puerperal peritonitis*. In a large practice of more than twenty years, I have never found anything, nor all other things combined, to equal this simple plant in the treatment of this exceedingly painful, dangerous and sometimes stubborn disease. I have never failed with it once in all this time, to the best of my recollection. A recent case that gave much trouble and anxiety to two of my honoured medical brethren, has brought it afresh to my mind, though I have not been in practice myself for eight years. My method with it is simply this:—Make as strong a decoction of the plant (leaves, vines, and roots) as possible, and give the patient, at any stage of the case, large draughts of the tea, as hot as she can drink it, every half hour, or oftener, till she be thrown into full perspiration. All pain and fever will soon be gone, and then you have the entire mastery of the case."

Some years ago, Dr. Richard Moore, of Sumter District, S. C., called attention to this plant as an efficient and useful remedy in the treatment of chronic colds, threatening phthisis ; he used it in the form of decoction.*

Both Dr. Moore and Dr. Hauser name the plant employed by them *Potentilla reptans*. The Linnean plant bearing this name, however, is a native of Europe and Asia, and does not occur in this country; it is represented on this continent by *Potentilla canadensis*, Lin., which resembles it, and is a rather variable species, growing in dry fields and moist thickets. *P. sarmentosa*, Wild., *P. caroliniana*, Poir., *P. simplex*, Michaux, and *P. pumila*, Pursh, are now regarded as mere varieties of this species, which occurs from North Carolina to Mississippi, and northward throughout Canada. The plant is, however, distinguished from *P. reptans*, by the latter having many slender, nearly smooth and purplish stems, the leaves on longer petioles, leaflets elliptical to obovate, obtuse, serrate, and somewhat hairy, the lateral pairs approximate, or united at base; stipules small oval-lanceolate, entire or few-toothed; petals yellow, obcordate. *P. canadensis* has even the summer

* See 'Resources of the Southern Fields and Forests.' By Dr. F. P. Porcher, 1869, p. 166.

runners thicker, green, or occasionally purplish, always silky hairy; stem-leaves on shorter petioles; leaflets obovate-oblong, rather acute, coarsely serrate, hairy; stipules ovate, acutely toothed; petals roundish obovate, entire or notched.

The botanical characters, it will be observed, are sufficiently distinct for the two species, although their sensible properties are alike as far as odour and taste are concerned. It is scarcely to be supposed that the American plant be possessed of more potent properties than the majority of the plants of the same genus and tribes mentioned above; but the statements made of its efficiency are such that they invite to a carefully undertaken trial.

THE OCCURRENCE OF ORGANIC FORMS IN CONNECTION WITH CONTAGIOUS AND INFECTIVE DISEASES.*

BY J. BURDON SANDERSON, M.D., V.P.R.S.,

Jodrell Professor of Physiology in University College, etc.

LECTURE III.

(*Concluded from page* 970.)

It has been sought to answer this question in two ways: on the one hand, by separating the rods from the liquid, and determining their pathological properties by experiment; and on the other, by testing the activity of the liquid after the rods have been removed from it by some process of filtration, The first of these methods—that employed, or rather attempted, by Davaine and the French experimenters—has led to no result; and it is difficult to see how it could yield any; first, because complete separation of such organisms from the medium in which they are contained is impossible; and, secondly, because, in the very act of filtration, the organisms themselves would probably undergo such changes as would entirely alter their properties. If, as is probable, the activity of the rods is dependent on their vital functions, there is no reason to anticipate that they would continue to manifest that activity when "out of their element;" still less that it would show itself in any descendants or progeny obtained from them by the method of cultivation. The other method has been used by Klebs and Tiegel. These observers have found that, just as it is possible to separate the bacteria contained in ordinary septic products from the liquid in which they are suspended by filtering them under pressure through a stratum of porous porcelain, the same method can also be successfully applied to blood containing the rods of splenic fever. The result of the experiments which, it must be admitted, were not so frequently repeated as could have been wished, was, that the filtrate of blood (or rather the liquid of the spleen of a diseased animal), of the virulence of which experimental proof had previously been obtained, was found to be incapable of communicating the disease. Clearly there is no proof in this fact that the contagium of splenic fever is exclusively contained in the rods; but there is proof in it that the agent is, as we believe all other contagia are, a body which is incapable of solution or diffusion, and which attaches itself to concrete particles.

An additional and, to my mind, more satisfactory proof of this lies in the remarkable observation made by Brauell, that, when pregnant animals are affected with splenic fever, the blood of the embryo is not contagious. Brauell found in repeated trials that, in such animals, blood from the fœtal circulation could be inoculated without result. Here the placental apparatus serves not merely as a filter, but as a diffusion-cell, keeping back not merely solid particles, but everything which is not capable of passing through animal membranes. This fact—of the immunity of the fœtus—must be taken in connection with the incommunicability of the disease excepting by actual transference of blood.

The contagium of splenic fever is wonderfully persistent. With reference to this point, there is an apparent antagonism of facts, which, however, on examination, turns out to be a perfect agreement. Brauell found that blood, after removal from the body, loses its activity in a few days. On the other hand, we are certain that the contagium must have a state of existence in which it is in the highest degree permanent and indestructible. Thus Bollinger gives an account of what may be called a stable-enzootic of splenic fever, in which ten cases occurred in one stable during a period of three years, no other cases occurring in the neighbourhood. The contagium must have remained latent during the whole period.

What does this mean? Here is a disease only transmissible by inoculation, and of very short duration. Why does it not perish out of existence? Clearly it would do so had it not some as yet unknown means of perpetuating itself. How it does so it would be too bold to conjecture. The rods can hardly be supposed to be the means of perpetuation; for like the contagious property which they perhaps represent, they are very fugitive, and, in particular, like it, and along with it, they disappear at the moment that putrefaction commences. It is therefore not possible to refer to them as contrivances suited for the storage of contagium, or for its conveyance to a distance, for either of which purposes they are obviously unfit. This very consideration, however, can, I think, be made to appear rather as an aid to our understanding of the relation between organization, or rather living organic forms, and contagion, than as a difficulty or objection. For, if we turn from the specific form to what we know about the development and life-history of common bacteria, and, indeed, of the beings belonging to the same group in general, we find the same thing. Just as in the case of the specific contagium we are compelled to recognize two states of existence, one enduring and latent, the other active but fugitive; so among these organisms we find one condition in which the growth and multiplication of individuals is very active, but individual life is extremely short; another in which the vital activities of the organism are stored up for the future, the individual being for this very end endowed with the power of resisting external disintegrating agencies, and thereby of enduring for an indefinite period. Thus, without any effort, we find, in all probability, in the life-history and development of the organisms, the counterparts of all the phases of the process of contagion.

During the last few years, the pathology of splenic fever has acquired an even wider interest than it had before, from the publication of a series of cases of a rapidly fatal disease affecting the human subject which presents the characters of splenic fever, and turns out, on investigation, to be identical with it. The first of these cases was published by Professor Buhl, at Munich, in 1868. It was that of a man aged thirty-two, who died after a short illness, of which collapse and vomiting were the chief symptoms. After death, the stomach and duodenum were found to be the seat of circumscribed foci of submucous infiltration, presenting characters similar to the so-called "carbuncles" of the intestine seen in the horse. The rods of splenic fever presented themselves in the blood, and the other lesions corresponding to those of the disease in question were found.

The affection was termed by Buhl "*Mycosis intestinalis.*" Shortly afterwards, two other cases were recorded by Professor Waldeyer, now of Strasburg. In one of them, that of a slaughterer, whose occupation pointed to the sources of infection, the nature of the disease was suspected during life. After death, the suspicion was confirmed by the complete correspondence of the lesions with those of splenic fever in the horse. As in Buhl's case, the microscopical investigation showed that masses of zooglæa existed in the affected tissues, and that rod-like microphytes were to be found in the circulating blood, particularly in that of the portal vein. Other rapidly fatal cases have since been recorded, all of which

* Lecture delivered at Owens College, Manchester; reprinted from the *British Medical Journal.*

exhibited pathological appearances of the same kind, the most constant being the enlargement of the spleen and the circumscribed hæmorrhagic infiltrations of the intestines, resulting in more or less extensive sloughing of the mucous membrane, and associated with serous exudations, infiltration of the subserous tissue, and hyperæmic enlargement of the lymphatic glands in relation with the infiltrated parts.

Whatever doubt remained as to the identity of mycosis intestinalis with splenic fever, was removed by the appearance of a communication by Dr. Münch of Moscow, who was able to state, from the results of his own dissection in the "Workman's Hospital" at that place, that in all the cases which he had occasion to examine the bodies of men who had died of disease contracted by infection from animals, the intestinal lesions and the condition of the other internal viscera corresponded closely with those described by Buhl and Waldeyer. In these, as in many other cases recorded by the best observers, the primary pustule (*pustula maligna*) at the seat of inoculation, often supposed to be the one pathognomonic lesion of splenic fever in man, was by no means a constant feature. Out of twenty-eight cases recorded by Münch (1867–71), seventeen exhibited a primary pustule, which in all but two was carbunculous; but, in the other eleven cases, there was nothing whatever to be found on the skin.

As regards the morphological relations of the organisms found in mycosis intestinalis with those of splenic fever, further investigation is required. So far as the former have been described, they agree completely with the others, as may be readily seen by comparing the drawings of Wagner, taken from a case of mycosis, with Cohn's or Bollinger's representations of the rods of splenic fever.

The identity of the two forms being admitted, Buhl's and Waldeyer's anatomical investigations afford a key, which was before entirely wanting, to the understanding of the so-called "localizations" of splenic fever in cattle. This key consists in the demonstration that the formation of foci of infiltration, of which we read so constantly and repeatedly in the descriptions of the veterinary pathologists, is a process of which it is the characteristic that the tissues of the infiltrated part became infested by myriads of microphytes of a particular kind, so that the presence of these bodies is as much a part of the process as the emigration of the colourless corpuscles from the blood-vessels is a part of ordinary suppuration. Further than this it is not possible to go, until the initial stages have been investigated in the lower animals.

I now pass to a disease which in two or three respects resembles splenic fever, while it differs from it in a great many more. As regards its mode of diffusion, there is this striking resemblance, that, although relapsing fever does not require inoculation in order to communicate itself from the sick to the healthy, the area within which its contagium can act is very limited. If a patient be introduced into a ward, the patient in the next bed may be attacked, but the disease does not spread. In the recent epidemic at Breslau, to which I am about to refer, there were many instances in which the disease found its way into rooms inhabited by several families, and it was then observed that the members of one family (in other words, those who lay on the same heap of straw) were attacked one after another, while the other occupants of the room remained exempt.

Another striking point of resemblance lies in this, that they are both pre-eminently blood-diseases. In the case of splenic fever, we have direct evidence of this in the fact that the disease is conveyed by transfusion of blood. Whether this is also true as regards relapsing fever has, of course, not been ascertained; but we have, as indications of the blood-affection, first, the fact that the spleen, of which the function is intimately connected with the blood, is enlarged in a similar way in both diseases; and, secondly, the fact which at the present moment specially interests us—the recent discovery that, in the blood of persons suffering from relapsing fever, organisms exist, which, from their remarkable form, are called *spirilla*.

During the prevalence of relapsing fever in Berlin in 1872, Dr. Obermeier, who had, in the previous epidemic of 1868, been engaged in microscopical investigation of the blood, announced the discovery of the spirilla in a communication made to the Berlin Medical Society. This communication was based on twelve cases, in all of which the organisms were observed. On March 26th, Dr. Obermeier published a second series of observations; twenty new cases had been investigated, in nine of which the blood had been examined daily. The results of these examinations showed, that the presence of the organisms in the blood was associated with the morbid process so closely, that as soon as the pyrexia disappeared they disappeared with it, reappearing when the patient again fevered in the relapse.

Soon after the death of Dr. Obermeier, a third series of observations was communicated by Dr. Engel to the *Berlin Medical Weekly Journal*, founded on the examination of the blood in eighteen cases in the Charité Hospital at Berlin, under the care of Professor Frerichs. They confirmed in every particular the statements of Obermeier, deriving additional value from the exact observations they contained as to the time which intervenes between the onset of pyrexia and the first appearance of the organisms.

During the same year, the epidemic prevalence of relapsing fever at Breslau afforded additional opportunities for investigating the subject. The first results of these inquiries were communicated by Dr. Weigert to the Silesian Scientific Society on September 12th, 1873. The clinical relations of the subject have since been worked out by Dr. M. Litten in a report on the epidemic founded on observations in the General Hospital in Breslau.

In this report, Dr. Litten has given by far the most complete account of the spirilla that has yet been published. He confirms the statement of Obermeier that they are found only in the blood of persons affected with the disease. In more than one hundred cases they were never missed. They occurred only during the paroxysms, and invariably disappeared before the fall of temperature—never remaining during the period of apyrexia. Their number, however, varied considerably; they were sometimes so numerous as to crowd every field, at others they were difficult to find. Dr. Litten describes their motions as partly consisting in undulations which progress along the course of each fibril, and partly in oscillatory movements, *i.e.*, alternate flexions and extensions, springing from some point in the course of the fibril.

Dr. Litten made some very interesting observations on the relation of these remarkable bodies to temperature. He observed that on raising the temperature of the stage of the microscope gradually to 60° C., no effect was produced. As soon as this point was passed the movements became languid. By the time that 65° was reached they had entirely ceased. No effect was observed on cooling the preparation to the temperature of freezing. When it was kept for some time on ice, the movements finally disappeared.

Here I stop. I have brought before you, to the best of my ability, the leading facts relating to the only four cases known to me in which the connection between organic forms and specific diseases has, as yet, been satisfactorily made out: those of cow-pox, sheep-pox, splenic fever, and relapsing fever. These four diseases, although they are so different, are associated by the fact that each of them presents very well-marked nosological specificity—in other words, they are all of them characteristically contagious diseases. Small-pox we must not yet include, excepting on the ground of identity with cow-pox; but we may hope that the researches of Dr. Weigert, as soon as they appear, will afford us material for conclusions on this subject. In the meantime, let us carefully guard against undue precipitation, in the process of combining the few facts we are already in possession of into a system. The desire to discover the practical bearing of his results on the all-important questions of prevention and treatment is a constant and ever recurring temptation to the scientific pathologist, seducing him from his path of patient and silent investigation into speculations about the origin and nature of disease which, even though they may sometimes lead to useful practical applications, have no permanent value.*

THE PREPARATION OF SALICYLIC ACID DRESSINGS.

The following information respecting the use of salicylic acid in the preparation of antiseptic dressings is taken from a translation of a paper by Dr. Thiersch, "On Lister's Antiseptic Method, and on the Substitution of Salicylic for Carbolic Acid," which has appeared in the *Medical Record* for May 26, and June 2 :—

Dr. Thiersch regards the antiseptic action of the salicylic dressing as certain as that of Lister's carbolic dressing. The salicylic acid also possesses two advantages ; it is less irritating, and is not volatile. It can thus be incorporated with the dressing in greater quantity and remain for a longer time in contact with it, without endangering the result. Another advantage of salicylic acid is that it is inodorous.

For dressing with salicylic acid there should be kept at hand a supply of salicylic water—a solution of one part in 300; and of salicylic cotton, containing respectively 3 and 10 per cent. Dr. Blaser, the apothecary of the Jacob's Hospital, makes the preparations in the following way. *a.* For 3 per cent. salicylic cotton, 750 grammes are dissolved in 7,500 grammes of spirit of spec. grav. 0·830 ; the solution is then diluted with 150 litres of water, at a temperature from 156° to 176° Fahr. ; and the mixture is used to saturate twenty-five kilogrammes of cotton-wadding freed from fatty matter. *b.* The 10 per cent. salicylic cotton is made by dissolving one kilogramme of salicylic acid in 10,000 grammes of spirit of spec. grav. 0·830, adding 60 litres of warm water (as above), and saturating with the mixture 10 kilogrammes of cotton-wool. The saturation of the cotton is best done in a large shallow wooden tub ; and it is best to use only a small quantity of cotton-wool (two or three kilogrammes) at one time, as in only this way an equal distribution of the salicylic acid is possible. The proceeding occupies only a short time.

In charging the cotton-wool with the warm solutions of salicylic acid, it is introduced in layers, moderate pressure being applied to each layer, so that it may be completely saturated before another is introduced. After the proper quantity of cotton-wool has been introduced and is perfectly saturated, the whole is inverted, and allowed to stand for a short time (about ten minutes), so that the solution may be diffused as equally as possible. The cotton-wool is then laid in small heaps to cool, during which process the salicylic acid crystallizes ; and it is then allowed to dry in a moderately warm place for about twelve hours. It is not advisable to hang it up, as, in the process of draining, the equal distribution of the acid is disturbed. The salicylic acid may not crystallize in equal amount in all parts of the wadding ; and even after drying, the distribution of the acid may be rendered unequal by handling. Thus, in many parts there will be less than 3 per cent., in others more. An addition of 1 per cent. does no harm ; but if in the 3 per cent. cotton-wool there be a deficiency of 1 per cent., or in the 10 per cent. cotton of 3 per cent. the deficiency should be made up from portions containing an excess.

The salicylic cotton-wool does not allow the passage of the discharges of the wound so readily as Lister's carbolic gauze ; and hence, when a dry salicylic acid dressing has remained for a week or two, pus is generally found in various quantities between it and the wound. Dr. Thiersch has made some experiments in order to find a more permeable material for dressing than cotton-wool. Hemp, flax, sawdust, etc., did not answer the purpose. His attention was then called to jute ; and, having obtained a supply of clean jute, he charged it with 3 per cent. of salicylic acid, adding also 20 per cent. of glycerine to prevent the acid from falling off in dust. He introduced 2,500 grammes of jute into a solution of 75 grammes of salicylic acid in 500 grammes of glycerine and 4,500 grammes of water, at a temperature of 158° to 176° Fahr. In this way he obtained a soft material, resembling flax, giving off but little dust, which, when left on a wound for nine days, completely absorbed thick pus, the pus becoming equally diffused through it. At the same time, the dressing remained inodorous, and gave in every part the reaction of salicylic acid on being tested with chloride of iron. On account of the equal distribution of the discharges from the wound in the jute dressing, it is not necessary to apply a strongly charged layer internally ; a 4 per cent. dressing is sufficient. Dr. Thiersch believes that jute will supersede cotton as a dressing for large suppurating wounds, although it is not to be compared with the latter as regards softness. Some comparative statements of the cost are given, to show that the salicylic acid dressing, especially when jute is used, is much cheaper than the carbolic acid dressing : the proportions, calculated for a case of amputation of the thigh, being:— Lister's dressing, 2·35 *mark*; dry salicylic dressing, 1·52 *mark* ; dry salicylised jute dressing, 0·92 *mark*.

The cheapest of all is the jute dressing ; and it is the more so, because it can be allowed to remain a longer time on the wound without danger of an accumulation of the discharges beneath it. Dr. Thiersch's experiments with the jute dressing are as yet, however, not sufficiently numerous to enable him to speak with absolute certainty about it. He does not think that it is of much importance whether a spray of carbolic acid (1 in 50 of water) or of salicylic acid (1 in 300) be used. Many give carbolic acid the preference, because it does not cause coughing and sneezing, and is readily removed from the clothes by evaporation. Dr. Thiersch prefers salicylic acid, because it irritates the wound less. The sponges are kept in a solution of carbolic acid (1 in 20 of water) ; and, after being used, are washed with much warm water and again placed in the carbolic acid solution. Salicylic acid solution may also be used.

SOME OF THE PHENOMENA ACCOMPANYING A CHANGE OF PHYSICAL STATE.*

BY THOMAS WILLS, F.C.S.,

Of the Royal Naval College, Greenwich.

Chemists are at the present time acquainted with, at the most, some sixty-three or sixty-four bodies which are called *elements*, so called from the fact that all attempts to resolve them into anything other than themselves have hitherto failed, and because it has been found that all material things, without exception, are composed of one or more of these substances united together in different ways. We may allow our imagination to regard these *elements* as the *bricks of the universe*. I have here written upon this table a list of these bodies, many of which are very well known, others are mere chemical curiosities.

Now if I could place before you a specimen of each of the substances mentioned here, there would be no two found alike, but all would possess more or less diverse properties and characteristics, but at the same time it would be seen at once that three well marked divisions might be made, owing to the occurrence of two distinct breaks in

* Since this lecture was delivered, the first part of Dr. Weigert's 'Researches' has been published at Breslau, with the title 'Anatomische Beiträge zur Lehre von den Pocken.'

* Lecture delivered before the Bristol Pharmaceutical Association, April 30, 1875.

physical state. Thus, it would be found that out of these sixty-four elements fifty-seven would appear as solid bodies, two as liquids, and four as gases, leaving one the physical state of aggregation of which has not yet been determined. Let us at once clearly understand what is meant by these terms solid, liquid, and gas. Here, for instance, is a block of wood; it resists the pressure of my fingers; it has a well-defined form, and it maintains that form, which in this case is cubical; the particles of which the wood is composed are evidently not free to move, but remain in one position, and we speak of matter having these characteristics as being in the solid condition. Here, however, is a basin of water; I plunge my hand into the water and it gives way; the water, you further observe, has no particular form of its own but takes the form of the vessel which retains it, some vessel being necessary for its retention; also this water, and bodies in a like condition, when left free to move, present a well defined and perfectly level surface: here it is evident that unlike the particles of wood, the particles of water are to a large extent free to move about amongst themselves. Matter with these properties is in the liquid state.

Enclosed within this bladder is some of the ordinary air which may be taken as a fair example of gaseous matter; such matter offers very little resistance to the passage of one's hand through it; it presents no surface as the water does, and it requires a completely closed vessel to retain it, and, at the same time, it completely fills any vessel in which it may be kept; it is here obvious that there is little or no power holding the particles of gaseous matter together, as their tendency is rather to get as far from each other as possible, and to fly apart.

From these observations we may conclude that the cause of the very great difference in physical properties between these three states of matter is to be found in the presence or absence of a power binding the particles of a body together. This power or force is called cohesion; and such a force acts between the similar particles of the same body. We have no difficulty whatever in recognizing this cohesion in solid bodies; in its absence no solid could exist. In liquids this cohesion is to a large extent wanting, nevertheless it may be shown that it still exists, but in a much weaker state. Liquids, when placed on a level surface and left to themselves, show a tendency to form themselves into drops, and water, if freed from air, obtains more of the properties of a solid body. In gases we fail to find any trace of cohesion, for, as was mentioned previously, the particles of a gas have rather a tendency to fly away from each other. In furtherance of our object we shall now inquire whether the amount of cohesion possessed by any particular body is fixed and certain, or whether we can so alter its amount as to alter the physical state of the body itself.

The question as it is put here is intended only to make our ground quite clear, for you will see at once upon a moment's reflection that we can and do do this continually, and hence it follows that when speaking of the state of a body we must take into account the circumstances under which it is existing.

Thus it has been previously mentioned that amongst the sixty-four elements, are to be found two liquids, the one bromine and the only liquid metal, mercury, but this remark only applies under ordinary existing circumstances. The liquid bromine will become a gas at the tropics, and the liquid mercury a solid at the poles. Now that difference of circumstances at the tropics and the poles which affects the state of these two bodies is one of temperature only. The force of heat then is antagonistic to the force of cohesion, and consequently tends to lessen its effect, and we should feel inclined to argue that the same substance under different conditions of temperature might be made to assume different states of aggregation. Taking for illustration two other bodies, solids, from the list of elements, viz., lead and iodine, and subjecting them to the action of heat, that is to say, raising their temperature, we see the result—the lead becomes a liquid and the iodine a gas. Here, work has been done, this work consisting in the separation of the molecules of which the lead or iodine is composed and in doing this work a certain amount of heat has been consumed. On the return of either to their previous condition this heat will be given up. Here, however, a point of some importance occurs. This consumed heat is not all expended in one direction; a part of it being used to increase the temperature of the body, such heat is at once recognizable by the thermometer and remains as heat; but another portion of this force is expended in separating the molecules of the body to a greater distance one from the other; that is the force of heat has been converted into another kind of force, and this amount is not recognized by the thermometer.

When the molecules of a body are in such proximity as to have a certain sufficient attraction for each other—viz., when there is present a certain amount of the force of cohesion, the solid state is maintained; separate them from each other so as to lessen this attraction and they obtain a certain freedom of motion amongst themselves and the passage into the liquid state is the result. The extent of the distance by which these molecules are separated when a solid becomes a liquid is, without doubt, very small; but even by this small interval their attractive force is largely destroyed.

This effect may be paralleled by an experiment in magnetism. A powerful magnet may be made to support a heavy weight from its naked poles; but if a small thickness of paper be interposed between the magnet and the weight it will be found that the weight cannot be supported.

When heat is first applied to a solid body it is invariably expended in these two directions, but at the moment when any portion of the solid begins to assume the liquid state, the whole of the heat applied to a body is expended in one direction only, that is in doing molecular work; and this continues to be the case until the whole of the substance has become a liquid, when again the heat is divided in two distinct ways, hence the temperature of a body remains constant during the process of fusion or liquefaction, no matter how much heat is being applied; upon resolidification this so-called *latent* heat is rendered manifest once more.

It is therefore necessary, before a substance passes from the solid to the liquid state, that it should be supplied with a certain fixed and definite amount of heat, and when solids are observed to become liquids we are perfectly sure that this heat has been obtained from some source or other. Experimental illustrations of these facts might be multiplied to a great extent. The effect of causing a solid to become liquid such as, for instance, the solution of a salt in water, is a cooling one. The solid in becoming a liquid requires an amount of heat which it obtains from the water in which it is dissolved, and thus this water is cooled; and if a liquid be caused to solidify, such as, for instance, the sudden crystallization of a solution of sulphate or hyposulphite of soda, the liberation of heat is at once recognized. At the moment when the passage from the liquid to the solid state takes place, a power of molecular arrangement seems to be active, and the molecules show a decided tendency to unite together in a certain particular and characteristic manner, and in this way geometrical structures of extreme beauty are developed as if by a natural growth, and thus we have the marvellous phenomena of crystallization, as it were a link between the inorganic and organic kingdoms, crystallization resembling very closely in some respects the building up of vegetable structures.

Crystals are formed in a perfectly regular way, each crystallizable substance having a characteristic form of crystal, and the angular measurements of each crystal of the same substance are always found to be alike. By this means, as you are aware, crystallographic systems have been arranged, the study of which, however, has by no means become so general as would no doubt be desirable. One, probably the great, point of interest attached to this subject, is, that it brings us face to face with molecular action and reveals to us a little of the more subtle work of nature, and it will probably be from this or some allied source that future knowledge regarding atomic and molecular arrangement will come. Already, in the hands of such men as Dr. Tyndall and Professor Mitscherlich, the subject has proved fertile in this direction.

We have hitherto been confining our attention to those phenomena which are connected with the solid and liquid states of matter, but the facts which have been stated regarding the circumstances under which one state passes into the other are equally correct when applied to the liquid and gaseous conditions.

There appears to be a much greater distance between the liquid and gaseous states than between the solid and liquid, but it is probable that every substance which can be subjected to heat without decomposition, can by such means be caused to pass through all three states, the liquid state occupying the intermediate position. The usual effect of heating a solid body is first to convert it into a liquid and then into a solid, water affording an excellent illustration of this effect.

The molecular work done, however, in the conversion of a liquid into a gas is much greater than that done in the liquefaction of a solid. The separation of the molecules is much wider, and they are altogether released from the force of cohesion; hence the difference in bulk between the gas or vapour produced and the bulk of the liquid producing it is extremely large. A cubic inch of water, for example, becomes, when vaporized, speaking roughly, a cubic foot of steam.

Now in the case of the conversion of a liquid into a gas, as before, heat is consumed in direct proportion to the work done, and is also expended in two directions, a portion of it remaining latent being converted, as it were, into an elastic spring keeping the gaseous molecules apart, while another portion is recognized as giving to the gas or vapour a certain elevation of temperature.

At a point called the boiling-point, of which something more will be said hereafter, liquids pass into gases with the utmost ease, and this point, like that of liquefaction, is one at which a constant temperature is maintained until the whole of the substance has changed its state, all the heat during this interval being consumed in doing molecular work. On the return of the vapour to the liquid state this heat once more becomes manifest.

As a solid on becoming a liquid is cooled by abstracting the heat from the medium surrounding it, so a liquid on becoming a gas cools those objects which may be in contact with it. In this way the evaporation of water from the earth's surface exerts a cooling effect upon the earth and upon the atmosphere, so also cold sometimes of extreme intensity is obtained by the evaporation of volatile liquids such as ether.

As the physical state depends upon the distance of the molecules of a body from each other it would appear quite reasonable to expect that the application of some force other than heat which should bring these molecules into closer approximation would be accompanied by a change of state. If mechanical force be applied in order to obtain such a result, it is found that liquids yield very slightly to such force, so slightly that it is found impossible by the application of even the greatest mechanical force at our command to bring the molecules of any liquid sufficiently close as to cause such a liquid to become a solid.

With gases, however, the case is very different, the ease and the extent to which they yield to compression being extreme, under these circumstances it is quite possible to cause a change of state, and thus we have the liquefaction of gases. It will be evident that if there be in gaseous matter a certain amount of heat, not evident to us as heat, but as a molecular motion, it will be possible to convert a gas into a liquid in two ways,—in the first place, by abstracting this equivalent of heat, whereby the molecular motion will cease, or, secondly, by overcoming and destroying such motion by a superior force, whereby the equivalent of heat will be liberated as recognizable heat. In other words, a gas may be liquefied by either exposing it to great cold, or by forcible compression; by one of these means or by both combined many gases have been successfully liquefied. Much interest is attached to such liquefied gases.

I have here a vessel containing a considerable quantity of such a liquefied gas,—carbonic acid gas; this gas requires for its liquefaction a considerable pressure, as much as thirty-five atmospheres or more than 500 lbs. upon the square inch. The compression has been effected in this case by a powerful steam compressing pump, and during its compression the heat which existed as molecular motion was squeezed out of it, this vessel having to be well cooled during the operation to prevent its becoming too hot. Now I will ask you what will happen should this great pressure be suddenly released? We know that the tendency of the liquid would be to fly off as a gas once more, but in order to do this it is necessary that the equivalent of the molecular motion necessary for the assumption of the gaseous state must be supplied to it in the form of heat. From whence is this heat to come? Surrounding objects do not afford a sufficiently prompt supply, so that the evaporation of the first portion of the liquid absolutely abstracts heat from another portion, which is immediately lowered in temperature thereby. But observe the effects of this. By this extreme and rapid cooling the molecules of the liquid carbonic acid are drawn so close to each other that the liquid state cannot be maintained and the liquid passes into a solid, this white solid is carbonic acid, its temperature is—100°, and by its means we may illustrate many of the effects of extreme cold. Water, bromine, and mercury (which freezes at a temperature of—40°) may be frozen with the greatest ease. We turn now to the evaporation of liquids.

Although it is only at a point which is spoken of as the boiling point that we see distinctly the passage of a liquid into a gas, yet at temperatures far lower than this most liquids gradually assume the gaseous state; even at the freezing temperature water will pass into vapour, and the gradual drying up of a pool of water, or of a wet towel, illustrates the fact; this evaporation takes place from the surface only. As the temperature is raised evaporation proceeds at a greater rate, until there comes a time when vapour or gas is formed in the interior of the liquid, and we have then the phenomenon of ebullition or boiling. This point is a perfectly definite one, and it is reached when the elastic force of the vapour given off is equal to the pressure of the superincumbent atmosphere. If this external pressure be lowered then, having less resistance to overcome, the boiling point is reached more quickly, or in other words ebullition takes place at a lower temperature. If the pressure be increased, then the contrary result is obtained. It has been already mentioned that the temperature after the boiling point has been reached remains constant until the whole of the liquid has been converted into vapour or gas.

A remarkable phenomenon is observed if a liquid be very suddenly heated when, instead of the liquid being immediately dissipated in the form of gas or vapour, a portion only of it is so converted, and this portion so vaporized serves to lift the remainder of the liquid out of contact with the heated surface or vessel, thus allowing it to maintain a comparatively low temperature, and very largely to retard its evaporation. This phenomenon is called that of the spheroidal condition, and it is observed whenever a liquid is allowed to fall upon an intensely heated surface—it is necessary that the temperature of this surface shall be sufficiently high. This point varies with different liquids; whenever the spheroidal state occurs the liquid is invariably prevented from touching the heated solid by the interposition of a thin film of vapour. This want of contact between the two bodies may be shown in a variety of ways. In an experiment arranged here, a battery and electric bell are joined in a circuit, which includes the heated surface and the water upon it; at the present time the only break in the circuit occurs between the drop of water and the hot plate. If, now, the temperature of the plate be allowed to fall, the film of vapour supporting the drop is abolished and contact is obtained, which is ascertained by the ringing of the bell.

Many remarkable results may be obtained in virtue of the spheroidal state; thus a moist hand may be passed with impunity through molten iron or lead, or protected by a layer of the vapour of ether the scalding effect of boiling water is destroyed.

It has been supposed that some boiler explosions have occurred under circumstances connected with the spheroidal condition. Water in this state gives off very little steam, but if the temperature of the supporting furnace falls sufficiently low for contact to be established, there is a sudden and large evolution of steam, which, no doubt, if taking place in a boiler, would produce an explosion. The difficulty has always been to account, except under gross carelessness sufficient in itself to account for an explosion, for the water getting into the spheroidal condition; but an observation of Mr. Barrett seems to simplify this matter slightly. He finds that water containing a little grease takes the spheroidal state with much greater ease and at a lower temperature than pure water; and this effect is so remarkable that I propose to show it to you.

Here are two glass vessels of water, in one of which a little soap has been dissolved, making the water slightly turbid; in a small furnace, I have here a copper ball, which is raised at the present time to a bright red heat. On taking the ball out of the furnace and plunging it immediately into the vessel containing the soapy water, no hissing is heard, but the ball is seen still at a bright red heat, beneath the surface of the water, surrounded by a layer of vapour; on taking the ball out of this vessel and placing it into the other, in which no soap has been placed, a loud hissing noise and the evolution of a quantity of steam announces that the ball has at once come into contact with the water, and is being cooled in the ordinary way. The experiment here made is one of great interest.

The passage of the solid into the liquid state and of the liquid into the gaseous is usually abrupt and sharply defined, but there is every probability that this passage is continuous and not abrupt as it appears, but that it occupies a definite interval of time. It is readily seen that the molecules of any solid body, starting from their closest position of proximity, and under the influence of heat moving away from each other, until they occupy the position required for the liquid state, must of necessity pass over all the intervening positions when the body can be neither a true solid nor a true liquid.

Again, the amount of cohesion present when a body is in the solid state must *gradually* decrease until it is reduced to that amount present when the body is in the liquid state, all intermediate quantities being present at some time or other, and once more, starting with the amount of heat necessary to maintain a body in the solid form and then increasing the heat until the minimum quantity has been supplied necessary for the assumption of the liquid state, the whole of the intervening points must have been passed over, when the body has more heat, or its equivalent molecular motion, than is necessary for it while in the solid state, but less than that required for the liquid, when in fact it is neither the one nor the other. This interval may be very minute, in some cases inappreciable, but it nevertheless exists, and, to a great extent demonstrates the continuity of the solid and liquid states of matter. The passage of ice into water probably takes place during an interval not greater than 0·1° C.

We are, however, familiar with some substances which at ordinary temperatures have intermediate properties, and with many others which at a greater or less elevated temperature show such properties; honey, treacle, glue, tar, etc., belong to the former, while we have solder, glass, sealing-wax, and many of the metals of the latter. One case in particular is worthy of attention, that of the element sulphur. At ordinary temperatures this body is a yellow brittle solid; when heated to a moderate temperature (115° C.) it melts and becomes a mobile liquid. If this liquid be now poured out into water it solidifies into the original hard and brittle sulphur, and, on this solidification it gives out all the heat it received during the process of liquefaction. If, however, the temperature of the melted sulphur be raised considerably higher than its first melting point it becomes suddenly (at 230° C.) thick and viscid as treacle; heated still higher it again becomes liquid (at 250° C.); if now the sulphur be again poured out into water the whole of the heat taken up during this liquefaction is not given up, a part being missing. On examining the sulphur in the water it is found to be very different from the first brittle solid, being a soft, flexible, spongy mass, a body evidently intermediate between the solid and liquid states. If this variety of sulphur be left to itself it gradually hardens and becomes converted into the hard and brittle variety, at the same time giving up precisely that amount of heat which was previously missing. Here we have an excellent illustration of this intermediate state, and its relation to cohesion and heat.

Our reasoning would, in the same way, apply to the liquid and gaseous states, but in this case we have good experimental evidence to show that these states are continuous.

In 1822 Cagniard de la Tour made a number of remarkable experiments, in which he sealed up volatile liquids in glass tubes and exposed them to an elevated temperature. At a particular point he observed that the liquid disappeared, and that the tubes became filled with matter in a condition neither liquid nor gaseous. More recently Dr. Andrews, of Belfast, has carefully examined this subject and finds that with all liquid bodies which do not decompose when heated that there is a point at which they are in an intermediate state between the liquid and gas. Thus with carbonic acid, at a temperature of 31° C., or 87° F. it is found impossible to liquefy this gas by any amount of pressure—but the gas is reduced to a condition in which though homogeneous it is neither liquid nor gas—under these circumstances the lowering of the temperature will reduce it to a liquid, the raising of the temperature convert it into a gas, but in neither case can any break of continuity be detected in the transition.

In concluding this lecture, let me say, that the importance of any subject can never be arrived at by a study, however close, of the subject alone; to do so we must look at it in its relation with respect to other subjects, upon which it may have, or which may have upon it, any influence whatever, and if the subjects brought before you in this somewhat fragmentary lecture be regarded in this light it will be seen that they possess very considerable importance. Time will not permit me to indicate the directions in which these subjects have such evident application, but this I feel I may safely leave to yourselves.

THE DETECTION OF MINERAL ACIDS IN VINEGAR.

The fact that the violet of methyl-aniline undergoes no change of colour in contact with acetic acid, whilst the least trace of a mineral acid changes it to a greenish-blue, is suggested by M. Witz as a ready method of detecting the presence of free mineral acid in vinegar. To ascertain the relative strength in acetic acid and in mineral acid it would be sufficient to ascertain by means of an acidimetric solution (1) the point of neutrality to litmus, which would correspond with the sum of the acids; and (2) the point of neutrality in respect to the methyl-aniline violet, which would correspond to the mineral acids only. The difference would give the quantity of acetic acid.

PRESENTATION TO MR. BAYNES, OF HULL.

On Friday evening, June 5, several of the leading members of the Hull Chemists' Association assembled at the Cross Keys Hotel for the purpose of presenting to Mr. James Baynes a testimonial of their esteem and recognition of the valuable service he has rendered to the trade in his capacity as one of the Council of the Pharmaceutical Society. An excellent dinner was provided, and between twenty and thirty gentlemen sat down, Mr. Anthony Smith (president of the association) filling the chair, and Mr. William Staning the vice-chair. After the usual prefatory toasts,

The Vice-President proposed "The Pharmaceutical Society," congratulating the Hull Chemists' Association on having one of its members on the Council, and another as its Local Secretary.

Mr. C. B. Bell responded, and in the course of his remarks expressed the hope that the Pharmaceutical Society might long continue as their legal head. He trusted that none of the innovations that might be brought in with the idea of clipping the wings of that Society would be successful; but that it might continue in the honest straightforward course it had ever pursued, and thus be a lasting benefit to the trade generally. It was now busily engaged in opposing the Pharmacy Bill, which had been introduced into the House of Commons by Sir Michael Hicks-Beach, which, if carried, would have a detrimental effect upon the Pharmaceutical Society. As the Bill was now framed any young man might, after passing certain examinations in Ireland, return to this country and commence business as a chemist and druggist without paying anything, or only a small acknowledgment, to the Society. Petitions had been sent up against this Bill, and he read replies which had been received from the East Riding and borough members on the subject. Their respected friend Mr. Baynes was on the Council of the Pharmaceutical Society, and they must all admit that the local society, mainly through his instrumentality, had received great benefit at the hands of the Society. He concluded by thanking them for the compliment they had paid him by electing him for the fourth year the local honorary secretary of the Society.

The President, in proposing the toast of the evening, alluded to the invaluable services which Mr. Baynes had rendered, not only to the Hull Chemists' Association, but to the trade generally. In the name of the Association and the trade, he asked Mr. Baynes' acceptance of a humble tribute of their gratitude and esteem. It might have assumed the shape of a more valuable gift, but after consideration they felt that rather than adopt the stereotype form of presenting a piece of plate, as conveying their individual esteem and good wishes, it would be preferable to offer Mr. Baynes a presentation from that society which he had so nobly aided.

The testimonial consisted of a handsomely illuminated address, in a gilt frame, the margin being adorned by Mr. Baynes' monogram, and some ancient trade marks, beautifully executed in gold and colours. The text was as follows:—"Hull Chemists' Association. At a meeting of the above association, held at the Cross Keys Hotel, on the 9th of March, 1875, the president, Mr. Anthony Smith, in the chair, the following resolution was proposed by Mr. Staning, and seconded by the vice-president (Mr. Myers), and carried unanimously:—"That the best thanks of this association are hereby presented to James Baynes, Esq., for his untiring exertions and valuable advice during the long period he has deservedly held so prominent a position in the trade of the town. The association further tender their best thanks to him for the faithful advocacy of their interests, and those of the trade generally, in the honourable position of member of the Pharmaceutical Council of Great Britain. The association desires to acknowledge with gratitude the many obligations they are under for the ready and willing manner in which he has, at all times, at much personal inconvenience, placed his abilities and energies at their disposal, and pray that the Great Architect of the Universe may bless him with health and strength to prolong his efforts for the good and welfare of his brother chemists."

Mr. Baynes, on rising to acknowledge the compliment paid him, was received with hearty applause. He said it often happened that in cases of this kind one individual carried off the honours which, in fairness, belonged to others; and he felt that was the case now with him. He dared not arrogate to himself anything approaching the terms in which they had chosen to express their recognition of his services; for in respect to earnestness and heartiness he could point to gentlemen who, in their day, had done as much for the trade as he had done. On one ground, perhaps, he might, without egotism, accept that testimonial as true, and that was simply as to length of service. He had from time to time during the last 35 years had occasion to use his energies in promoting that which he believed to be for the best interests of the trade. In 1839 the Medical Council were about making a raid upon the chemists, and he felt that had they succeeded in carrying out their intentions they would have sunk to the low condition of the ordinary trader—that they would have found themselves in the condition of the so-called chemists of Ireland, a mixture of the general dealer and something lower. Then, led on by such men as Jacob Bell, Charles John Payne, William Allen, and others, an association was formed simply as a trade protection society. They felt their interests were at stake; and out of that effort, he was happy to say, grew the Pharmaceutical Society, the beneficial results of which were patent to all present. During some twenty-five years he filled the office of local secretary, and in the early part of that time there was occasionally some hard work to do. Now, he thought, the trade, although in serious difficulty in many respects, was, after all, rising in status; and though he knew that would not earn them much bread and butter, still it was most satisfactory to all interested in the trade. They had been driven by Government either to accept a governing body elected by themselves, or the Medical Council, who would have been hard taskmasters indeed. Coming to more local matters, he for many years regretted that they had no local association, such as they now possessed, upon which they could fall back in case of need. They seemed to be a rope of sand; and though they had given him credit for many virtues, he never had the courage to try and form another society. He came in after the formation of the Hull Chemists' Association, and he thought he might say that during the time that had elapsed since its establishment, it had done a good work, in which he was sure others had taken a larger and more onerous share. They had often paid him the compliment of asking his advice, and that he had always honestly and faithfully rendered with a single eye to the advantage of the trade. Although, personally, he was not favourably disposed to testimonials, yet he regarded this as something more than an expression of dry thanks. They had thought fit to clothe their thanks in terms which he should long remember; and he had much rather receive such a token than one of greater intrinsic value. If such expressions were recorded on a simple sheet of paper they would be most acceptable, but placed as they had been on this beautiful work of art, he should ever remember that they conveyed very much more than appeared on the face of it.

Mr. Gates then proposed "The Health of the President," the toast being cordially received and acknowledged by Mr. Anthony Smith.

Mr. Oldham gave "The Healths of the Visitors," associating with it the name of Mr. H. J. Amphlett, who responded.

Mr. Baynes then proposed "The Healths of the Vice-President, Secretary, and Committee of the Hull Chemists' Association," the toast being acknowledged by Mr. George Myers, vice-president; Mr. C. B. Bell, secretary; and Mr. Oldham, on behalf of the committee.

The Pharmaceutical Journal.

SATURDAY, JUNE 12, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PHARMACY ACT (IRELAND) BILL.

A FURTHER postponement of the second reading of the Irish Pharmacy Bill until Monday, the 14th of June, is all the parliamentary progress we have to report as having taken place in connection with this measure since our last issue. There has been, however, no diminution of the activity displayed throughout the pharmaceutical community in forwarding to Parliament petitions against the proposed Bill. Up to the end of last week no less than 124 petitions had been presented, bearing the signatures of 1405 pharmaceutical chemists and chemists and druggists. Since that time, and up to Wednesday, 28 more petitions had been presented against the Bill, besides the petition of the Pharmaceutical Society.

Meanwhile there has been only a single petition presented in favour of the Bill, and, strange to say, this one has been sent by the King and Queen's College of Physicians in Ireland. Another instance is thus afforded of the singular inconsistency that has characterized the proceedings of our Irish friends in regard to pharmaceutical legislation. So far back as the time when the Pharmacy Act of 1868 was before Parliament, the same College of Physicians exerted its influence to bring about the extension of that Act to Ireland, and a circular was issued by the Registrar setting forth the grounds for desiring that the Bill should be altered so as to apply to Ireland as well as to England and Scotland. This circular pointed out the inconveniences resulting from the altered procedure of the Apothecaries' Company in regard to the granting of certificates "to open shop for the retail of medicine, and to practise the art and mystery of an apothecary," and from the innovation of requiring a four years' curriculum, comprising medical studies. It also showed that the want of compounding and dispensing establishments in Ireland, then universally complained of and yearly increasing under the existing state of the law and action of the Apothecaries' Company, might be remedied by one of two courses, either by the Apothecaries' Company granting, as formerly, its certificate on the condition required by the Act, viz., that the person applying for the certificate shall satisfy the Court of Directors as to his "knowledge of the business," or by the Bill (Pharmacy Act, 1868) then before Parliament being extended to Ireland, so as to supply what had become a very serious want, and at the same time to protect the public from the danger of ignorant persons compounding and dispensing medicines.

This circular then went on to state:—

"Either course would attain the desired end; but as the tendency of medical legislation in the several Medical Acts *is to assimilate the laws in England and Ireland*, and as *one Pharmacopœia or Formulary for compounding medicine*, '*The British Pharmacopœia*' has been substituted for the three—English, Irish, and Scotch—previously in force; it would seem the more desirable course to make the qualification the same for opening shop for the retail of medicine and compounding prescriptions in the three ocuntries.

"The inhabitants of the three countries will then have the same facilities for obtaining medicine, and having prescriptions compounded, and the same security against mistakes and unskilfulness in compounding, while the same reciprocity of rights which has been established by the Medical Acts for the three countries in regard to the practice of medicine and surgery will then be extended to pharmacy, permitting the apothecary or chemist to open shop indifferently in the three countries, provided he is properly qualified.

"LOMBE ATTHILL, M.D.,
"*Fellow and Registrar.*

"*College Hall, June* 15, 1868."

In the early part of last year, a Bill to amend the practice of pharmacy in Ireland was drawn up by the College of Physicians, and printed and circulated together with some explanatory observations.* Not long afterwards this very Bill, of which the sum and substance was the extension of the Pharmacy Act of 1868 to Ireland, was introduced into Parliament† by MR. ERRINGTON, MR. BLENNERHASSETT, and MR. BUTT, and eventually it was referred to a Select Committee which, after taking evidence, reported against the Bill.

The only representative of the King and Queen's College of Physicians who appeared to give evidence in reference to the Bill proposed by that body was the President of the College, Sir DOMINIC CORRIGAN, who to the astonishment of every one declared that he did not approve of the Bill, and gave evidence against it, suggesting at the same time that there was a necessity for a separate Pharmaceutical Society in Ireland.

Since that time Sir DOMINIC's views appear to have developed themselves more fully, and he has appeared as the adviser of the Irish chemists and druggists, warning them not to have anything to do with existing pharmaceutical societies.‡ It seems now that he has also succeeded in converting to his own peculiar views the body over which he presides, and

* See *Pharm. Journ.* [3], vol. iv., pp. 839, 847.

† *Ibid.*, pp. 1039, 1048.

‡ See before, p. 687

we may assume that he has led the College of Physicians to manifest the inconsistency of appearing as a petitioner in favour of a Bill which proposes to do the very reverse of that which it had in so elaborate a manner argued was the proper thing to do for amending the practice of pharmacy in Ireland.

Not long since we were hopeful that there was still some agreement between ourselves and Sir Dominic Corrigan in reference to Irish pharmacy and agreeing with him in the opinion that if the ranks of pharmacists in Ireland were to be augmented it must be from the body of chemists and druggists, we looked forward to some appropriate action being taken, under his guidance, by the Chemists and Druggists' Association, and wished them all success in such an endeavour to follow the example that has been set by pharmacists on this side St. George's Channel. As yet, however, we have no intimation that such a course is in contemplation, but in place of it there seems to be only a disposition to declaim against the *régime* of the Apothecaries' Company, and to look to Government to establish and support an Irish Pharmaceutical Society which, if it is to possess the independence and stability so much talked of as desirable, can, we believe, attain that end only as the result of united and voluntary efforts.

THE YORKSHIRE COLLEGE OF SCIENCE.

Little more than twelve months ago the first meeting of donors to the Yorkshire College of Science was held at Leeds, to decide upon the constitution of the College and to elect a Council, and within the last few days that Council has issued the first Annual Report, in which it has been able to speak of the taking of temporary premises, the appointment of professors, and the completion of the first courses of lectures as accomplished facts. Such energy and promptitude, it must be admitted, augur well for the future of the young institution. They will be invaluable in educating the Yorkshire public to a proper appreciation of the advantages pertaining to the College, which, from the statement that the number of day students has hitherto been small, would appear, as in early history of other similar institutions, to be at present somewhat wanting. It is satisfactory to learn, however, that short courses of evening lectures have been given, which have been more successful.

Another item in the Report furnishes food for congratulation, as indicating how the Yorkshire College of Science and kindred institutions may assist in solving the dormant problem of providing for the scientific education of pharmacists in the provinces. The Council states that arrangements have been completed with the Council of the Leeds School of Medicine, by which the students of that institution will go through their course of chemistry and laboratory practice at the College. At least twenty medical students are expected to attend Professor Thorpe's courses under this arrangement. Surely, in a county which boasts of one-fourth of the whole number of pharmaceutical organizations in Great Britain, there ought not to be much difficulty in raising an equal contingent of pharmaceutical students.

The "formal inauguration"—*pace* Mr. Freeman—of the College will take place at the commencement of the second session, in October next, when His Grace the Duke of Devonshire will preside, and will be supported by many distinguished men interested in the welfare of the College.

THE TRANSPORT OF POISONS.

An American contemporary states that recently a vessel arrived at New York, containing a large quantity of fine table salt, stored in sacks in the hold, and about a hundred kegs of arsenic between decks. During rough weather on the voyage the cargo shifted, and some of the arsenic escaped from the kegs and was washed by the sea down into the hold amongst the salt. After a portion of the salt had been disposed of and removed, the captain remembered this, and began to speculate as to the possible nature of the mixture. An examination of the salt by Professor Doremus removed his doubts by showing that it contained a considerable proportion of arsenic. Fortunately, by promptly telegraphing to the purchasers, all danger of poisoning was averted. Notwithstanding that the underwriters are endeavouring to persuade the owners of the salt that the addition of arsenic has enhanced its commercial value, most consignors and consignees of articles of food will feel that there is something very objectionable in a system of packing and loading which would allow of their aggrandizement in this way.

CINCHONA AND JALAP IN JAMAICA.

The *Lancet* states that several hundred acres of land in Jamaica are now devoted to the cultivation of cinchona, and that there is a probability that in a few years the island will supply the European market with a large quantity of good bark. Efforts have also been made to grow the jalap plant, and the last crop of jalap is said to have amounted to three or four hundred pounds.

DRUGS AND DRINK IN MISSOURI.

The disposition manifested by drug sellers in certain parts of the United States to encourage an undue development of the sale of non-official alcoholic preparations in connection with their ordinary trade, appears, at last, to have attracted the attention of legislators. The *Pharmacal Gazette* states that in Missouri an Act has been passed which provides that no dealer in drugs and medicines shall, without taking out a licence, directly or indirectly *sell or give away* any intoxicating liquor in less quantity than a gallon, except for medicinal or sacramental purposes, under a penalty of from fifty to two hundred dollars. Notwithstanding the apparent comprehensiveness of the words italicized, our contemporary points out that there is nothing to prevent a druggist loaning a bottle of whisky and taking a dollar as collateral security.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

After protracted deliberation and discussion it was eventually decided that the Annual Botanical Ramble of the members of this Association should be from Elton to Stamford; Fotheringhay Castle, Bedford Purlieus, and Burghley House to be visited *en route.*

On May 17th the favoured few started by rail along the Nene Valley. The weather, contrary to usual experience, being very fine, and the country most unusually beautiful, some lovely prospects being obtained over the county of spires and squires, here well deserving the alliterative epithet.

The entrance to Castle Ashby, the scene of the first ramble, was passed and Wellingborough soon reached. Wollaston with its ubiquitous church was on the right, near to it being the earliest extant example of early English architecture, Strixton church. Then came the beautiful spire of Higham Ferrers, the native place of Archbishop Chichele, once a parliamentary borough, and still, though only of village dimensions, retaining municipal dignity. Then came in quick succession, Raunds, Stanwick, Ringstead, and Thrapston. Above the latter, the river was white with *Ranunculus fluitans*, and bordered in the greatest profusion with showy masses of *Caltha palustris;* the smaller brooks were filled with dense thickets of *Typha Arundo*, whose dried stems looked strangely out of character with the fresh and blooming vegetation by which they were surrounded. Then on by the lovely woods of Lilford, past quaint Barnwell embowered in chestnuts, hiding its ruinous old castle now covered with the rich yellow wall-flower, Oundle, with its magnificent spire, was reached, and passing by Cotterstock, in whose sylvan beauties Dryden wrote his fables, on by Tansor, whose brooks are choked with *Hottonia palustris*, Elton station was at length reached. From here the party walked across to Fotheringhay, finding *Orchis Morio* and *Carex glauca* in the fields, and *Verbascum Blattaria* and *Anthriscus vulgaris* on the walls, while the ditches furnished *Carex riparia* and *vulpina* in abundance. The splendid church of Fotheringhay was soon an object of admiration, it being one of the 15th century edifices, with handsome tower, surmounted by an octagonal lantern, which, with the high site, gives it a very imposing appearance. The interior is chiefly remarkable for containing two monuments erected by Elizabeth to Richard and Edward, dukes of York, who fell fighting, respectively at Agincourt and Wakefield. Some beautiful chestnut trees were examined, and the peculiarity of the relative length of stamens and pistil (as in the *Primula*) being reversed in different plants was noticed.

The site of the castle was then visited, and though the earthworks still remain but one fragment of masonry near the river is the only relic left of the castle which for so long a time held prisoner Mary, Queen of Scots. The moat furnished botanically *Ranunculus intermedius, Potamogeton natans* and *Iris Pseudacorus.* On the sides of the mound *Hyoscyamus* was soon found then came *Veronica serpyllifolia, hederifolia,* and *arvensis,* followed by *Papaver somniferum*, which was scattered all around. Then a shout hailed the discovery of *Ranunculus parviflorus*, whose tiny mutilated petals and tuberculated carpels were eagerly examined. The south side of the mound was blushing red with the *Erodium cicutarium*, and here was found the *Onopordon Acanthium,* and a seedling *Carduus eriophorus.* On returning through the village an old dame inquired if we had been gathering Queen Mary's thistle, alluding to *Onopordon*, which tradition says was brought to Fotheringhay by Mary's attendants.

Proceeding to Stamford by the old road, long disused for traffic, now covered with greensward, and bordered for some distance by the wood of Bedford Purlieus, in which *Allium ursinum* made a most pleasing contrast in colour to the *Scilla nutans, Lamium Galeobdolon* was also plentiful. By the roadside a great clump of *Belladonna* was found, and then the woods yielded quickly after *Luzula sylvatica, Aquilegia vulgaris,* the beautiful *Melica uniflora, Melampyrum pratense, Habenaria chlorantha,* and the rare (in Northamptonshire) *Euphorbia amygdaloides. Convallaria majalis* is also found plentifully in the Purlieus, but time did not permit going to its habitat. *Circæa lutetiana* was common, and the *Conium* and *Belladonna* also frequent.

Wittering Heath, now enclosed, was then crossed, and on its dry sandy soil a new set of plants was found, *Cerastium arvense, Origanum vulgare, Reseda lutea, Helianthemum vulgare* being met with in abundance. An old willow swamp contained the great tufts of *Carex paniculata,* while further on, nearly covered with *Tamus communis, Daphne laureola* and *Viburnum Lantana* were plentifully growing.

A hasty glance after the arrival at Stamford was given to the town before dinner, at which Mr. Hester presided, the vice-chair being filled by Mr. Druce. The usual loyal and local toasts having been drunk, but short time remained to see Burghley House, but a sharp run through the fine park and avenues brought the party to the magnificent pile of buildings forming Burghley House, and much pleasure was enjoyed in passing through the superb suite of rooms, filled as they are with objects of *vertu.* The portrait of the "Village Countess" was, of course, pointed out and Tennyson's charming ballad rehearsed, but *the* picture was one of the Saviour, by Carlo Dolci, its exquisite expression of divine love, compassion, and sorrow, well deserving it to be called the "gem of the house." The rooms occupied by Queen Elizabeth and Queen Victoria were also objects of interest, and the beautifully painted ceilings much admired.

But little time was left to get to the station, and the party were soon whirled homewards through the Welland Valley, passing on the right Kelton, celebrated for its stone quarries, and on the left Colley Weston, for its roofing slates. Rockingham Castle was quickly left behind, just one glimpse of Uppingham being obtained and then Market Harborough was reached; here the railway banks were covered with *Thlaspi arvense.* Then on by the valley through which that branch of the Nene which rises on Naseby Field flows. Northampton was reached by 8 p.m., after a very pleasant day, resulting in a few good finds, and in seeing in flower or fruit 147 species of plants.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, June 3, 1875. Professor Abel, F.R.S., etc., in the chair. After the usual business of the Society, numerous papers were read, the first of which was on "The Effects of Pressure and Cold upon the Gaseous Products of the Distillation of Carbonaceous Shales," by Mr. J. T. Coleman. He finds that 1000 cubic feet of the gas produced in such large quantities at shale oil works, when submitted to pressure, will give about one gallon of volatile hydrocarbons fit for improving the illuminating power of ordinary coal gas. 2. "On the Agricultural Chemistry of the Tea Plantations of India," by Dr. C. Brown, giving analyses of the ashes of tea and the effect of fertilizers on the growth of the plant. 3. "On the Structure and Composition of Certain Pseudomorphic Crystals having the Form of Orthoclass," by Mr. J. A. Phillips. 4 and 5. "Note on the Sulphates of Narceine and other Narceine Derivatives," and "On the Action of Organic Acids and their Anhydrides on the Natural Alkaloids, Part V.," both by Mr. G. H. Beckett and Dr. C. R. A. Wright. 6. "On the Action of Chlorine on Pyrogallol," by Dr. J. Stenhouse and Mr.

C. E. Groves, with an Appendix by Mr. Lewis on the crystalline forms of mairogallol, one of the products. 7. "On Nitro-alizarin," by Mr. W. H. Perkin, F.R.S., etc. This compound, obtained by the action of nitric acid on diacetyl-alizarin, dyes fabrics mordanted with alumina of an orange colour, whilst the amido-alizarin obtained from it by reduction gives a fine purple. 8. "On Some Metallic Derivatives of Coumarin," by Mr. R. Williamson. And 9. "On the Action of Dilute Mineral Acids on Bleaching Powder," by F. Kopfer. The next meeting, the last of the session, will take place on Thursday, June 17, when the following papers will be read:— 1. "On Nitrosyl Bromide," and "On Sulphur Bromide," by M. M. P. Muir. 2. "Notes on the Chemistry of Tartaric Acid and Citric Acid," by R. Warington. 3. "On the Action of Nitric Acid on Copper, Mercury, etc., especially in the presence of Metallic Nitrates," by J. J. Ackworth. 4. "Decomposition of Water by the Joint Action of Aluminium Bromide, Iodide or Chloride, including Instances of Reverse Action," by Dr. Gladstone and Mr. Tribe. 5. "On Achrematite, a new Arseniate of Lead," and 6. "New Reactions of Tungsten," by Professor Mallet. 7. "On the Action of Chlorine on Acetamide," by E. W. Prevost.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture VI.

Physical deterioration from Alcohol, continued. Influence on the vital organs. Mental phenomena induced by its use. Summary.

Towards the close of my last lecture I touched on the effects of alcohol upon the colloidal structures of the body, indicating that it is impossible for these structures to escape deterioration under its continued action. I must dwell for a few moments longer on this subject.

The parts which suffer most, at first, from alcohol, are those expansions in the animal body which the anatomists call the membranes. The membranes are colloidal structures, and every organ is enveloped in them. The skin is a membranous envelope; through the whole of the alimentary surface, from the lips downwards, and through the bronchial passages to their minutest ramifications, extends the mucous membrane; the lungs, the heart, the liver, the kidneys, are folded in delicate membranes which you can strip easily from these parts. If you take a portion of bone you will find it easy to strip off from it a membranous sheath or covering; if you open and examine a joint you will find both the head and the socket lined with membrane.

The whole of the intestines are enveloped in fine membrane, called *peritoneum.* All the muscles are enveloped in membranes, and the fasciculi or bundles and fibres of muscles have their membranous sheathing. The brain and spinal cord are enveloped in these membranes; one nearest to themselves, a pure vascular structure, a network of blood vessels; another, a thin serous structure; a third, a strong fibrous structure. The eyeball is a membrane of colloidal humours and membranes, and of nothing else. To complete the construction, the minute structures of the vital organs are enrolled in membranous matter.

It was held by the old anatomists that this membranous arrangement of the body is mainly mechanical. The parts and organs, according to their view, are supported and held in position by these membranous sheaths and pouches and coverings. Doubtless this is a portion of their usefulness, for in fact they do hold all the structures together in the most perfect order. But this is only a small part of their duties. The membranes are the filters of the body. In their absence there could be no building of structure, no solidification of tissue, no organic mechanism. Passive themselves, they nevertheless separate all structures into their respective positions and adaptations.

The animal receives from the vegetable world and from the earth the food and drink it requires for its sustenance and motion. It receives colloidal food for its muscles; combustible food for its motion; water for the solution of its various parts; salts for constructive and other physical purposes. They have all to be arranged in the body, and they are arranged by means of the membraneous envelopes. Through these membranes nothing can pass that is not for the time in a state of aqueous solution like water or soluble salts. Water passes freely through them, salts pass freely through them, but the constructive matter of the active parts that is colloidal does not pass; it is retained in them until it is chemically decomposed into the soluble type of matter. When we take for our food a portion of animal flesh, it is first resolved in digestion into a soluble fluid before it can be absorbed; in the blood it is resolved into the fluid colloidal condition; in the solids it is laid down within the membranes into new structure, and when it has played its part it is digested again, if I may so say, into a crystalloidal soluble substance ready to be carried away and replaced by addition of new matter, then it is dialysed or passed through the membranes into the blood, and is disposed of in the excretions.

See then what an all-important part these membranous structures play in the animal life. Upon their integrity all the silent work of the building up of the body depends. If these membranes are rendered too porous, and let out the colloidal fluids of the blood—the albumen for example—the body so circumstanced dies; dies as if it were slowly bled to death. If, on the contrary, they become condensed or thickened, or loaded with foreign material, then they fail to allow the natural fluids to pass through them. They fail to dialyse, and the result is either an accumulation of the fluid in a closed cavity, or contraction of the substance enclosed within the membrane, or a dryness of membrane in surfaces that ought to be freely lubricated and kept apart. In old age we see the effects of modification of membrane naturally induced; we see the fixed joint, the shrunken and feeble muscle, the dimmed eye, the deaf ear, the enfeebled nervous function.

It may possibly seem to some of you at first sight that I am leading away from the subject of the secondary action of alcohol. Not so. I am leading directly to it. Upon all these membranous structures alcohol exerts a direct perverting power of action. It produces in them a thickening, a shrinking, and an inactivity that reduces their functional power. That they may work rapidly and equally they require to be at all times charged with water to saturation. If into contact with them any agent is brought that deprives them of water, then is their work interfered with; they cease to separate the saline constituents properly, and if the evil that is thus started be allowed to continue, they contract upon their contained matter in whatever organ it may be situated, and condense it.

In brief, under the prolonged influence of alcohol those changes which take place from it in the blood corpuscles, and which have already been described, extend to the other organic parts, involving them in structural deteriorations, which are always dangerous, and are often ultimately fatal.

Preliminary Effects on Vital Functions.

I remarked in my last lecture that the slow or chronic effect of alcoholic drink upon the body was to induce a series of stages analogous in all respects, except in period of duration, to the process of acute poisoning by the same agent. In the first prolonged stage there occur phenomena of disease which are as characteristic of the agency when it is known as they are deceptive when the agency is not known.

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

The ultimate changes that follow the use of alcohol by those who indulge in it, in what is too often considered a temperate degree, are actual local changes within one or other of the vital organs. But before such actual deterioration obtains there are usually other phenomena transitory in character yet unequivocal. I pointed out certain of these in the last lecture, but I did not specify them all.

In addition to that irritation of mind and suffering "of wounds without cause," to which I then drew attention, an extreme emotional derangement is often produced. The afflicted man—and I fear I must say woman also, for women are sometimes afflicted—the afflicted man under this primary prolonged influence of alcohol becomes nervous and excitable, ready at any moment to cry or to laugh, without valid reasons for either act. The emotional centres are alternately raised and depressed in function by the poison, but after a time the depression overcomes the exhilaration, and the impulse is to a maudlin sentimentality extending even to tears. The slightest anxieties are then exaggerated, and there is experienced at the same time an indecision and deficiency of self-confidence which is doubly perplexing. When an act is done, when a letter, for instance, or other piece of business has been finished and despatched, an uneasy feeling of distrust is felt that perhaps some mistake has been made, which distrust passes rapidly into a sentiment that the thing cannot be helped; it is bad luck, but it must take its chance. In various other directions this distrust shows itself, and the worst of all is, that the very doubt prompts the desire for another application for relief to the evil that is the cause of the burthen. A small dram more of the stimulant, not an overpowering draught that will cause quick and sure insensibility, but just a mouthful, that is the remedy, and that is the certain promoter of the sorrow.

We know now, as surely as if we could see within the body, what is the condition of the organs of the person afflicted in the manner thus defined. We are conscious that the vessels of the brain, of the lungs, of the liver, of the kidneys, of the stomach are paralysed, and are injected to full distention with blood. Some of these parts have actually been seen under this state, and the fact of the red injected condition directly demonstrated.

Alcoholic Dyspepsia.

Of all the systems of organs that suffer under this sustained excitement and paralysis, two are injured most determinately, viz., the digestive and the nervous. The stomach, unable to produce in proper quantity the natural digestive fluid, and also unable to absorb the food which it may imperfectly digest, is in constant anxiety and irritation. It is oppressed with the sense of nausea; it is oppressed with the sense of emptiness and prostration; it is oppresed with a sense of distension; it is oppressed with a loathing for food; and it is teased with a craving for more drink. Thus there is engendered a permanent disorder which, for politeness' sake, is called dyspepsia, and for which different remedies are often sought but never found. Antibilious pills—whatever they may mean—Seidlitz powders, effervescing waters, and all that pharmacopœia of aids to further indigestion, in which the afflicted who nurse their own diseases so liberally and innocently indulge, are tried in vain. I do not strain a syllable when I state that the worst forms of confirmed indigestion originate in the practice that is here explained. By this practice all the functions are vitiated, the skin at one moment is flushed and perspiring, at the next is pale, cold, and clammy, and every other secreting structure is equally discomposed.

Nervous Derangements.

The nervous structures follow the stomach in the order of derangement, or, it may be, precede it. We have not yet traced out with sufficient care the conditions of the centres of the organic chain of nerves, but we know that they are reduced in power; and, in regard to those higher and reasoning centres, the brain and its subsidiary parts, the spinal cord and voluntary nerves, we are aware that they are supplied with blood through vessels weakened, and in a condition either of undue tension or undue relaxation. Moreover, the delicate membranes which envelop and immediately surround the nervous cords are acted upon more readily by the alcohol than the coarser membranous textures of other parts, and thus a combined arrangement of evils affects the nervous matter. The perverted condition of the nervous centres gives rise to many striking phenomena, extending from them to the nervous cords and to the organs of sense. The irregular supply of blood to the retina causes temporary disturbances of vision, with appearances before the eyes of those specks and small rounded semi-transparent discs, which are called by the learned *muscæ volitantes*. From the imperfect tension of the arteries, the blood which rushes through causes dilatation of them, and in the bony canals of the skull an impingement is made upon the bony structure. Vibrations which extend to the neighbouring organs of hearing are thus produced, giving rise to sounds of a murmuring, ringing, or humming character, according to the modification of the arterial tension.

The perverted condition of the membranous covering of the nerves gives rise to pressure within the sheath of the nerve, and to pain as a consequence. To the pain thus excited the term neuralgia is commonly applied, or tic; or if the large nerve running down the thigh be the seat of pain, "sciatica." Sometimes this pain is developed as a toothache. It is pain in nearly every instance, commencing at some point where a nerve is enclosed in a bony cavity, or where pressure is easily excited, as at the lower jaw bone, near the centre of the chin, or at the opening in front of the lower part of the ear, or at the opening over the eye-ball in the frontal bone.

(*To be continued.*)

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Pharmacy Act (Ireland) Bill.

The second reading of this Bill has been postponed until Monday next, the 14th inst.

On Monday, June 7, Dr. Lyon Playfair gave notice that on Monday, June 14, he would ask the Chief Secretary for Ireland the following questions:—(1) How many Licentiates are there of the Apothecaries' Hall in Ireland who restrict themselves to pharmacy; that is, who do not at the same time practise medicine or surgery? (2) And is there any other class of chemists and druggists in Ireland who can legally dispense medicines according to prescriptions?

The following petitions against the Bill have been presented since Thursday, the 3rd inst.:—

From the Pharmaceutical Society of Great Britain.

Aylesbury	Mr. Nathaniel M. de Rothschild.
Bath	Major Nathaniel G. B. Bousfield.
Birkenhead	Mr. David MacIver.
Birmingham	Right Honourable John Bright.
Blackburn	Mr. William Edward Briggs.
Bolton	„ John Hick.
Bridgnorth	„ William Henry Forster.
Brighton	„ James Lloyd Ashbury.
Cardigan	„ Thomas Edward Lloyd.
Carlisle	Sir Wilfred Lawson.
Carmarthen	Mr. Charles William Nevill.
Chichester	Lord Henry G. C. G. Lennox.
Cirencester	Mr. Allen Alexander Bathurst.
Darlington	„ Edmund Backhouse.
Evesham	Colonel James Bourne.
Exeter	Mr. Arthur Mills.
Eye	Viscount Barrington.
Glasgow	Mr. George Anderson.
Great Grimsby	„ John Chapman.

Hanley ....Mr. Robert Heath.
Hitchin .... „ Abel Smith.
Huntingdon ....Sir John Burgess Karslake.
Launceston ....Mr. James Henry Deakin, jun.
Leeds.................... „ W. St. James Wheelhouse.
Leith .... „ Donald R. Macgregor.
London ....Alderman Sir James C. Lawrence.
Maldon ....Mr. George M. W. Sandford.
Newport (Mon.) ... „ Thomas Cordes.
Nottingham .... „ Bernhard Samuelson.
Sheerness .... „ Edward Leigh Pemberton.
Sheffield .... „ Anthony John Mundella.
Stirling .... „ H. Campbell Bannerman.
Stroud .... „ Alfred John Stanton.
Truro....................Lt.-Col. Sir J. M. Hogg, K.C B.
Ulverston ....Captain the Hon. F. A. Stanley.

Petitions were also presented from the following places:—

Aberystwith.	Eastbourne.
Bradford.	Torquay.
Coventry.	Ursham.
Dorchester.	

The Sale of Food and Drugs Bill.

This Bill was read a second time in the House of Lords on Monday last. In moving the second reading the Duke of Richmond said the Bill had been introduced into the House of Commons in consequence of the failure of previous legislation on the subject, and was based on the report of a Select Committee. That Committee had reported that considerable hardship had resulted to retailers in consequence of their having been punished for adulteration over which they had had no control. It recommended that the defendant in proceedings for selling adulterated articles should be allowed to give evidence, and the Bill gave effect to that important recommendation. The Bill made it an offence to mix any injurious foreign substance or liquid with any article sold as food or a drug. For the first offence a penalty of 50*l.* might be imposed, and for a second six months' imprisonment. The adulteration must be injurious in order to subject the defendant to such consequences. The mixing with an article of any foreign article merely for the purpose of rendering it more palatable or portable was not to be an offence, provided the person selling it labelled the adulteration on the article to be sold. Under the existing law there was no penalty for abstraction from the ingredients of which an article was composed. Thus it was no offence to abstract the cream from milk or to abstract essential oils. The Bill dealt with abstractions as well as with additions. It contained provision that the seller of the adulterated article might plead in court that it had been warranted to him as genuine, and it gave him power to proceed against the wholesale dealer. As regarded analysts, it enabled small districts to combine together so as to employ an analyst to act for them jointly. It provided that no one engaged in retail trade should be appointed an analyst, and it provided that when proceedings were about to be instituted, one portion of the article should be left with the intended defendant, that another should be given to the prosecutor, and that a third should be handed to the analyst. Both the defendant and his wife might give evidence ; and if the skill of the local analyst were called in question there might be a reference to Somerset House for the purpose of further analysis.

In the discussion which followed—

The Earl of Morley ventured to think that the Act of 1872 had proved of considerable benefit to the community. At the same time, he agreed with the Select Committee that it was desirable to protect retail dealers from vexatious prosecutions and from any possible unfairness in respect of analysis and in respect of proceedings which might follow the making of the analysis. There were certain expressions in clauses of this Bill which would require careful consideration in committee. He thought the word "knowingly" would cause great difficulty in the working of the Bill, and that the words "prejudice of the purchaser" would also cause embarrassment. The proposal to enable districts to join together for the appointment of an analyst he regarded as a very desirable one.

Lord Redesdale suggested that in Clause 7 it would be well to introduce words requiring the seller to state what it was the article was mixed with, and what was the percentage of the foreign ingredient.

The Sale of Mixed Cocoas.

In the Court of Common Pleas on Monday, the 7th inst., a case came before Mr. Justice Brett and Mr. Justice Denman, which had been stated by the Justices for the division of Spalding, Lincolnshire, for the opinion of the Court upon the Adulteration of Food, etc., Act, 35 and 36 Vict. c. 74, sections 2 and 3.

The appellant, who was a grocer at Spalding, upon being asked for a quarter of a pound of cocoa, delivered to the respondent an ordinary packet of Epps's cocoa, without making any verbal statement as to its contents. Upon the face of the packet were the words "prepared cocoa, for ingredients see the other side," and upon the back, "cocoa contains a bland oil which is pre-eminent as a vitalizing substance; to render the oil soluble and easy of digestion, it needs to be combined with just so much loaf sugar and West India arrowroot as will effect its perfect incorporation. In the preparation of the cocoa contained in this packet we guarantee that no other ingredients than those mentioned are used." The respondent, who bought the cocoa for the purpose, then had it analysed, and it was certified to contain "40 per cent. of cocoa, 44 per cent. of sugar, and 16 per cent. of starch." The information, under section 2 of the Act, charged the respondent with having sold as unadulterated cocoa, cocoa that was adulterated. The Justices convicted the defendant and fined him 40*s.*, and stated this case for the opinion of the Court upon the validity of such conviction.

The Court quashed the conviction, holding that, assuming the cocoa could be properly said to be "adulterated cocoa," still it had not been sold as unadulterated. The mere handing of the packet did not constitute a complete sale, passing the property into the purchaser. It was open to him if it did not correspond with what he had asked for to reject it. And here there was a printed statement which immediately brought to the notice of the purchaser the fact that the article was a preparation of cocoa and the ingredients of which it was composed. Therefore, whether it was true or not, as had been stated, that the mixture of some such ingredients was necessary to make pure cocoa edible, this cocoa could not be said to have been sold as unadulterated.

Death Through an Overdose of Epsom Salts.

On Wednesday, May 26, an inquest was held at Rainham, by Mr. T. Hills, touching the death of Sarah Ann Daniel, aged 27 years, who resided at Station Lane, Rainham. It appeared from the evidence of the mother of the deceased, that early on Tuesday morning she complained of feeling very ill and being numbed all over. She said she had taken two packets of salts, as she had the headache. A doctor was sent for, but before medical aid could be obtained she expired. Deceased told her mother that she bought the salts of a person named Jacobs. Dr. Penfold said he procured two samples of salts, containing one ounce in each packet, at the shop of Mrs. Jacobs ; he examined them, and found them to be simply Epsom salts ; they came out of the same box as those supplied to Mrs. Daniel. He made a *post-mortem* examination which proved that the stomach was filled with a solution of Epsom salts ; the brain was healthy, and from examination of the organs, he pronounced the death of the young woman to have been from syncope, owing to strong doses of an aperient medicine, viz., Epsom salts, having been taken. The jury immediately returned a verdict in accordance with the medical testimony.—*Rochester and Chatham Journal.*

Poisoning by a Vermin Killer.

On Friday, May 28th, Mr. Moore, coroner, held an inquest at Warwick respecting the death of Louisa Popple, aged 17, who had committed suicide by taking poison. After evidence had been given as to the circumstances attending the death, and a statement of the deceased as to the purchase of the poison—

Mr. Charles Williams, chemist and druggist, Warwick, said the deceased, whose mother he knew also, had on several occasions been a customer at his shop. On the afternoon of Tuesday, the 25th May, between three and four o'clock, deceased came to the shop and asked for a packet of mice-poison, telling witness it was for her mother, who wanted to poison some mice. He supplied deceased with a threepenny packet of Battle's Vermin Killer. He was not supposed to know what were the contents of the packet, which was sold to him; but he told deceased to caution her mother that the packet contained poison. There was also a printed caution on the inside of the packet. Deceased had not, to his knowledge, ever asked for packets of this nature before.

The superintendent of the police said he could not obtain the vermin killer at other chemists' shops without bringing a witness or signing a book, but Mr. Williams said it was not obligatory to do either. He was aware that some chemists had adopted the practice. Every tradesman who sold the "killer" was obliged, however, to put his name on the packets.

Medical evidence was given that death had been caused by strychnine and the jury returned a verdict that deceased had poisoned herself whilst in an unsound state of mind.—*Leamington Advertiser.*

Poisoning by Laudanum.

On Friday, May 28th, at Leamington, an adjourned inquiry was held by Mr. W. S. Poole, coroner, into the circumstances connected with the death of George Townsend, aged 21, who had been found in bed at his lodgings in a comatose state and died two hours afterwards. A labelled bottle which had contained laudanum was found near him, and some letters which showed that he had an intention to commit suicide at the time of writing them.

Mr. Thomas Loveitt, chemist and druggist, of Coventry, identified the empty bottle found in the deceased's bedroom as one in which he had supplied two ounces of laudanum to a young man, apparently about 21 years of age, who, in answer to a question, said that he was suffering from nervousness, and had been ordered by his doctor to take from five to ten drops, in order to procure sleep. He told the young man to be sure not to take more than ten drops, as that was equal to half a grain of solid opium, and cautioned him that he might become addicted to the habit of taking laudanum. The man did not appear at all depressed, but was very chatty, and was in the shop from five to ten minutes.

The Coroner: This bottle would be nearly full. That would be quite sufficient to poison a man?

Mr. Loveitt said it would be quite sufficient to poison a great many men. He told the man that ten drops were quite enough for him, and he replied, "You are very particular," to which witness rejoined that he was obliged to be in such cases. When told that it would be 6*d.* an ounce, he said he had paid 8*d.* before.

The foreman observed that caution ought to be exercised in selling poison.

Mr. Loveitt said he should not sell laudanum to any person where his suspicions were in any way aroused, but the young man in the present instance seemed perfectly collected, and obtained it by making a false representation—that he had been ordered by his doctor to take it for sleeplessness.

The Coroner said it was quite impossible to prevent persons obtaining poison by Act of Parliament, and laudanum was not one of those included in the schedule of the Pharmacy Act, where it was necessary that the purchasor should be known to the vendor, or be introduced by a mutual friend, and had to sign a book.

The foreman having asked Mr. S. U. Jones, pharmaceutical chemist of Leamington, and local secretary of the Pharmaceutical Society, who happened to be in the room where the inquiry was being held, whether he would sell laudanum to a stranger?

Mr. Jones said it would depend upon circumstances, that laudanum was frequently used in large quantities externally as an anodyne, and if a person were to come to him and state that his medical man had directed it to be used in that way, he should have no hesitation in supplying two ounces, as half an ounce was frequently used for one application. He explained also that laudanum was not one of the poisons in the first schedule of the Pharmacy Act, 1868, so that it was not necessary for the purchaser to bring a witness or sign a book.

Mr. J. Fenn Clark said that, since the previous inquiry, he had analysed the contents of the stomach of the deceased; and every test, one alone excepted, indicated the presence of opium.

The jury returned a verdict that the deceased committed suicide by taking laudanum, but that there was no satisfactory evidence as to the state of his mind when he did so.—*Leamington Advertiser.*

Review.

A Handbook of Hygiene. By George Wilson, M.A., M.D. Second edition: carefully revised. London: J. and A. Churchill. 1873.

Manual for Medical Officers of Health. By Edward Smith, M.D., LL.B., F.R.S. London: Knight and Co. 1873.

A Manual of Public Health. By W. H. Michael, F.C.S., Barrister-at-Law, W. H. Corfield, M.A., M.D., Oxon, and J. A. Wanklyn, M.R.C.S. Edited by Ernest Hart. London: Smith, Elder and Co. 1874.

Manual of Public Health for Ireland. By T. W. Grimshaw, M.A, M.D., J. Emerson Reynolds, F.C.S., Robert O'B. Furlong, M.A., Barrister-at-Law, and J. W. Moore, M.D. Dublin: Fannin and Co. 1875.

A Manual of Hygiene, Public and Private, and Compendium of Sanitary Laws. By C. A. Cameron, Ph.D., M.D., etc. With 35 illustrations. Dublin: Hodges, Foster and Co. London: Baillière and Co. 1874.

Public hygiene or preventive medicine is now a recognized branch of professional study. It is not a new science, but a new method of using carefully ascertained facts which bear upon the health of the masses, and the application of which is rendered practicable only by legislative enactment.

The prevention of disease is essentially the function of the physician who is conversant with the causes which produce it; but although the study of prophylactic measures against the ingress and aggravation of disease has, from time immemorial, been included in the regular medical curriculum, it has never been regarded as being of more importance than a subsidiary matter in the ordinary schemes of curative treatment.

The medical practitioner is daily consulted as to what will avert the complaints which his patients conceive to be impending, or have reasonable fears will be their lot to inherit by entail; and he as frequently ventures to advise with the view of checking some weak indulgence which may be a folly of fashion, or of strenuously putting down some growing passion which may eventually attain to the magnitude of unconquerable vice. But beyond offering his advice, which is often as ineffective as it is gratuitous, the physician has neither the means nor the right to interfere with the liberty of action of his patients. "In all such cases," as Mr. J. S. Mill truly observes, "there should be perfect freedom, legal and social, to do the action and stand the consequences." Imprudence, therefore, in the management of personal affairs is not a subject for legislation. But the case is entirely altered when the conduct of one becomes hurtful to another. The omission or commission of some act on the part of one individual, either from motives of personal interest, or from sheer ignorance, may involve the well-being of the whole community. Under these circumstances it becomes necessary for authority to step in and correct the action of misguided liberty.

A man blunted in his perceptions may fail to appreciate the æsthetics of filth and putrefaction, and so create not only a simple nuisance, but an active source of disease to his luckless neighbours, without perhaps being aware that he has committed any great evil. Or a butcher may endeavour to make the best of a bad bargain by inducing the poor and ignorant to buy tainted meat at a very cheap price. All such palpable nuisances, which are readily recognized by the most ordinary experience as the causes of disease, it is the duty of inspectors of nuisances to detect and remove, under the orders of the district sanitary authority.

But there are a host of subtle and insidious causes of disease arising from climate, physical geography and general topographical conditions, which require the most careful investigation of a special and technical kind for their detection and removal; and those who devote themselves to the study of public hygiene stand in need of a far more extended knowledge of science than a mere physician or surgeon who occupies himself solely with the curative treatment of disease.

Sanitary science embraces a very wide range of subjects; and health officers can only be efficient and competent for their work when they combine in themselves the knowledge—more or less profound—of the physicist, the chemist, the geologist, and the statistician, besides that of the practical physician.

It would be preposterous, therefore, to expect that a manual of three or four hundred pages should comprise an exhaustive treatment of these several branches of knowledge. It is just as absurd as it would be to expect that a manual of the practice of medicine should comprise a complete course of anatomy and botany, chemistry and physiology, therapeutics and pathology. But as the 'Medical Manual' argues the previous knowledge of these subjects, and is intended only as a guide to clinical study and medical practice, so the manuals on hygiene take for granted a certain amount of practical knowledge of the sciences, and a certain degree of dexterity in the use of the microscope, and of skill in chemical manipulation.

The demand for books on hygiene is of a threefold nature: (1) by the student, for an accurate hand-book on the elements of sanitation; (2) by the busy health officer for a trustworthy manual of reference; and (3) by the public analyst for a manual of the simplest and most reliable methods for conducting special operations. It would be too much to expect that any one book should fully satisfy this threefold demand. But it is not too much to hope that each description of inquirer will have all he can possibly need from the hands of those most competent to supply it.

Microscopy and analytical chemistry cannot, however, be learnt from books, but only in the laboratory; and the public analyst must already be something of a manipulator before he can honestly enter upon the duties of his office, or even avail himself of the particular methods described in works on hygiene for detecting adulterations or impurities in food, water, milk, etc.

On detection of a fraudulent adulteration, as certified to by the public analyst, the adulterator becomes liable to a fine; and as the analyst's report is received without question as evidence in court, the conviction and punishment of the accused will be just or unjust, according to the technical skill or bungling ignorance of the analyst.

We mention this in order to prevent any disappointment to those who aspire to become health officers and public analysts, and who fancy that the mere reading of a manual will sufficiently qualify them to meet all cases that might arise in the performance of their responsible duties.

Wilson's 'Handbook'—the first mentioned in the list at the head of this article—from its systematic arrangement and general scientific accuracy is eminently suited to the requirements of senior medical students and junior practitioners. The opening chapter is a condensed summary of judiciously selected facts of great importance on hereditary influence, the causes of deterioration and preventible disease, and serves as a proper introduction to the subjects which immediately follow. In chapter 2 is briefly considered the functions and constituents, nutritive values, and examination of different articles of food, together with the effects of insufficient or unwholesome food on public health. Chapters 3, 4, and 5 are devoted to air, its impurities, and their effects on public health; to the methods employed for its chemical and microscopic examination, and to ventilation. Chapters 6 and 7 treat of water, as to its supply, chemical examination and purification. Chapters 8 and 9 of dwellings and hospitals. Chapters 10, 11, and 12 of the removal, purification, and utilization of sewage. Chapter 13 treats of preventive measures and disinfection; and chapter 14 of the duties of medical officers of health. This, we repeat, is *the* text-book on hygiene for students.

The 'Manual for Health Officers,' by the late Dr. Edward Smith, consists for the most part of extracts from the various public Acts bearing upon sanitation, and may, on this account, be found to be useful. There are fifty-three tables of curious, valuable, and interesting statistics spread through the volume. But the scientific portion of this manual, or what professes to be such is not altogether very accurate or trustworthy.

The 'Manual of Public Health,' edited by Mr. Ernest Hart, is a more practical work, and intended for the use of local authorities as well as medical officers of health. It is divided into three separate parts,—legal, medical, and chemical,—written by three gentlemen severally experienced in each of the branches of knowledge involved. In the first part, Mr. Michael (barrister-at-law) points out the nature and extent of the powers conferred, and the responsibility imposed upon the various authorities and officers immediately concerned with the working and carrying out of the provisions of the Sanitary Acts. Annexed to this part are three indices, one to the statutes pertaining to public health, the second to the powers, and the third to penalties under the Acts; all of which are conveniently arranged for reference.

The second or medical part is in seven chapters which deal with questions more or less immediately connected with the functions of the health officer. It is more in the form of a commentary on the Sanitary Laws, interspersed with practical advice, and is written by Dr. Corfield, Professor of Hygiene in University College. The third and last part, written by Mr. Wanklyn, describes the methods and processes for the chemical examination of water, air, milk, wine, etc., with a few concluding sensible remarks on disinfection. The execution of this part is satisfactory, as might reasonably be expected from the author. We venture to suggest to the able and accomplished editor of this manual, that an index to the whole work would be a decided improvement in the second edition, and considerably enhance its usefulness.

The book that stands next for notice is the 'Manual of

Public Health for Ireland,' the conjoint work of two physicians,—who are also diplomates in state medicine of Trinity College, Dublin,—a barrister, and a chemist (Professor Emerson Reynolds).

Irish dispensary medical officers are appointed *ex officio* sanitary officers by section 10 of "The Public Health (Ireland) Act, 1874," and suddenly find themselves entrusted with the performance of duties which are both responsible and novel. The compilation of this manual was undertaken to meet their requirements, and we have no hesitation in pronouncing it a successful achievement. It will be referred to both as an educator and a guide in matters with which it deals, by those for whom it is especially intended. It is accurate and explanatory as far as it goes, and both health officer and medical student will find in it much useful information about statistics and meteorology, which they would seek for in vain in most manuals on hygiene.

Dr. Cameron's manual, the last in our list, is by far the most comprehensive work on hygiene which we have examined. It is professedly intended for the purposes of the Irish health officer, but it will be consulted by all earnest inquirers who desire a fuller account of the facts and discoveries which have contributed towards the establishment of the science of sanitation. The author seems to have spared no labour to render the book a thoroughly trustworthy manual of reference; and the industry with which he has collected his data, and the judgment and ability which he has exercised in the selection of the most readily available scientific methods, are conspicuous in almost every page of it. Dr. Cameron's 'Manual of Hygiene' will be found useful to both professional and non-professional readers, to the student as well as to the expert.

BOOKS, PAMPHLETS, ETC., RECEIVED.

ON DEFECTIVE HEARING: Its Curable Forms and Rational Treatment. By CHARLES KEENE, F.R.C.S., etc. Second Edition. London: Hardwicke. 1875.

THE POCKET DOCTOR FOR THE TRAVELLER AND COLONIST. By HARRY LEACH, M.R.C.P., etc. London: S. W. Silver and Co. 1875.

HOW TO TEACH CHEMISTRY: Hints to Science Teachers and Students. Being the Substance of Six Lectures delivered at the Royal College of Chemistry in June, 1872, by EDWARD FRANKLAND, D.C.L., F.R.S., etc. Summarized and Edited by GEORGE CHALONER, F.C.S. London: J. and A. Churchill. 1875. From the Publishers.

Obituary.

Notice has been received of the death of the following:—

On the 10th March, 1875, Mr. Thomas Davys Manning, Pharmaceutical Chemist, of Yeovil, aged 78. Mr. Manning had been a Member of the Pharmaceutical Society since 1869.

On the 9th May, 1875, Mr. John Hogan Barnes, Chemist and Druggist of Liverpool, aged 40.

On the 16th May, 1875, Mr. William Cameron, Pharmaceutical Chemist, of Kelso, aged 43. Mr. Cameron had been a Member of the Pharmaceutical Society, since 1865.

On the 26th May, 1875, Mr. John Wyman, Pharmaceutical Chemist, of Fore Street, London, aged 66. Mr. Wyman had been a Member of the Pharmaceutical Society since 1842.

On the 28th May, 1875, Mr. Ralph Caldwell Crafton, Pharmaceutical Chemist, of Croydon, aged 79. Mr. Crafton had been a Member of the Pharmaceutical Society since 1841.

On the 30th May, 1875, Mr. James Jackson, Chemist and Druggist, of Heywood, Lancashire, aged 46.

On the 2nd June, 1875, Mr. Frederick Curtis, Pharmaceutical Chemist, of Baker Street, London. Mr. Curtis had been a Member of the Pharmaceutical Society since 1853.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE INTERNATIONAL MEDICAL CONGRESS.

Sir,—In September of this year an International Medical Congress will take place in Brussels, the programme of which has already been published, and was referred to in the *Pharmaceutical Journal* last week. Medical congresses, as a rule, possess little to interest pharmacists, but the one before us is in this respect somewhat exceptional, and appears to me to merit a further notice in a Journal devoted to pharmacy. The subject matter of the 8th section is "Pharmacology," and the first question for discussion—"Faut-il étendre l'emploi médical des principes immédiats chimiquement définis et en multiplier les préparations dans les pharmacopées.' Rapporteur, M. Van Bastelaer, membre de la Commission Médicale du Hainault, pharmacien à Charleroi." The fact that a subject for discussion at a medical congress should be referred to a pharmacien is something new to British pharmacists, and deserves recognition. The future may be casting its shadows forward, and the sentiment uttered by one of the medical profession at our annual dinner may be nearer its realization than we imagine, "and as sure as the suns progress, your ultimate destiny is to form a living, integral, harmonious part of this great profession which exists only to bring forward the time which its own poet foretold in his inimitable lines—

"Ultima Cumæi venit jam carminis ætas,
Magnus, ab integro sæclorum nascitur ordo."

Surely this might be taken as an indication that "there's a good time coming," but in Great Britain I fear that we must "wait a little longer."

THOMAS GREENISH.

THE SALE OF VERMIN KILLERS.

Sir,—In the "Parliamentary and Law Proceedings" section of the Journal for May 29th and June 5th I see no notice taken of a coroner's inquest held on the body of a young girl who committed suicide, near Warwick, by taking Battle's Vermin Killer, supplied to her by a chemist in Warwick, who appeared as a witness at the inquest. How is it that a highly respectable firm in Wolverhampton was convicted and fined (together with expenses) £3 1s. only a few weeks ago, and this chemist is allowed to sell such deadly poison without conforming to the law on the sale of poisons? The difference between the two firms seems to be that one neglected to get the purchaser's address, whilst the other neither put name, address, nor purpose in the registration book. If it be true as stated by the seller at the inquest, that "we are not supposed to know what is contained in Battle's Vermin Killer" (I speak from the report in the *Chronicle* and *Advertiser*) and this is admitted to be sufficient guarantee that we may sell that deadly poison without taking any notice of the Sale of Poisons Act, then I think it becomes Mr. Cross's duty to reimburse Messrs. Reade and Co., of Wolverhampton, of the money mulct in fine and expenses. I should like your opinion on the matter in next issue.

A. P. S.

[*** Our correspondent will find a report of the case at p. 1001. Prior to the receipt of his letter no report had reached us. With respect to the question asked, we are unable to explain why there has been no prosecution in a case where there has been an evident infringement of the Act. The presence of strychnine in the preparation referred to is, we think, too notorious to admit of being ignored with safety.—ED. PH. J.]

THE DRUGGING OF ANIMALS BILL.

Sir,—Whether or not Sir J. Astley's "Drugging of Animals Bill" be more stringent than necessary, it is highly requisite that some restriction should be put upon the sale of nitrous acid, muriate of antimony, sulphate of iron, etc., to those agricultural servants who look after their masters' horses, and who have now no difficulty in getting six or eight ounces of any of the articles in Part 2 as published in the Journal. These drugs are obtained sometimes under the plea that they are wanted for "foot rot," but in reality are got to give to their horses for the purpose of "fining their coats," or as a "tonic," without their even knowing the powerful effect which these articles must exercise on the stomach. Many a farmer has been astonished at the mysterious way in which his draught horses have died. At one time waggoners were all anxious for "arsenic," but since the difficulty of obtaining it, the run has been upon the drugs enumerated in Part 2 of Sir J. Astley's Bill. For my part, I should like to see a greater check set upon obtaining these mineral acids and metallic salts. Depend upon it if some of these waggoners have to sign their names for what they purchase, there would be some hesitation, and consequently less likelihood of valuable horses "wasting away."

FROM AN AGRICULTURAL COUNTY.

PHARMACEUTICAL TITLES.

Sir,—Mr. G. L. Huett in the last *Pharmaceutical Journal* asks what is the contraction for pharmaceutical chemist. I suppose he means to ask what letters he can put after his name to show that he has attained to the position of pharmaceutical chemist. I should think Ph.C. would answer his purpose very well, certainly not P.C., as that may mean not only "Privy Councillor," but also in some districts "Police Constable," with neither of which, I suppose he would wish to be confounded; the best letters would be F.P.S., were there such a title as "Fellow of the Pharmaceutical Society." Until there is I should advise him, if he wishes, to write a paper for the Pharmaceutical Conference, or publish a book, to obtain a fellowship in some society,—as the Linneau or Chemical, both open to chemists of talent and scientific attainments,—or obtain the University degree of Sc.B. or Sc.D., both I think granted by the London University. Until the Pharmaceutical Society elect fellows I conceive their examinations will not gain a position entitling a man to put letters after his name.

WILLIAM PENNEY.

High Street, Poole, June 7, 1875.

Sir,—Your last issue contains an inquiry as to the best mode of indicating to the public by the use of certain letters at the end of a man's name that he is a pharmaceutical chemist. The public really do not care about or understand the difference between a pharmaceutical chemist and a member of the Pharmaceutical Society. The latter may as legitimately use the letters "M.P.S." as the former "P.C.;" the use of the three letters giving an appearance of quite as much if not more importance than the use of the two. But will the use of either add to the importance of the person using them in the eyes of any except himself? I trow not. The desire of many persons to swell themselves out by adding a tail to their names makes them look truly ridiculous. If a pharmaceutical chemist may proclaim his trade by adding P.C. to his name, why may not a linen and woollen draper add to his, L.W.D.? There are extant at present such a multitude of new fangled titles of this kind that one is sorely puzzled to interpret them; just as were the inhabitants of a little market-town in which a quack doctor took up his residence, and who had his cards printed "Jno. C. Blank, Esq., S.S.B.K." By the aid of these mystic letters he passed for a wonderfully clever man, until in a fit of candour he admitted to a friend over a glass of wine that all that was meant was that his house had stone steps and a brass knocker. I know the following to be a fact:—A gingerbeer maker went down to a watering place and took lodgings. Great was the astonishment of his landlady on receiving his letters to find them addressed to John Smith, Esq., M.P. On her expressing to him the pleasure she felt in entertaining a member of Parliament, he candidly assured her that he was not one, but was simply a "Maker of Pop."

These remarks are not intended to condemn the legitimate use of titles indicating that the user is a fellow of one of the well-known learned or scientific societies recognized as such by the general public.

AN OLD CHEMIST AND DRUGGIST.

A MODE OF MAKING SUPPOSITORIES, PESSARIES, ETC.

Sir,—While the above subject is on the carpet perhaps I may be allowed to write a few words upon a method of making those troublesome articles which often take up so much time and patience, and then do not turn out as well as expected.

As I have had some little experience in making suppositories and have tried various methods, including Mr. Ellis's, and the proposed improvement upon his by the use of waxed paper, I think I may venture to lay before your readers a very simple and cleanly plan which I now always adopt.

Take a piece of ordinary firewood and cut one end of it into the usual shape of a suppository, which figure can, of course, be modified according to the size required. Next cut pieces of tin foil about two inches square, and taking hold of one corner fold it over the mould, then with the fleshy part of thumb and forefinger gently smooth the foil round the mould and with a sharp knife run round the top, then insert the mould with the foil on it in the neck of a small phial, and on giving the wooden handle a slight twist and gentle pull the tin-foil mould will be left in the neck ready to receive the mass in the condition which is generally used for metal moulds.

The advantages which this method has will be apparent to all, viz.:—

(1) Cleanliness. The superiority of sticking the moulds into damp sand, whereby very often the sand becomes part of the suppository, and thus instead of having its ordinary effect, the medicine becomes converted into an irritant.

(2) Expeditiousness. The mould may be made in about half the time required by the ordinary methods, for there is no time wasted by taking the mould of the matrix and trimming with scissors, etc., as one cut round with a penknife directly the foil is folded will suffice.

Then again there is no water required to damp the moulds as they will not adhere to the suppository, but can be easily detached when cold.

I do not claim that this method is by any means perfection, but I myself have proved it much superior to any other I have heard of, and perhaps if anyone who has a few suppositories to make were to try it they would be pleased with it. It is not offered without having been tested, as I have made as many as perhaps fifty dozen by the method.

AN APPRENTICE.

Sacerdos.—You will find formulæ for tincture and wine of boldo on p. 406 of the present volume.

Erratum.—On p. 984, col. i., line 10 from bottom, *for* "Tinct. Sulph.," *read* "Zinci Sulph."

"*Deus.*"—We know of no law regulating the practice of drawing teeth either "on or off the premises."

"*A Student.*"—You may find the information in any elementary work on chemistry.

G. Watt.—(1) *Lotus vulgaris.* (2) *Lepigonum rubrum.* (3) *Geum urbanum.* (4) *Vicia sepium.* (5) *Silene inflatum.* (6) *Alliaria officinalis.* (7) *Potentilla tormentilla.* (8) *Lathyrus macrorrhizus.*

G. C. Druce.—(A) *Arrhenatherum avenaceum.* (A 2) Yes; *Aira flexuosa. C. divulsa.* Yes; *L. multiflora congesta.* (4) *Poa trivialis. Polygala depressa.* The *Crepis* is probably *C. taraxacifolia*, but send a specimen in fruit.

"*Inquirer.*"—The sections of the Pharmacy Act, 1868, relating to the Register of Chemists and Druggists apply to persons keeping "open shop for the retailing, dispensing, or compounding of poisons," and do not extend to or interfere with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing.

"*Botanist.*"—Bentall's botanical paper may be obtained from Mr. Van Voorst, Paternoster Row.

W. H.—There is much virtue in an "if." We do not believe that a public company can legally carry on the business of a chemist and druggist.

"*Preston.*"—Several articles have appeared in this Journal respecting the antiseptic properties of carbolic acid, salicylic acid, borax, and other substances.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Billings, Clapp and Co., Mr. Stokoe, Mr. Hime, Mr. Bell, Mr. Pollard.

INDIAN BARKS CONTRIBUTED TO THE MUSEUM.

BY JOHN ELIOT HOWARD, F.R.S., ETC.

Whilst recently engaged, at the request of the authorities of the Pharmaceutical Society, in revising the list of the barks of the genus Cinchona in the Museum at Bloomsbury Square, I noticed the absence of good and sufficient specimens of the barks now produced from the plantations in India.

This is especially to be regretted, since the collection does not represent the success which has so happily attended the great experiment of the cultivation of these plants, in the varied climates and greatly diversified circumstances into the midst of which they have been transplanted. As the importation of these barks from India is now becoming an important feature in commerce; and as they furnish an increasingly important material for the extraction of quinine and other alkaloids; I shall have pleasure in endeavouring to supply, to some extent at least, the above deficiency.

At present I confine myself to the bark of *C. officinalis*, as quite recently sent home from the Government plantations at Ootacamund (Madras Presidency). From these I have selected four specimens of varying aspect, the examination of which chemically has been carried out by my nephew, David Howard, F.C.S., to whose paper * I may also refer for highly important information, illustrated by additional specimens.

The barks were sent mingled together in one common importation. I will therefore distinguish them by the letters of the alphabet, since I view them all as varied forms of *C. officinalis*. I may premise, however, that (A) presents specially the characteristics of the sort called *crispa* at Ootacamund, but which appears to be wholly unlike the *crispa* of Tafalla, which I have figured in my 'Nueva Quinologia,' and which (as there observed) may be specially distinguished by its *hirsute* scrobicules. This kind —the *Quina fina de Loja*—is growing, I believe, in Ceylon, but not on the Indian continent. In 1869 I sent a typical specimen of it to Mr. Broughton, who replied—"The leaf you sent of *crispa* is markedly different from ours. Our *crispa* has a leathery leaf and strongly marked scrobicules; but it verges into other varieties, that only the more typical plants can be positively identified." I may add, that I sowed the seed from the capsules of a well marked botanical specimen (No. 6 at Kew, and with me) sent from Ootacamund, and obtained two trees—one of the variety *angustifolia* (No. 11),† which is very rich in quinine; the other still living, and a tall plant, of which the foliage sometimes verges towards the *angustifolia*, and sometimes is scarcely distinguishable from the normal *C. officinalis*. I quite agree with Mr. McIvor in his remarks‡ on the narrow leaved variety that it is "*only* a variety, and consequently will not come twice from seeds;" and with Mr. Broughton, who says,§ "The trees No. 11 are now in bud—one has already flowered and seeded, and when in flower did not appear to differ from the other *C. officinalis* blossoms;" and again,‖ "Some further experience quite supports your view that it (the *angustifolia*) is a crown bark. I can now trace all gradations into the Bonplandiana type."

It seems to me that the *crispa* of Ootacamund is only a form of the *C. officinalis*, and the *angustifolia* a scarcely to be distinguished form of the *crispa;* and as the *crispa* of Tafalla is quite another thing, I would suggest the discontinuance of the term *crispa* as being previously appropriated by Tafalla to another kind.

The results of the chemical examination were as follows:—

(A)	Quinine	4·70
	Cinchonidine	0·90
	Quinidine	0·30
	Cinchonine	0·50
	Total	6·40
(B)	Quinine	4·10
	Cinchonidine	1·30
	Quinidine	0·10
	Cinchonine	0·20
	Total	5·70
(C)	Quinine	3·20
	Cinchonidine	1·00
	Quinidine	trace
	Cinchonine	0·10
	Total	4·30

(D) Root bark of *C. officinalis*, which contains about 6 per cent. of mixed alkaloids, largely quinine.

In my examination of Pavon's collection of Peruvian barks in the British Museum, published in the *Pharmaceutical Journal* in 1853, I expressed my belief, that "the old original *crown bark*, the fine loxa of Uritusinga was one which well merited its character on account of the quantity of alkaloids contained." We now find this supposition verified; and the old *crown* bark reappearing in all its original richness in the Government plantations in India. The old characteristics of the bark, as to external appearance, attract notice; as is manifest by comparison with the descriptions of the "*knotty loxa*" of Jussieu, and the *quina de loxa* gathered by Humboldt and described by Haynes; also to very old specimens existing in the museums of the College of Physicians and various hospitals in London, and in my own collection, as gathered by Pavon and others.*

I refer to my "Examination" quoted above for descriptions of the remarkable care and precautions taken (or supposed to be taken) in the gathering of these distinguished barks from the mountains of Uritusinga, Cajamuna, and Guatisinga, under the superintendence of a distinguished botanist—the best being selected for the royal pharmacy. This was in the palmy days of the Spanish monarchy,—days which do not seem likely to return; and now "the crown" is content to partake with "the million" in the worthless barks furnished by Peru,—cheapness rather than efficiency being the recommendation.

* This paper will be published in the next number of this Journal.

† A botanical specimen of this valuable kind is now in the Herbarium of the Pharmaceutical Society.

‡ *In lit. penes me*, June 29, 1869.

§ *In lit.*, April 24, 1869.

‖ *In lit.*, July 6, 1869.

* I am indebted to Dr. Weddell for a specimen of "Cascarilla Colorada from the mountain of Cajamuna, near Loja, *brought from Peru by Jos. Jussieu*, who considered it as the most efficacious bark, and almost lost in his time."

The reader who wishes further information on the value of these may refer to the descriptions of *C. villosa*, *macrocalyx*, *lutea*, *ovata*, etc., in my 'Quinologia;' and, having studied these barks experimentally and medically, he may perhaps be disposed to think that the barks of the different varieties of common willow would be preferable, and more for the patient's benefit.

It is probable that the barks grown in the East Indies will shortly supersede the above-named sorts in pharmacy. In this case it should be understood that the alkaloids are different in the barks of *C. officinalis* and of *C. succirubra*. In the recent examinations Cinchonidine is noted separately from Quinidine, which was not the case in 1853. Also it will be seen that in the *rich* Loxa barks, such as those now sent, Quinine is the chief ingredient. This is not always the case, especially in the poorer sorts, where the place of this alkaloid is often taken by Cinchonidine, as I have before noted in the *Chahuarguera*. It is a mistake to suppose that Cinchonine* is abundant in the *true* Loxa barks, though it may be in those of Jaen (*C. macrocalyx*, etc.).

The alkaloids contained in *C. succirubra* are numerous, and vary under different circumstances of growth to a great extent, Cinchonidine generally being markedly prevalent. But the chief circumstance, respecting which it may be well to sound a note of warning, is the extraordinary difference in the state in which the astringent or tannin material exists in the bark. I have made a great number of experiments on different barks in this respect, and with varied reagents. The result has been a firm conviction that a widely differing medical effect must result from such diverse ingredients in a decoction or infusion of tincture of bark. The *officinalis* and *succirubra* are two of the most remarkably contrasted barks in the above respect; and it might be worth the inquiry of our medical men whether there is any ground for the prejudice which seems to have been entertained in South America against the *red* barks, as being of a heating nature. For myself I have no opinion to offer; but, if I were compelled to resort to either of these barks as a tonic, I should like to know which was the most likely to produce a good effect; and in this respect I suppose that I am not peculiar. But where shall the information be obtained?

* Cinchonine and Cinchonidine were often confused in the early analyses of bark.

THE RESTORATION OF WRITING EFFACED BY SEA WATER.

BY THOS. GARSIDE.

A letter which had been submerged in the wreck of the unfortunate "Schiller," and in which the writing was quite illegible, was shown to me, with the request that I would suggest a means of restoring it. As the method adopted proved completely successful I describe it for the benefit of those who may be called upon under similar circumstances. The letter was carefully brushed over with solution of sulphocyanide of potassium (1 in 20) and then, still damp, held over a dish containing hot hydrochloric acid. The writing was thus developed of a deep red colour. The rationale of the process is this: The iron of the ink is precipitated as peroxide upon the fibres of the paper, and remains when all other colouring matters are washed away. Being in an insoluble form however, no effect is produced by the reagent until the fumes of the acid have rendered it soluble. Probably ferrocyanide of potassium would answer as well or better than sulphocyanide.

Southport, June 1, 1875.

DETECTION OF METHYLIC ALCOHOL IN ETHYLIC ALCOHOL.*

BY A. RICHE AND C. BARDY.

The authors find that the method described by Dumas and Peligot for detecting the presence of wood spirit by converting it into oxalate of methyl, is not applicable when the wood spirit is accompanied by any considerable proportion of ethylic alcohol. Although the crystals of oxalate are easily obtained when operating upon even traces of methylic alcohol alone, yet in the presence of ethylic alcohol the crystals of oxalate of methyl are dissolved in the oxalate of ethyl, or the two ethers unite to form mixed compounds that affect the liquid state. They consider, however, that they have arrived at a solution of the problem by means of the coloured products, differing in shade and stability, which are yielded by the careful oxidation of ethyl-aniline and methyl-aniline. The following is the method, which must be rigorously followed:—

Ten cubic centimetres of the alcohol are introduced into a small flask, together with 15 grams of iodine and 2 grams of red phosphorus, and immediately distilled, the product being collected in about 30 or 40 c.c. of water. The alcoholic iodide which sinks to the bottom of the liquor is separated by means of a pipette and collected in a flask containing 6 c.c. of aniline. The mixture becomes heated, the reaction being aided by keeping the vessel during some minutes in warm water, or moderated, if necessary, by means of cold water if it should enter into a vigorous ebullition. At the end of an hour very hot water is poured into the flask to dissolve the crystals formed, and the liquor is heated to boiling for two or three minutes until it is quite clear. An alkaline solution is then added, which sets free the bases under the form of an oil, which is brought level with the neck of the flask by the addition of sufficient water.

The oxidation of the base may be accomplished by bichloride of tin, iodine, chlorate of potash, or, better still, by a mixture indicated by Hofmann, which is formed of 100 grams of quartz sand, 2 grams of chloride of sodium, and 3 grams of nitrate of copper. One cubic centimetre of the oily liquid is poured upon 10 grams of this mixture and carefully incorporated with it by means of a glass rod; it is then introduced into a glass tube 2 centimetres in diameter, and kept at a temperature of 90° C. in a water-bath during eight or ten hours. The mixture is then exhausted in the same tube by three treatments with warm alcohol, which is thrown upon a filter and made up to 100 c.c.

Pure alcohol gives a liquor of a reddish tint. Alcohol containing 1 per cent. of methylic alcohol gives a liquor manifestly violet by the side of the preceding. With 2·5 per cent. of methylic alcohol the shade is a very distinct violet, and with 5 per cent. it is considerably darker. By comparison in tubes of the same calibre with mixtures containing known quantities of the alcohols, a fair idea may be obtained of the amount of wood spirit in any given specimens.

The ordinary colorimetric methods give good results, but greater precision may be attained by adding 5 c.c. of the liquid to 95 c.c. of water, and pouring 5 c.c. of this new solution into 400 c.c. of water contained in a porce-

* Abstract of a paper read before the Academy of Sciences (*Comptes Rendus*, vol. xxx., p. 1076).

lain capsule and heating it in a boiling water-bath. Small fragments of white merino, free from sulphur, are then placed in the solution and kept there half an hour, after which time they are removed, washed and dried. If there has been no methylic alcohol present the stuff remains white; but 1 per cent. gives a violet tint which perceptibly increases in depth with the proportion of methylic alcohol.

TOUGHENED GLASS.*

A very interesting paper on Toughened Glass has recently been read before the Society of Arts, by Mr. Perry F. Nursey, C.E., in which he describes the process of M. de la Bastie for tempering glass and giving it an extraordinary degree of tenacity. The paper is printed in the *Journal of the Society of Arts* for June 4, and the following is taken from it.

After briefly sketching the history of the glass manufacture, Mr. Nursey referred to the curious physical phenomena exhibited by unannealed glass as exemplified in the Bologna phials and Prince Rupert's drops, and described the ordinary methods of annealing. During the thirty centuries over which the history of the glass manufacture extends it does not appear that any process has been invented by which the inherent brittleness of glass and its liability to fracture have been successfully overcome and at the same time its transparency preserved. It has remained for our own times, which have seen such remarkable scientific developments, to witness the production of a process by which glass is practically deprived of its brittleness. The inventor of this process is M. Francois Alfred de la Bastie, a French gentleman of property, who was educated as an engineer.

Many years since M. de la Bastie was impressed with the desirability of rendering glass less brittle, and so extending the sphere of its usefulness. Aware that the fragility of glass results from the weakness of the cohesion of its molecules, he thought that, by mechanically forcing the molecules closer together, and rendering the mass more compact, the strength and solidity of the material would be increased. This is exactly the line of argument an engineer would follow—it is one which led Sir Joseph Whitworth to produce the well-known Whitworth metal. M. de la Bastie found, however, after long trial and experiment, that mechanical compression failed to influence glass in the slightest degree, even when applied while the material was in a fluid or soft condition. He therefore changed his tactics, and commenced to apply to glass a system of tempering, such as is usually applied to steel, namely, submitting it to a bath of heated oil. He knew that by immersing heated glass in cold water he would only put the material in a state of unstable equilibrium, so that the least shock would cause it to break up, as in the case of the Rupert drops. He then sought to invert this result, to diminish, or even to remove, the extreme fragility of glass by tempering it by immersion in a fluid other than water. In attaining this object two essential objects had to be determined. Firstly, the point at which glass can be tempered without being put out of shape, and secondly, the medium to be employed for the immersion of the glass. The first condition M. de la Bastie found to be that degree of heating at which softness or malleability commences, when the molecules are capable of closing suddenly together, condensing the material when it is plunged in a liquid at a somewhat lower temperature. The second condition he found was satisfied by having a fluid capable of being raised to a much higher temperature than that of boiling water, without entering into a state of ebullition. For this purpose, and after a long series of experiments, M. de la Bastie devised an oleaginous compound, formed of oils, wax, tallow, resin, and other similar ingredients in certain proportions.

Although the invention is apparently a most simple one, there are many delicate conditions involved, the disregard of any one of which constitutes the precise difference between success and failure. It thus happened that, seven years since, just as M. de la Bastie had perfected his invention, and had produced highly satisfactory results, he lost the clue to his success, and for two years was baffled in every attempt to re-discover it. He at length succeeded in regaining his secret, and has since been engaged in perfecting his invention, and putting it into a practical shape. He had to carefully adjust all the numerous details, for although the invention consists in simply heating the glass, and dipping it while hot into a heated oleaginous bath, there are many conditions involved. Thus glass articles may be underheated and will not be susceptible to the effect of the bath, or they may be overheated, and will lose their shape; or, again, they may be heated to the right temperature, and yet be spoiled during the process of transference into the bath. Then, again, the exact proportions of the oleaginous constituents of the bath, and their precise temperature, have an important influence upon the ultimate result. All these points, however, with many others, have been definitely settled by M. de la Bastie, who has for some time past worked his process experimentally, and is now erecting a factory in France, in which to carry it on practically and commercially.

In carrying out his process, M. de la Bastie finds it necessary to raise the glass to be tempered to a very high temperature. The hotter it is the less the risk of breaking the glass, and the greater the shrinkage or condensation. Hence the advantage, and often the necessity, of heating the glass to the point of softening, which is attended by the difficulty that glass in the soft condition gets readily out of shape, so that it must be plunged into the bath almost without touching it. In plunging the hot glass, too, into a heated combustible liquid the latter is apt to take fire. These difficulties M. de la Bastie has overcome by placing the tempering bath in immediate communication with the heating oven, and covering it so as to prevent access of air. The oven being charged with the articles to be tempered, they are made to slide into the adjoining bath without being handled, and the contents of the bath, having no supply of external air, are not liable to inflame. In order that the shape of the tempered articles may not be affected, particularly flat glass, the floor of the oven is made to cant, so that when the glass is heated on it, it is turned to a sloping position, and the glass slides into the bath, along a surface arranged in it at the same angle as that of the oven floor. To avoid the clearness of the glass being affected by the dust of the furnace flame, which is apt to settle on the glass and chill its surface, the glass is heated in a muffle, to which the flame has no access, being applied externally. The shock of the fall of glass into the bath is prevented by fixing in it a sheet of wire gauze, or asbestos fabric, for the glass to fall on.

Of course the condition of working would be considerably modified if glass manufacturers adopted the toughening process in their own works. In such case the toughening process would simply take the place of the present annealing process, than which it is said to be much more speedy and economical. The glass would then be treated just at the point at which it passes from the fluid to the solid condition, and would not require reheating. By the substitution of this process for that of ordinary annealing, the saving, it is claimed, would be considerable. There would be the saving of the fuel used in the annealing ovens; the saving of the time required for annealing; the saving in breakages, besides a saving in labour.

The physical change which glass thus treated undergoes is complete and remarkable. Its extreme brittleness is exchanged for a degree of toughness and elasticity which

* Abstract of a paper in the *Journal of the Society of Arts*, June 4, 1875.

enables delicate glass articles to be thrown about indiscriminately, and more substantial ones to resist the impact of heavy iron weights falling from considerable heights. Mr. Nursey states that upon his first making the acquaintance of toughened glass articles at the offices of the representatives of M. de la Bastie—watch glasses, plates, dishes, and sheets of glass, both coloured and plain, were thrown across a large room, and fell spinning on the floor. Water was boiled in a tempered glass saucer for some time over a brisk fire, and the saucer was quickly removed to a comparatively cold place, and stood on iron, but was in no way affected by change of temperature. A small piece of plate glass was held in a gas flame until the corner became very hot. The glass proved a bad conductor of the heat, which did not extend any appreciable distance beyond the point of contact with the flame, neither was the glass cracked from unequal expansion, nor was it damaged by sudden immersion in cold water. In order to judge of the comparative resistance offered by untoughened and toughened glass to the force of impact, a piece of the former, measuring six inches by five inches by one-eighth inch thick, was supported in a frame about half an inch from the floor. A two-ounce brass weight was then dropped upon it from twelve and eighteen inches respectively without damage, but on the height being increased to twenty-four inches the glass was broken into several fragments. A piece of toughened glass of the same size but rather thinner, was then treated in the same way, at heights increasing a foot at a time, up to ten feet, but without producing the slightest visible impression. It is possible, however, that, by the repetition of the blows, the structure of the glass may have become imperceptibly altered, as it is known that by repeated blows the fibrous nature of wrought iron becomes exchanged for the crystalline character of cast iron. Finding the two-ounce weight to make no impression, an eight-ounce iron weight was substituted, and was dropped on the glass from a height of two feet, and then of four feet, without fracturing it. On the height being increased to six feet, however, the glass broke with a distinct report. But here another phenomenon presented itself; instead of the toughened glass being broken into some twelve or fifteen large angular pieces, as was the ordinary glass, it was literally reduced to atoms. There were, it is true, some pieces about half an inch square, but these were traversed in all directions by delicate lines of fracture, and, on being gently touched, crumbled into small pieces, and many of these small pieces were easily reduced by gentle pressure into mere atoms, so thorough and so complete does the disorganization of the entire mass appear to be. A similar result is produced by placing a piece of toughened glass flat on the table with a corner projecting over, and endeavouring to chip the corner off with a hammer. The corner will, after a series of smart blows, be broken off, but the whole mass will be at the same moment disintegrated and reduced to atoms. Another peculiarity about toughened glass is that the fragments are by no means so sharp, and therefore not so capable of piercing the flesh, or of causing incised wounds, as are those of ordinary glass.

One important point of difference between M. de la Bastie's toughened glass and Prince Rupert's drops is that, although the skin of the former may be scored through with the diamond, the body cannot even then be broken through by ordinary force, much less does the mass fly to pieces and disintegrate, as in the case of the Rupert drops. Toughened glass is also readily susceptible of a high degree of polish, and it can be cut by the wheel for lustre work and such like. The glass can likewise be engraved, either by hydrofluoric acid, or by Mr. Tilghman's sand-blast process. It will thus be seen that toughened glass presents features which appear to some extent paradoxical.

It would appear that toughened glass possesses enormous cohesive power, but that if the equilibrium of the mass is disturbed at any one point, the disturbance, or disintegration, is instantaneously communicated throughout the whole piece, the atoms no longer retaining the power of cohesion. It is as though the glass was endued with a nervous system, a shock to which at any one point instantly and utterly demoralized the whole. It is important to note that neither transparency nor colour in glass is in any way affected by the process of toughening, and the ring, or sound emitted upon the glass being struck, is nearly as clear in toughened as in plain glass.

In order to determine the relative values of ordinary glass and the toughened material, as regards their strength, the following experiments, with the view of ascertaining their respective resistances to ordinarily applied stress, have been carried out by the aid of Mr. Kirkaldy's testing machinery.

Twenty pieces of glass were submitted to bending stress, ten being toughened and ten untoughened. The glass was of French manufacture, and was that known as "Rive de Giers." Each piece of glass measured, as nearly as possible, six inches in length by five inches in breadth, and the samples had a mean thickness of ·2259 of an inch. Each piece was placed with a bearing of half an inch at each end, and the weight was brought gradually upon the centre, in some instances by the testing machine and in others by direct weights. Taking two pieces of glass, having about the same sectional area—the one tempered and the other untempered—Mr. Kirkaldy's certificate shows that the untempered glass yielded under a strain of 279 lbs., whilst the toughened glass did not give way until a stress of 1,348 lbs. had been reached. The same proportion, however, did not occur throughout the series, the toughened glass giving in some instances lower results. This arose from two causes, the diminished area of some of the samples of glass, and from the fact that, in some instances, the process of toughening had not been perfectly carried out; for the samples were prepared by M. de la Bastie under purely experimental conditions. The imperfect tempering was made manifest, after the destruction of the glass, in three ways chiefly, firstly, by the glass showing needle fractures, such as are seen in untoughened glass; secondly, by a faint milky line presenting itself in looking at the glass in section; and, thirdly, by portions of the glass, a square inch in area, remaining unfractured, whilst the whole surrounding mass was reduced to atoms. But above and beyond all this, it was evident that the strains applied were such as could not possibly come upon glass articles in ordinary use; they were long-sustained pressures, tending at every increment of weight to alter the relative position of the particles of the glass, but affording them no opportunity of returning to their normal position, or, in other words, of utilizing the elasticity of the mass. Glass articles in ordinary use are subject to sudden sharp blows, either from falling down, or from some extraneous substance being brought smartly in contact with them. Under these conditions the elasticity of toughened glass is called into play and enables it to sustain a shock immeasurably beyond that which would suffice to destroy ordinary glass, as is shown by the experiments first described. Hence the proper tests for glass, either toughened or plain, are precisely those of smart and sudden impact, and not of prolonged stress.

Examination and experiment with this remarkable substance have revealed a number of most interesting facts with regard to its physical character. The microscope reveals the fact that the fractures follow a regular order, which gives a uniform shape to the crystals which they produce. Large crystals can be subdivided into several smaller ones with a similar result. The edges of the atoms, too, are not jagged and serrated, as are those of ordinary glass, hence their diminished tendency to cause incised wounds, as already mentioned. This peculiarity would afford a means of ascertaining whether the glass had been tempered or not.

The physical character of toughened glass has been made the subject of careful investigation by M. Victor de Luynes. As a general result, M. de Luynes has found that toughened glass will bear from 80 to 100 times the strain of ordinary glass. M. de Luynes also examined both plain and toughened glass by the aid of polarized light, the results of his examination going to show that toughened glass owed its peculiar characteristics to a condition of intensified compression.

LEECHES IN ANJOU.*

BY C. MÉNIERE, OF ANGIERS.

It is well known to the leech fishers of Anjou that certain waters cannot support leeches, and that the conformation of the banks may be prejudicial to their reproduction, whilst others, on the contrary, yield continually a relatively abundant collection. If some industries progress there are others that remain stationary; for although in Anjou on rare occasions a leech fisher may be seen who uses a net with fine meshes, fixed at the end of a pole intended to stir up the marshy waters, there are others who content themselves with placing their legs in the midst of the swamp and allowing the leeches to fasten on to them.

The fishers usually like calm weather, with not too high a temperature; some prefer to work in stormy weather, before sunrise, or in the evening at sunset. Moreover, upon searching, with the aid of a lamp, the borders of a marsh where the vegetation is developed, a good number of leeches may be found attached to the branches and leaves of certain plants.

Anjou possesses nearly all the species of leeches as well as numerous varieties. There exists a considerable difference in certain species, according to the marsh in which they are found. For instance, the experienced fisher can distinguish the official leech which has lived in a marsh in the midst of vegetation, for in other conditions it no longer presents the same character. It is also believed by some persons that the colour of the water influences the colour of the leech, and the greater or less development of the characters by means of which they are classified. Although the author attributes only a secondary importance to this point, he considers that the chemical nature of the water affects the abundance or scarcity of the leeches. Thus they are not found in the calcareous and ferruginous waters, whilst the waters reposing upon schist beds, which are slimy at the bottom and charged with aluminous *débris*, yield seven or eight species.

The author describes some leeches as parasites and some as sedentary. He uses the term "parasite" because, for instance, the leech of the species *Pisciola piscium*, as soon as it possesses sufficient agility, attaches itself to the tench, roach, or the back of the young pike, making its way to the neighbourhood of the gills, sucking the blood and growing; neither is it detached until it is well gorged and developed. Hence this species is found not only in ditches and marshes, but also in open water in rivers, among stones, and especially slates.

The *Hirudo geometra* is not rare in Anjou. It never remains in the marshes—at any rate while young—preferring the schistous sides of streams, and clinging to the young fish which seek the borders of limpid streams. These two species, which appear to have the same habits, become in their turn a prey to the pike.

The other species, which he calls sedentary, scarcely quit their native marshes. The *Hirudo vulgaris* is sometimes carried by the current into a river, but it prefers the running water of ditches, or brooklets covered at the bottom with vegetable *débris*, such as twigs and branches, which serve it as a resting place. The *Hæmopis sanguisuga*, commonly called the horse leech from its fastening on the flesh of horses turned into the marshes or humid pastures, is always found where the water is shallow, and by preference in that which is miry. It lives very well in water charged with organic matters, and attacks salamanders, frogs, the fry of fish, etc.

* From the *Répertoire de Pharmacie*, iii., 306.

ZEBRA WOOD.*

BY JOHN R. JACKSON.

In a paper "On the Identity of Goa Powder and Araroba," read before the Pharmaceutical Society on April 7 last, and published in the Society's Journal for April 10 (p. 801), Mr. E. M. Holmes, the author, refers incidentally to the botanical source of zebra wood, and, quoting from Martius's 'Flora Brasiliensis,' refers it to *Centrolobium robustum* Bth., a large leguminous tree bearing winged fruits very similar in shape to those of the maple, but very much larger. In the discussion which ensued upon Mr. Holmes's paper Professor Bentley took occasion to show that, according to Schomburgk, zebra wood is derived from *Omphalobium Lamberti*, a tree of Guiana, belonging to the Connaraceæ. This reference to a valuable ornamental wood opens a question of some interest, inasmuch as a good deal of doubt has hitherto existed regarding the source of zebra wood.

In Holtzapffel's 'Descriptive Catalogue of the Woods Commonly Employed in this Country for the Mechanical and Ornamental Arts,' the botanical notes to which are by Dr. Royle, zebra wood is described as the produce of the Brazils and Rio Janeiro. Its colour is described as orange-brown and dark brown variously mixed, generally in straight stripes. It is considered by cabinetmakers to be intermediate in general appearance between mahogany and rosewood, so as to form a pleasing contrast with either of them. It is used in cabinetwork and in turnery, and has a very handsome appearance when polished. It is described as being "sent in logs and planks as large as 24 inches." No reference is made to the tree furnishing it, but from a note we are told that "zebra wood is also called pigeon-wood by Browne. One kind of pigeon-wood in Jamaica is Guettarda speciosa; another kind, called also zebra wood, is described by Browne, but he was unable to make out the genus." What this last may have been we are unable to say; it seems clear, however, that none of the zebra wood of commerce comes from the West Indies, though Grisebach, in his 'West Indian Flora,' tells us that the name is applied to *Eugenia fragrans*, var. *cuneata*. So far as we have been able to make out, Martius's description and identification of the zebra-wood of Rio de Janeiro with *Centrolobium robustum* seems correct, and Schomburgk's identity of *Omphalobium Lamberti* with that of Guiana is probably also correct, for we are told by one of the largest importers of foreign woods in this country that the best zebra wood comes from Rio de Janeiro, the next best from Bahia, which may, perhaps, also be the produce of *Centrolobium*. Honduras supplies an inferior sort, although the wood is larger in diameter. Of the tree furnishing this kind we have no information; that obtained from Demerara, which undoubtedly is furnished by *Omphalobium Lamberti*, is of a poorer class than all the preceding, a wood of a similar quality commercially being produced in Nicaragua, to the botanical origin of which we have no clue.

From these remarks it will be seen that zebra wood is the produce not of one tree but of several, two of which it may be considered are pretty satisfactorily settled, namely, that the Rio de Janeiro zebra wood is obtained from *Centrolobium robustum*, and the Demerara sort from *Omphalobium Lamberti*. There is a peculiar mystery hanging over the origin of most of the South American woods, many of which are highly ornamental, and are imported in large quantities, considering the uses to which they are put. Thus, for instance, a wood known in the trade as angica wood, which is very similar in appearance to zebra wood, was at one time shipped in quantity from Parahiba and Paranahiba (Brazils), but its origin was never known, and its importation has ceased for many years.

Museum, Kew.

* Reprinted from the *Gardeners' Chronicle*, June 12.

THE PHYSIOLOGICAL ACTION OF LIGHT.*

BY JAMES DEWAR, F.R.S.E.

The late Sir Henry Holland, President of the Royal Institution, in his essay on the "Progress and Spirit of Physical Science" (1858) says, "The experiments of D'Arcy prove that the impression of light is often retained on the retina for fully two and a half minutes, the time in which a luminous particle or undulation passes through nearly thirty millions of miles of space! What is the condition of light—be it conceived as matter, or motion, or force—when thus arrested and enchained in a living organism?"

To this profound problem of the specific effect produced on the retina and optic nerve by the action of light, Mr. Dewar and Dr. John G. McKendrick have especially directed their attention. Numerous hypotheses have been made from time to time by physicists and physiologists; but up to the present date our knowledge of the subject is without any experimental foundation. For example, Newton, Melloni, and Seebeck stated that the action of light on the retina consisted of a communication of mere vibrations; Young conjectured that it was a minute intermittent motion of some portion of the optic nerve; Du Bois-Reymond attributed it to an electrical effect; Draper supposed that it depended on a heating effect on a choroid; and Mosier compared it to the action of light on a sensitive photographic plate.

It is evident that, in accordance with the principle of the transference of energy now universally accepted, the action of light on the retina must produce an equivalent result, which may be expressed, for example, as heat, chemical action, or electro-motive power. It is well known that the electro-motive force of a piece of muscle is diminished when it is caused to contract by its normal stimulus, the nervous energy conveyed along the nerve supplying it; and similarly a nerve suffers a diminution of its normal electro-motive force during action. In the same manner, the amount and variations of the electro-motive power of the optic nerve affected secondarily by the action of light on the retina, are physical expressions of certain changes produced in the latter; or, in other words, are functions of the external exciting energy, which in this case is light. Considerations such as these led them to form the opinion that the problem of what effect, if any, the action of light has on the electro-motive force of the retina and optic nerve, would require for its investigation very careful and refined experiment.

The inquiry divided itself into two parts—first, to ascertain the electro-motive force of the retina and nerve; and, second, to observe whether this was altered in amount by the action of light. The electro-motive force of any living tissue can be readily determined by the method of Du Bois-Reymond. This great physiologist found that every point of the external surface of the eyeball of a large tench was positive to the artificial transverse section of the optic nerve, but negative to the longitudinal section. This he accomplished by the use of his well-known non-polarizable electrodes, formed of troughs of zinc carefully amalgamated, containing a solution of neutral sulphate of zinc, and having cushions of Swedish filter paper on which to rest the preparation. (To protect the preparation from the irritant action of the sulphate of zinc, a thin film, or guard of sculptor's clay, moistened with a ·75 per cent. solution of common salt, and worked out to a point, was placed on each cushion.) These electrodes were connected with a galvanometer, and the preparation was placed so that the eyeball, carefully freed from muscle, rested on the one clay guard, while the transverse section of the optic nerve was in contact with the other. By following Du Bois-Reymond's method the experimenters had no difficulty in obtaining a strong deflection from the eyes of various rabbits, a cat, a dog, a pigeon, a tortoise, numerous frogs, and a goldfish. The deflection was frequently so much as to drive the spot of light off the galvanometer scale.

With regard to the second question—namely, Whether, and to what extent, the electro-motive force would be affected by light? more difficulty was found. The method followed was to place the eyeball on the cushions in the manner above described, to note the deflection of the galvanometer needle, and then to observe whether or not any effect was produced on the impact of a beam of light during its continuance and on its removal. In a few of the earlier experiments Du Bois-Reymond's multiplying galvanometer was used, but finding the amount of deflection obtained was so small that the effect of light could not be readily observed, they latterly used Sir William Thomson's exceedingly sensitive reflecting galvanometer, kindly lent them by Professor Tait. They met also with secondary difficulties, such as the dying of the nerve, the impossibility of maintaining an absolutely constant zero, and an absolutely constant amount of polarity, the effects of heat, etc.; but these difficulties were overcome as far as possible by the most approved methods. The changes in polarity of the apparatus occurred slowly, and could not be mistaken for the changes produced by the action of light, which occurred suddenly, and lasted a short period of time. It is also important to state that the deflections observed do not at present profess to be absolute, but only relative values. About five hundred observations were made previous to April, 1873, and every precaution was taken to obtain accurate results. The effects of heat were carefully avoided by covering over the troughs on which the eye under examination rested, with a spherical double-shell of glass, having at least an inch of water between the walls.

The results arrived at are as follows:

1. The action of light on the retina is to alter the amount of the electro-motive force to the extent of from 3 to 7 per cent. of the total amount of the natural current.

2. A flash of light, lasting the fraction of a second, produces a marked effect.

3. A lighted match, held at a distance of four or five feet, is sufficient to produce an effect.

4. The light of a small gas flame enclosed in a lantern, and caused to pass through a globular glass jar (12 inches in diameter), filled with a solution of ammoniacal sulphate of copper, or bichromate of potash, has also produced a change in the amount of the electro-motive power.

5. The action of light on the eye of the frog is as follows: When a diffused light is allowed to impinge on the eye of the frog, after it has arrived at a tolerably stable condition, the natural electro-motive power is in the first place increased, then diminished; during the continuance of light it is still slowly diminished to a point where it remains constant; and on the removal of light there is a sudden increase of the electro-motive power nearly up to its original position. The alterations above referred to are variable, depending on the quality and intensity of the light employed, the position of the eyeball on the cushions, and modifications in the vitality of the tissues.

6. Similar experiments made with the eye of warm-blooded animals, placed on the cushions as rapidly as possible after the death of the animal, and under the same conditions, have never given an initial positive variation, as detailed in the case of the frog, but always a negative variation. The after inductive effect on the withdrawal of light occurs in the same way.

7. Many experiments were made as to effect of light from different portions of the spectrum. This was accomplished by causing different portions of the spectrum of the oxyhydrogen lime-light to impinge on the eye. All these observations tend to show that the greatest effect is produced by those parts of the spectrum that appear to consciousness to be the most luminous; namely, the yellow and the green.

* Lecture delivered at the Weekly Evening Meeting of the Royal Institution of Great Britain, Friday, February 5 1875.

8. Similarly, experiments made with light of varying intensity show that the physical effects observed vary in such a manner as to correspond closely with the values that would result if the well-known law of Fechner was approximately true.

9. The method followed in these inquiries is a new method in physiological research, and by the employment of proper appliances it may be greatly extended, not only with regard to vision, but also to the other senses.

After April 21, 1873, Mr. Dewar and Dr. McKendrick, the experimenters, endeavoured to obtain quantitative results, involving time as a variable element in the case of the action of light on the retina and optic nerve. They therefore found it necessary to construct a true graphical representation of the variations of the electro-motive force occasioned by the impact and cessation of light. It is clear that to register minute galvanometrical alterations, the only plan that could be employed would be to photograph on a sensitive surface, covering a cylinder rapidly revolving on a horizontal axis, the alteration of position of the spot of light reflected from the mirror, just as continuous magnetic observations are registered. As the apparatus required to execute these observations is very complicated, and would require much preliminary practice, they in the meantime adopted a simpler method of registration. This plan was to note the position of the galvanometer at equal intervals of time before, during, and after the impact of light on the eye. In these observations they used a seconds pendulum giving a loud beat. One observer read aloud the galvanometer; the other marked every interval of two and a half seconds, registered the numbers obtained, and regulated the supply of light. A little practice in the method above described enabled them to obtain very satisfactory results, agreeing very closely in different observations, and showing in a decided way the salient points of the variation curve.

These curves show that on the impact of light there is a sudden increase of the electro-motive force: during the continuance of light it falls to a minimum value, and on the withdrawal of light there is what they termed an *inductive effect*, that is to say, a sudden increase of the electro-motive force which enables the nerve to acquire its normal energy. The falling off of the electro-motive force by the continued action of light is the physical representative of what, in physiological language, is called fatigue; the inductive effect exhibiting the return of the structure to its normal state. Occasionally the impact of light is not followed by a rise in the electro-motive force, but by a diminution. This is probably to be explained by the fact, that the death of the retina and nerve is indicated by a gradual falling of the electro-motive force, and that this change frequently goes on so rapidly that the impact of light is unable to produce any rise. In these circumstances, the spot of light, which before the impact of light was slowly moving downwards, is on the impact steadied for a moment, and then pursues its downward course more rapidly.

By several distinct sets of observations:

1. It was proved that though there is no difficulty in obtaining a strong current from the skin of the frog, this current is not affected by light. This observation demonstrates that the pigment cells of the skin in the vicinity of the cornea have nothing to do with the results obtained.

2. The current obtained from a mass of the pigment cells of the choroid does not exhibit any sensitiveness to light.

3. The subcutaneous injection into the frog of woorara, santonin, belladonna, and Calabar bean, does not destroy the sensibility of the retina to light.

4. As to the action of the anterior portion of the eye. On carefully dissecting an eye of a frog, so as to remove completely the anterior portion, including cornea, aqueous humour, iris, ciliary muscle, and lens, and on bringing the retina into actual contact with one of the clay pads, we readily obtained a large deflection, which was as sensitive to light as when the whole eye was employed, thus eliminating any possibility of the contraction of the iris under the stimulus of light having to do with the results previously obtained.

5. On using the anterior portion of the eye, so that the cornea and posterior surface of the crystalline lens were the poles, a large deflection, which was, however, insensible to light, was obtained.

6. The sclerotic and nerve without the retina, in the same manner, gave a large natural electro-motive force, also not sensitive.

7. The distribution of the electro-motive force between the different portions of the eye and cross section of the nerve may be stated as follows:—The most positive structure is the cornea, then the sclerotic, then the longitudinal surface of the nerve; the cornea is also positive to the posterior surface of the crystalline lens, and the retina itself seems to be positive to the transverse section of the nerve.

8. As to the effects produced by lights of different intensities. If a candle is placed at a distance of one foot from the eye, and then is removed ten feet, the amount of light received by the eye is exactly one hundredth part of what is got at a distance of one foot, whereas the electro-motive force, instead of being altered in the same proportion, is only reduced to one-third. Repeated experiments made with the eye in different positions have conclusively shown that a quantity of light one hundred times in excess of another quantity only modifies the electro-motive force to the extent of increasing it three times as much, certainly not more.

9. It was apparent that these experiments would ultimately bear upon the theory of sense-perception as connected with vision. It is now generally admitted that no image, as such, of an external object is conveyed to the sensorium, but that in reality the brain receives certain impressions of alterations taking place in the receiving organ. The natural query then arises, Are the physical effects we have described and measured really comparable in any way with our sensational differences in light perception, when we eliminate all mental processes of association, etc., and leave only perception of difference of intensity? In other words, are these changes the representative of what is conveyed to the sensorium? It would appear, at first sight, that this problem is altogether beyond experimental inquiry. There is, however, a way of arriving at very accurate measures of the variation of our sensational differences in the case of light, and this has been developed theoretically and experimentally by the justly renowned physiologist Fechner. Stating the law of Fechner* generally, we may say the difference of our sensations is proportional to the logarithm of the quotient of the respective luminous intensities. A recent series of experiments by Dalbœuf† has entirely confirmed the truth of this law. If, therefore, the observed difference in electro-motive power, registered under conditions of varying luminous intensity, agree with this law of Fechner, regulating our sensational impressions, then there can be little doubt these variations are the cause of, and are comparable to, our perception of sensational differences. Now, it is stated above, that with a quantity of light one hundred times in excess of another quantity, the electro-motive force only becomes three times greater. According to Fechner's law, we may say the difference of our sensations, with that variation in the amount of luminous intensity, would be represented by 2, the logarithm of 100. The experimental results being as 3 to 1, the difference is also 2, thus agreeing very closely. It is to be remembered, however, that these results have been obtained by experiment on the eye of the frog, but similar changes have been observed in the eyes of mammals. In the latter, however, the amount of alteration is not so great, in all probability owing to the rapid death of the parts.

10. When one clay point is placed in contact with the cornea or nerve, and the other with the section of the optic lobe, a current is at once obtained which is sensitive

* Fechner, 'Elemente des Psychophysik.' Helmholtz, 'Optique Physiologique.'

† Recent Memoir to Belgian Academy.

to light. In this experiment the eye is left in the orbit, and the nerve is uninjured. Thus, the effect of light on the retina has been traced into the brain.

The continuance of these investigations led to the following results :—

1. The light from a beam of uncondensed moonlight, though of weak intensity, and almost entirely free from heat rays, is still sufficient to alter the electro-motive power of the nerve and retina.

2. They examined the phenomenon in the eyes of the following animals : (1) The common newt — *Triton aquaticus;* (2) The goldfish—*Cyprinus auratus;* (3) The rockling — *Motella vulgaris ;* (4) The stickleback — *Gasterosteus trachurus;* (5) The common edible crab—*Cancer pagurus;* (6) The swimming crab—*Portunus puber;* (7) The spider crab—*Hyas coarctaius ;* (8) The hermit crab — *Pagurus Bernhardus;* and (9) The lobster—*Homarus vulgaris.*

The general results with the eyes of these various animals were similar to those previously described. The eye of the goldfish and rockling, both sluggish fishes, were found to resemble each other, inasmuch as the variations in the electro-motive force were slow, and in this respect they presented a marked contrast to those of the active and alert stickleback, the eye of which was very sensitive to light.

The experiments on the eyes of crustacea are of importance, because they show that the action of light on the compound eye is the same as on the simple eye, namely, that it alters the amount of the electro-motive force of the sensitive surface. The eye of the lobster was found to give a deflection of about 600 galvanometical degrees, the scale being placed at a distance of about 26 inches. Light produced a variation in this deflection of about 60 degrees, that is, about 10 per cent., the largest amount of variation yet observed in any eye. It was also demonstrated that the effect of light, diminished in intensity by distance, was exactly what was observed in the case of the simple eye. For example, at the distance of one foot a variation to the extent of about 100° was observed. At a distance of 10 feet, with $\frac{1}{100}$th part of the amount of light, the effect was not 1° but 20°, or $\frac{1}{5}$th of the total amount observed at 1 foot.

3. The action of light on the electro-motive force of the living eye in cats and birds (pigeon and owl) has been observed. In the earlier experiments great difficulty was found in observing sensitiveness to light in the eyes of mammals and birds, when these were removed with the utmost dispatch from the orbit of the animal immediately after death. This was evidently owing to the fact that the sensibility of the nervous system in these animals disappears quickly after the withdrawal of healthy blood. It therefore became necessary to perform the experiment on the living animal. This was done by first putting the cat or bird under the influence of chloroform, then fixing it by a proper apparatus so that the head was perfectly immovable, and lastly removing the outer wall of the orbit with as little disturbance to the ciliary vessels as possible. The optic nerve was now cut, the transverse section directed upwards, and the clay points of the electrodes were now adjusted, one to the transverse section of the nerve, and the other to the cornea. With these arrangements a strong current extremely sensitive to light was at once formed.

4. The effect was traced into the optic lobes of a living pigeon under chloroform. The following were the results of this observation : *a.* When one pole was applied to the left optic lobe, and the other to the cornea of the right eye, a deflection was obtained which was sensitive to light : *b.* When the pole was removed from the right eye and applied to the cornea of the left, a smaller deflection was obtained, also sensitive to light ; and *c.* When light was allowed to impinge on both eyes, while the one pole was in contact with either eye and the other with the left optic lobe, the result was nearly double that produced by the impact of light on one eye alone, either right or left. These effects may be explained by the decussation of the optic nerves in the optic commissure.

5. The eye of the snake was examined, and in its action resembled that of a frog.

6. The law of the variation in the electro-motive force of the retina and optic nerve therefore holds good in the following groups of the animal kingdom, Mammalia, Aves, Reptilia, Amphibia, Pisces, and Crustacea.

7. Many experiments were made which prove that the pyschophysical law of Fechner, previously alluded to, is not dependent only on perception in the brain, but in part on the structure of the eye itself. The effects which occur on, during, and after the action of light on the retina, also take place after the eye has been removed from all connection with the brain. Thus the law of Fechner is not, as has been hitherto supposed, a function of the brain alone, but is really a function of the terminal organ, the retina.

8. A new method was employed for registering galvanometrical variations, which may be of service in many physical and physiological researches. This consists in placing at the proper distance from the galvanometer, instead of the ordinary graduated scale, the surface of a cylinder covered with paper, and moving on a horizontal axis by clock-work. The spot of light reflected from the galvanometer mirror is rendered more precise by having the shade of the galvanometer lamp blackened over the entire surface, with the exception of a spot about three millimetres in breadth, in the centre of which a line or cross is made of soot. The image of this line or cross is of course reflected by the mirror upon the cylinder. When the cylinder is set in motion by the clock-work the spot of light may be accurately followed by the hand of the observer, after a little practice, with a fine brush moistened with ink. The cylinder employed performed a complete revolution in eighty seconds. This time was divided into four equal parts, each representing twenty seconds, by four lines drawn transversely at equal intervals across the paper on the cylinder. The first space, between lines one and two, represented twenty seconds, in which the eye was in the dark, and in which the electro-motive force is represented by a straight line; the second space, between lines two and three, represented twenty seconds, during which the effect of the impact of light took place, and in which the variation of the electro-motive force is indicated either by a curve to the right or to the left; the third space, between lines three and four, represented twenty seconds of continued action of light, during which the electro-motive force gradually rises; and lastly, the fourth space, between lines four and one (the point of starting), representing twenty seconds; during which the electro-motive forces at first rises on the withdrawal of light, and afterwards sink rapidly.

It has been experimentally proved—(1) that the impact of light on the eyes of members of the following groups of animals, viz., Mammalia, Aves, Reptilia, Amphibia, Pisces, and Crustacea, produces a variation amounting to from 3 to 10 per cent. of the normal electro-motive force existing between the corneal surface and the transverse section of the nerve ; (2) that this electrical alteration may be traced into the brain ; (3) that those rays that we regard as most luminous produce the largest variation ; (4) that the alteration of the electrical effect with varying luminous intensity seems to follow very closely ratios given by the psychophysical law of Fechner; (5) that the electrical alteration is due to the action of light on the retinal structure itself, as it is independent of the anterior portion of the eye, eliminating, therefore, the natural supposition that the contraction of the iris might produce a similar result ; (6) that it is possible, by experiment, to discover the physical expression of what is usually called in physiological language fatigue ; and (7) that the method employed in this research may be applied to the investigation of the special organs of the other senses.

The Pharmaceutical Journal.

SATURDAY, JUNE 19, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE PHARMACY ACT (IRELAND) BILL.

WE are still unable to give our readers any account of the reception of this Bill in Parliament, since its second reading has been again postponed to the end of another week. Up to Friday, the 11th inst., the King and Queen's College of Physicians in Ireland continued alone in the support of this projected measure, while the total number of petitions presented against it up to the same date were 170, bearing 2,167 signatures. Since that time 42 other petitions have been presented. It is evident, therefore, that the introduction of this Bill has not been regarded with indifference by the pharmacists of Great Britain, and that there is considerable unanimity of opinion among them that its provisions are fraught with danger to the objects which they have for years been striving to secure. That the representation of this opinion in Parliament, when the Bill comes under consideration, should be disregarded, is a proceeding that can scarcely be accepted as probable.

However, a medical contemporary in writing upon this subject expresses the opposite opinion, and undertakes to "imagine such petitions will receive little consideration from Parliament." That the ground for such an "imagination" consists only in misconception is, however, sufficiently evident from the remarks that accompany it. In the first place our contemporary's want of accurate acquaintance with the facts of the case is evident from the statement put forward that British pharmacists have simply been petitioning for protection against trade competition and have for that reason taken up a "mad-dog" cry against Irish pharmacists. If this were the case, we admit there would be ample justification for any disregard that Parliament might manifest towards the petitions against the Irish Pharmacy Bill. But there is not the shadow of a pretext for the statement made by our contemporary. The competition of Irish pharmacists is not what is feared or deprecated; for those who are entitled to that designation and legally privileged to carry on business as pharmacists are too few in number to admit of any apprehension that they would join in the invasion of their British brethren. It is in fact one of the main arguments put forward by those who support the institution of a Pharmaceutical Society in Ireland, that there are so few qualified pharmacists in Ireland, and that great inconvenience to the public arises from the deficiency. Moreover it must be remembered that every one of the legally qualified pharmacists in Ireland is, and always has been, entitled, in virtue of being an "apothecary," to carry on the business of pharmacy in Great Britain independently of the Pharmacy Act, 1868.

But what is feared as a possible result of the Irish Pharmacy Bill becoming law is, that persons of inferior qualifications would be brought into competition with British pharmacists. The establishment of an Irish Pharmaceutical Society, empowered to grant certificates entitling the holders of them to registration in Great Britain as pharmaceutical chemists, without giving the Pharmaceutical Society of Great Britain due control over the examinations conducted in Ireland, might well result in the flooding of this country with persons wholly unfit to assume the position of "pharmaceutical chemist."

To show that there is sufficient reason for apprehension of such a result we need only refer to the evidence given before the Select Committee on the Apothecaries' Licences Bill of last session. In reply to a question put by the Chairman, Sir MICHAEL HICKS-BEACH, whether there was not throughout Ireland a great deficiency of establishments and shops for the sale of medicine and compounding of prescriptions, resulting in great inconvenience to the public, Dr. LEET, the Secretary to the Apothecaries' Hall of Dublin, stated that such was the case. Sir DOMINIC CORRIGAN and other witnesses agreed with him in this. But it was also stated by Dr. LEET that this want existed especially in the rural districts and in small towns where apothecaries "could not live," and that the class of persons suitable for supplying this want would be such as would take up any branch of trade that would maintain them in such places. This in fact, was Dr. LEET's idea of a "pharmaceutical chemist" according to his evidence. Mr. COLLINS, a director of the Apothecaries' Hall, also stated that while the towns are at present overstocked with "apothecaries" qualified to practice pharmacy, the "pharmaceutical chemist" could not live in the places where he was wanted by pharmacy alone, but must sell drugs, oils, and probably tobacco, tea, and sugar.

If the object of the Irish Pharmacy Bill be to create a class of persons to occupy a position of this kind in Ireland, it is not a very great stretch of imagination to suppose that the evidence of qualification required of them by the Examining Board of the proposed Irish Pharmaceutical Society would not be of a very high standard. And when it is proposed to appropriate for these persons the title "pharmaceutical chemist," and to give them the right of claiming registration as such in Great Britain, it surely must be obvious to the most ordinary mind that such a proceeding is calculated to excite indignation amongst those who for years past have laboured to make the title of pharmaceutical chemist respectable in the eyes of the public, and an object of emulation to the followers of pharmacy.

It is this injustice that the pharmacists of Great Britain protest against; and it is on this ground that the Bill has been opposed by the Pharmaceutical Society. It is entirely erroneous to say that the Society "goes simply for securing the control of Irish pharmacy." On the contrary, the Society has always judiciously abstained from any attempt to interfere with the regulation of pharmacy in Ireland. The proposal to extend the Act of 1868 to Ireland did not emanate from the Society, but was made independently of it. The evidence given by members of the Council before the Special Committee last session was throughout of the same tendency. The Bill then under consideration was drafted by the King and Queen's College of Physicians, and in effect, it proposed to extend the operation of the British Society to Ireland, with a local Board of Examiners in Dublin under its control. This was felt to be a reasonable project, and one that the Society had no right to object to. Both Mr. Sandford and Mr. Mackay expressed their opinion that the plan would work as well in Ireland as it had done in Scotland, and it has always seemed unaccountable that the report of the Committee should have so thoroughly ignored and run counter to the evidence given, as to recommend that the Bill should not be proceeded with.

If, however, the prevalence of Home Rule ideas renders such an extension of the Society's operations undesirable, the Society has certainly no disposition to seek for it, and it has always admitted that if the present Bill had merely proposed to create a society for Ireland, with its operations limited in sphere and effect to Ireland, for maintaining or creating there a body of examined persons to be described otherwise than by the title of "pharmaceutical chemist," the Society could not have raised objection, but might eventually have seen its way to friendly co-operation whenever the contemplated society had acquired a standing comparable with its own public estimation.

Some attempt has been made by the advocates of the Bill now before Parliament, to turn to account the differences of opinion expressed at the last meeting of the Council, which is even asserted to be the arena of intestine war in reference to the subject. We do not hesitate to contradict this statement, and to declare that the difference of opinion expressed had reference only to a technical point. The objection to the provision for reciprocity without any concomitant control of the examinations was unanimous, and the only question was whether opposition should be specially directed to that point or against the Bill as a whole. One of the reasons for adopting the latter course was the appropriation of the title of pharmaceutical chemist as being not only an interference with the British Society, but also unnecessary for the purposes of the Irish Bill. All that is requisite in Ireland is a distinctive title by which the public may readily distinguish the pharmacist qualified to dispense physicians' prescriptions from the chemist and druggist who is not permitted to dispense. For this purpose the designation "dispensing chemist" would suffice perfectly, and it has even the advantage of being more explicit than the term "pharmaceutical chemist."

We are glad, however, to be able to state that within the last few days some disposition to compromise has been manifested on the part of the Government, and, as we are informed, the withdrawal of the reciprocity clause (18) has been suggested in consideration of a withdrawal of the Society's opposition to the Bill. So far as we can judge an arrangement of this kind, if thoroughly carried out, might be satisfactory to all parties, and leave our Irish neighbours free to establish an entirely independent pharmaceutical society adapted to their own ideas and requirements.

Such independence, however, must be, in every respect, thorough and not merely one-sided. We think, therefore, that in the event of any such settlement of the matter as that we have mentioned as being probable, and in case the objection to the title "pharmaceutical chemist" should be waived, adequate provision should, at least, be made for protecting British Pharmaceutical Chemists from any possible improper use of that title on the ground of certificates obtained from the Irish Society. For this purpose a clause like the 27th clause of the Pharmacy Act, 1868, might be appropriate, providing that "This Act shall not extend to *Great Britain*," or some other provision that would prevent the Irish qualification being used in the way that bogus degrees are often used with impunity.

MEETING OF THE MEDICAL COUNCIL.

The General Medical Council was to meet on Thursday, the 17th. inst., under the presidency of Dr. Acland, at the new offices, formerly the Royal College of Chemistry, Oxford Street.

THE FATAL EXPLOSION IN IRELAND.

The amount of compensation to be paid by the Governors and Directors of the Apothecaries' Hall, Dublin, in the case where death resulted from an explosion caused by the substitution of sulphide of antimony for oxide of manganese (see before, p. 823), appears to have been settled at £1500. That sum had been paid in to the Irish Court of Queen's Bench in satisfaction of the claim, and a motion has recently been made and granted for its withdrawal.

LIEBIG'S SUCCESSOR AT MUNICH.

The *British Medical Journal* states that the chair of Chemistry at Munich, which has remained vacant since the death of Liebig, has been accepted by Professor Baeyer of Strassburg, who will commence his duties next winter session.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 16*th*, 1875.

Present—Messrs. Allchin, Barnes, Carteighe, Corder, Gale, Haselden, Hills, Linford, Martindale, Moss, Schweitzer, Southall, Taylor, and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Three candidates were examined. *Two* failed. The following passed, and was declared qualified to be registered as a Pharmaceutical Chemist :—

Naylor, William Arthur Harrison. Manchester.

MINOR EXAMINATION.

Thirteen candidates were examined. *Nine* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists :—

Equal { Beilby, Alfred Emanuel ....Sutton-in-Ashfield.
Equal { Ragg, William Watkins.........Edmonton Green.
Neale, Edgar.........................Faringdon.
Wright, Alfred.......................Stowmarket.

The above names are arranged in order of merit.

BENEVOLENT FUND.

Subscriptions Received during April and May, 1875.

	£	s.	d.
Ackrill, George, Mona Court, Kingstone, near Hereford ..	0	10	6
Adams, Robert White, Park Place, Park Street, Dover ..	0	5	0
Allen, George, Ampthill	1	1	0
Allen and Willis, 55, High Street, King's Lynn	0	5	0
Allison, E. and H., 11, Blanket Row, Hull	1	1	0
Allwright, Isaac B., Derby Road, Chesterfield	0	5	0
Anness, S. R., 26, Westgate Street, Ipswich	0	10	6
Anholm, August, 11, Smeaton Street, Hull	0	10	6
Armitage, E. H., Dartford..	0	10	6
Asling, Brelsford, Spalding	0	5	0
Atherton, John H., Long Row, Nottingham	0	10	6
Atmore, George, 48, High Street, King's Lynn	0	5	0
Attwood, Alfred, 147, Cannon Street, E.C.	1	1	0
Austin, Messrs., 149, Duke Street, Liverpool	0	10	6
Averill, H. A., 10, Market Square, Stafford..	1	1	0
Averill, John, 10, Market Square, Stafford	1	1	0
Ayre, George, Thirsk	0	10	6
Babtie, John, Dumbarton	0	10	6
Bacon, John T., Esq. (per Mr. Mould, 21, Moorgate St., E.C.)	1	1	0
Baildon, Henry C., 73, Princes Street, Edinburgh	1	1	0
Bailey, William, Railway Road, King's Lynn	0	2	6
Baily, John, 156, Clapham Road, S. W...	0	5	0
Baker, William, High Street, Stourbridge	0	5	0
Balch, Edwin, Queen Street, Ramsgate	0	5	0
Balk, William, 22, Lowgate, Hull	0	10	6
Balkwill, Alfred P., Old Town Street, Plymouth..	0	10	0
Ball, Edwin, Spring Gardens, Buxton	0	10	6
Barber, George, 1, Rathbone Place, Liverpool	0	10	6
Barker, William, 259, North Road, Preston	0	5	0
Barnaby, Francis, 223, Oxford Street, Manchester	1	1	0
Barnard, John, 338, Oxford Street, W.	1	1	0
Barnes, James B., 1, Trevor Terrace, Knightsbridge, S. W.	1	1	0
Barnes, James and Son, 114, Fishergate, Preston	0	10	6
Barnett, Alexander, 5, The Colonnade, Buxton..	0	10	6
Barron, Frederick, 2, Bush Lane, E.C.	1	1	0
Barry, James, Parade, Northampton	1	1	0
Barry, Thomas S., Broadway, Ealing	0	10	6
Barton, William Henry, 2, Woodside Terrace, Gipsy Hill..	0	10	6
Bassett, Charles, Pontypridd	1	1	0
Batchelor, Charles, Fareham	0	5	0
Bateson, Thomas, 23, Stricklandgate, Kendal	0	10	6
Baxter, George, Worksop	0	5	0
Baxter, William W., Bromley, Kent	0	10	6
Baynes, James, 21, Waterworks Street, Hull	0	10	6
Beach, James, East Street, Bridport	0	10	6
Beach and Co., Bridport	1	1	0
Beddard, John, 46, Churton Street, S. W.	1	1	0
Bell, Charles B., 6, Spring Bank, Hull	0	10	6
Bell, Edward C., High Street, Berkeley	0	10	6
Bell, W. H., 96, Albany Street, N.W.	0	10	6
Benger, F. B., Exchange Street, Manchester	0	5	0
Bently, William James, High Road, Tottenham	0	10	6
Berry, William, 15, Albert Villas, Cotham, Bristol ..	0	5	0
Bessant, Frederick R., Cromwell Place, South Kensington	0	10	6
Best, James, 333, Holloway Road, N.	0	10	6
Betts, John, Thoroughfare, Woodbridge..	0	10	6
Betty, Samuel, 6, Park Street, Camden Town, N.W.	0	10	6
Bilbrough, J. B., 15, Beech Grove Terrace, Leeds	0	10	6
Binge, Thomas, 23, Stockbridge Terrace, Pimlico, S.W. ..	0	10	6
Bingley, John, 91, Bailiff Street, Northampton	0	10	6
Bird, Robert, 103, High Holborn, W.C.	0	10	6
Bishop, Mary, 69, High Street, King's Lynn	0	5	0
Bishop, Thomas, Twickenham	0	10	6
Blackshaw, Thomas, Market Place, Burslem..	0	10	6
Blain, William, 25, Market Street, Bolton	0	10	0
Bland, John H., 75, High Street, Stourbridge	0	10	6
Blatchley, Thomas, Yeadon, Yorks..	0	10	6
Blundell, J., Tithebarn Street, Liverpool	0	10	0
Bolton, Thomas, 83, Middleton Road, Dalston, E.	0	5	0
Booth, George, Chesterfield	0	10	0
Booth, James, Elmfield, Rochdale	0	10	6
Bosley, John L., 51, Judd Street, W.C...	0	5	0
Bostock, William, Ashton-under-Lyne	0	5	0
Bourdas, Isaiah, 7, Pont Street, Belgravia, S. W.	1	1	0
Bourdas, Isaiah, jun., 48, Belgrave Road, S.W.	1	1	0
Bourdas, John, 7, Pont Street, Belgravia, S.W.	1	1	0
Bowler, William Samuel, Belper	0	5	0
Boyce, George, Chertsey	0	5	0
Bradley, Charles, 30, Market Place, Reading	0	5	0
Bradley, John, 4, Brondesbury Terrace, Kilburn, N. W. ..	1	1	0
Bray, William, Buntingford	0	5	0
Brearey, William A., Prospect Hill, Douglas	0	5	0
Brew, Thomas A., 71, East Street, Brighton	0	10	6
Briggs, James, 71, Owen Street, Tipton..	0	5	0
Bromley, Richard M., Denmark Hill, S.E.	0	10	6
Brooks, Charles, 355, Wandsworth Road, S.W.	0	10	6
Brown, A. H., Shanklin, Isle of Wight	0	10	6
Brown, David R., Lorne Terrace, Edinburgh	1	1	0
Buchanan, James, 52, North Bridge, Edinburgh..	1	1	0
Buck, Richard C., 192, Breck Road, Everton, Liverpool ..	0	5	0
Buck, Thomas, 9, East Street, Middlesborough	0	5	0
Buck, Thomas, 552, Kingsland Road, E.	0	10	6
Burden, Thomas, 6, Store Street, Bedford Square, W.C. ..	0	10	6
Burgess, William, Market Street, Stourbridge	0	5	0
Burrow, Messrs., Great Malvern	1	1	0
Busby, James, Harpenden	0	10	6
Buss, Thomas S., Ham Street, Kent	0	5	0
Caley, A. J., Bedford Street, Norwich	0	10	6
Cameron, William, Kelso	0	10	6
Campion, Robert, High Street, Harlow	0	10	6
Candler, Joseph T., High Street Margate	0	10	6
Cannell, William, Queen Square, Wolverhampton	0	10	6
Carter, William, Cheetham Hill, Manchester	0	10	6
Case, William, Cockthorpe, Wells, Norfolk	0	5	0
Catterns, H. P., Church Street, Camberwell, S.E.	0	10	6
Chaplin, John L., 55, Cornmarket, Wakefield	0	10	6
Chapman, Henry, Cornhill, Ipswich	0	10	6
Chapman, Richard J., Chipping Ongar..	0	10	6
Chapman, William F., 53, Witham, Hull	0	10	6
Clark, J. A., 11, Duncan Place, London Fields, E.	0	10	6
Clark, Thomas P., 151, High Street, Stourbridge	0	5	0
Clarke, Jos. A., 132, London Street, Glasgow	0	10	0
Clarke, Josiah, Croydon	0	10	6
Clarke, Thomas M., George Street, Richmond, Surrey ..	0	10	6
Clay and Abraham, 87, Bold Street, Liverpool..	1	1	0
Clay, Dod and Case, 52, St. Anne Street, Liverpool	1	1	0
Clayton, Francis C., Wheeley's Lane, Birmingham	0	10	6
Clift and Crow, Lee Bridge, Lewisham	1	1	0
Clifton, E., Westgate, Ipswich	0	5	0
Cocher, John A., 3, St. James' Street, King's Lynn	0	5	0
Cocking, Frederick J., Teignmouth..	0	5	0
Cocks, John W., 1, Madeira Place, Torquay	0	5	0
Cocksedge, H. B., 20, Bucklersbury, E.C.	0	10	6
Cole, Frederick, 185, High Street, Stoke Newington, N. ..	0	10	6
Coleman, William, Worcester Street, Wolverhampton ..	0	10	6
Coles, Ferdinand, 248, King's Road, Chelsea, S.W.	0	10	6
Coley, Samuel J., 57, High Street, Stroud	0	10	6
Cooper, Albert, 31, Gloucester Road, South Kensington, S.W.	1	1	0
Cooper, William W., 237, Amhurst Road, Stoke Newington, N.	0	10	6
Corfield, Charles, Church Street, St. Day	0	10	6
Corfield, Thomas J. T., St. Day	0	10	6
Cornelius, Joseph, Teignmouth	0	10	6
Corner, T. B., 1, Baxtergate, Whitby	0	10	0
Cornforth, Edwin, Birmingham	0	2	6
Cossey, John, St. John's Maddermarket, Norwich	0	5	0
Cottrill, Gilbert J., Shepton Mallet	0	5	0
Covell, William Mann, 302, Mare Street, E...	0	10	6
Crofts, Holmes C., 194, High Street, Chatham	0	10	6
Cruse, Thomas H., Palmerston Road, Southsea	1	1	0
Cupiss, Francis, Mere Street, Diss	0	10	6
Currie, John, 311, Sauchiehall Street, Glasgow	0	5	0
Currie John, 70, Eglinton Street, Glasgow	0	5	0
Curtis, A. A., 121, Westgate Street, Gloucester	0	10	0
Daggers, Frederick, Church Street, Preston	0	5	0
Daines, Thomas, King William's Town, Kaffraria	0	10	6
Daniel, John, Rickergate, Carlisle	0	2	6

Darling, William, 126, Oxford Street, Manchester	1	1	0
D'Aubney, Thomas, 82, Shepherdess Walk, N.	1	1	0
Davenport, Horace, Great Russell Street, W.C.	1	1	0
Davenport, J. T., Great Russell Street, W.C.	2	2	0
Davies, Edward, Market Place, Bishop's Castle	0	10	6
Davies, John L., Hay	0	5	0
Davies, William, 292, Gray's Inn Road, W.C.	0	5	0
Dawson, Alfred, High Street, Woking	0	10	6
Day, Thomas S., High Street, Beckenham	0	10	6
Dennis, John L., Nottingham	0	10	6
Dennison, Matthew, Dudley	0	5	0
De Peare, John T., 216, St. Paul's Road, Highbury, N.	0	5	0
Des Forges, J. H., 61, Lowgate, Hull	0	5	0
Dewar, Mrs., 154, Upper Whitecross Street, E.C.	0	10	6
Dickeson, Richard, Esq., J. P., Dover (per Mr. Bottle)	1	1	0
Dickie, James, 19, Struan Terrace, Victoria Road, Glasgow	0	5	0
Dixon, Henry, Ryde, Isle of Wight	0	10	6
Dixon, Joseph, 30, Whitefriargate, Hull	0	15	6
Dobson, J. B., 47, Great Union Street, Hull	0	5	0
Down, R. H., Torpoint	0	10	6
Dowty, Robert, 175, Kentish Town Road, N.W.	0	2	6
Duffin, Thomas, Wakefield	0	10	6
Duncan, Alexander, Commercial Road, Bournemouth	1	1	0
Duncan, Flockhart and Co., Edinburgh	1	1	0
Duncan, William, Rothesay	0	5	0
Duncanson, William, Port Street, Stirling	0	10	6
Dunkley, Edward, High Street, Tunbridge Wells	0	10	6
Dymott, F., 55, Grosvenor Street, W.	0	5	0
Dyson, George, 20, Mytongate, Hull	0	5	0
Eade, George, 72, Goswell Road, E.C.	1	1	0
Eade, James, 72, Goswell Road, E.C.	1	1	0
Earle, Francis, 22, Market Place, Hull	1	1	0
Edwards William, Denbigh	0	5	0
Edwards, William S., 14, Etham Place, Old Kent Road, S.E.	0	5	0
Elliot, Robert John, Church Street, Liverpool	0	10	6
Ellis, G. H., Pavement, Finsbury, E. C.	0	10	6
Elvey, Thomas, 8, Halkin Street, West	1	1	0
Entwisle, John B., 65, Duke Street, Liverpool	0	5	0
Evans, H. Sugden, 60, Bartholomew Close, E.C.	1	1	0
Eve, Charles, 37, Lombard Street, E. C.	1	1	0
Exley, George, Leeds	0	5	0
Fairlie, Jas. M., 17, St. George's Road, Glasgow	0	5	0
Feaver, Samuel, Duke Street, Truro	0	10	6
Fenn, John Thomas, 83, Regent Street, Westminster, S.W.	0	10	6
Fenwick, John, 17, Bute Terrace, Glasgow	0	5	0
Fergusson, John, 6, Strand Street, Liverpool	1	1	0
Field, William, 83, Brompton Road, S. W.	1	1	0
Fincham, Robert, 57, Baker Street, W.	1	1	0
Fisher & Son, Ramsgate	2	2	0
Fisher, C. H., 22, Cecil Street, Carlisle	0	5	0
Fisher, J. R., 5, Witham, Hull	0	5	0
Fitt, Francis E., Barking	0	10	6
Fitzhugh, Richard, Nottingham	0	10	6
Flower, Thomas S., Pier Street, Ryde, Isle of Wight	0	5	0
Foggitt, William, Thirsk	0	10	6
Foott, Richard R., 8, Stockbridge Terrace, S. W.	0	10	6
Forrest, Richard, 20, Cork Street, Bond Street, W.	1	1	0
Forrest, R. W., Gainsborough	0	10	6
Forrest, Robert, Commercial Road, South Shields	0	10	6
Foster, Alfred H., Navigation Street, Birmingham	0	5	0
Foster, Edward, 50, Friargate, Preston	0	10	6
Foster, James A., Birmingham	0	5	0
Foulkes, William James, 21, Grange Mount, Birkenhead	1	1	0
Francis, George, 1, Belle Vue Place, Great Malvern	0	5	0
Francis, George B., 5, Coleman Street, E. C.	1	1	0
Franklin, James, 93, Southgate Street, Spa, Gloucester	0	5	0
Frazer, Daniel, 113, Buchanan Street, Glasgow	1	1	0
Freestone, Thomas M., Bedminster Parade, Bristol	0	10	6
French, John, 293, High Street, Chatham	0	10	6
Fresson, Lewis F., Stevenage, Herts	0	5	0
Froom, William Henry, 75, Aldersgate Street, E. C.	1	1	0
Fryer, Henry, 4, Market Place, Huddersfield	0	10	6
Furze, Mrs. H., 6, Havelock Terrace, Forest Hill	6	10	6
Gale, Henry, 3, Millbrook Place, Camden Town, N.W.	0	10	6
Gale, Samuel, 338, Oxford Street, W.	1	1	0
Garbutt, Cornelius D., 16, High Street, Gateshead	0	10	6
Gardener, Charles, Grove Hill Road, Tunbridge Wells	0	10	6
Gardner and Ainslie, 58, George Street, Edinburgh	0	10	6
Gibson, C. P., Trustees of the late, 16, Whitefriargate, Hull	0	5	0
Gibson, John B., High Street, Grantham	0	10	6
Gibson, Robert, Hulme, Manchester	1	1	0
Gilmour, William, 11, Elm Row, Edinburgh	1	1	0
Glover, George, 19, Goodge Street	1	1	0
Goggs, Nathaniel W., Great Yarmouth	0	5	0
Goodall, Backhouse and Co., Leeds	2	2	0
Goodchild, Robert S., Well Street, South Hackney, E.	0	5	0
Goss, Samuel, 1, High Street, Barnstaple	0	10	6
Gostling, George J., Ipswich Street, Stowmarket	0	10	6
Gould, Robert George, Fowey	0	5	0
Gow, Alexander, Dudley Street, Wolverhampton	0	10	6
Granger, Edwin J., Upper Clapton, E.	1	1	0
Greaves, Abraham, Chesterfield	0	10	0
Greaves, A. W., Chesterfield	0	5	0
Greaves, William Samuel, Ironville, Chesterfield	0	5	0
Green, Samuel, 2, York Place, Nunhead, S.E.	0	5	0

Green, Thomas, 7, Corn Market, Belfast	0	5	0
Greenall, Alfred, 303, Breck Road, Liverpool	0	10	6
Greenish, Thomas, 20, New Street, Dorset Square, N.W.	1	1	0
Greenwood, Charles, 20, Parliament Street, Harrogate	0	10	6
Gregory, George H., East Street, Taunton	0	5	0
Griffith, Richard, High Street, Slough	0	10	6
Grindall, William, 54, Charles Street, Hull	0	5	0
Grisdock, Thomas, 42, South Street, Manchester Square, W.	1	1	0
Gudgen, Geo. B., Kimbolton	0	5	0
Guest, Geo. C., St. John's Square, Burslem	0	2	6
Hackman, Leonard L., Lake Road, Landport	0	10	6
Hall, H. R. F., 1, Beverley Road, Hull	0	5	0
Hall, Thomas, Grantham	0	10	6
Hambly, Charles J., Lydney Terrace, Taunton	0	10	6
Hames, John, Boutport Street, Barnstaple	0	5	0
Hampson, Robert, 205, St John Street Road, E.C.	1	1	0
Handley, Charles, 45, High Street, Stoke Newington, N.	0	10	6
Handley, Thomas, 14, Market Place, Loughborough	0	5	0
Hargreaves, Joseph and Son, 108, Fylde Road, Preston	0	5	0
Harris, Daniel R., 55, St. James's Street, S.W.	1	1	0
Harris, Henry W., 208, High Street, Rochester	0	10	6
Harris, H., Infirmary, Tunbridge Wells	0	10	6
Harrison, William, Kirkby Lonsdale	0	10	6
Harrower, Peter, 136, Cowcaddens Street, Glasgow	0	5	0
Hart, G. W., 9, Scale Lane, Hull	0	10	6
Hart, James, 131, Embden Street, Hulme	0	10	6
Harvey, Joseph S., 11, Market Jew Street, Penzance	0	5	0
Harvey, Thomas, Leeds	1	1	0
Harvey, W. R., 98, Humberstone Road, Leicester	0	10	6
Harvey, W. S., Margate	0	10	6
Harwood, Charles, 3, Lee Place, Lewisham	0	5	0
Haydon, Frederick W., Fordingbridge	0	5	0
Hayles Brothers, Ealing	1	1	0
Hayman, Alfred, New Street, Neath	1	1	0
Hayward, W. G., Bridge Street, Reading	0	5	0
Heald, Benjamin, Sleaford	0	10	6
Heap, William, Fishergate, Preston	0	5	0
Hearder, H. P., Westwell Street, Plymouth	0	5	0
Henty, Henry M., 19, High Street, St. John's Wood, N.W.	0	5	0
Hewlins, Edward, Leatherhead	0	10	6
Hick, Allan, Wath-upon-Dearne	0	10	6
Hickey, Evan L., 199, King's Road, Chelsea, S.W.	0	10	6
Hickley, Thomas P., 297, Edgware Road, W.	0	10	6
Hifley, Richard James, 7, Cobourg Street, Plymouth	0	5	0
Higgins, Tom Sellers, Huddersfield	0	10	6
Highley, William, Drake Street, Rochdale	0	5	0
Hill, A. B., Southwark Street, S.E.	1	1	0
Hill, William, Ipswich	0	5	0
Hillidge, George, 140, Friargate, Preston	0	5	0
Hills, Thomas Hyde, 338, Oxford Street, W.	5	5	0
Hills, Walter, 338, Oxford Street, W.	1	1	0
Hind, Thomas William L., Kendal	1	1	0
Hinds, H. D., The Mount, Pontardulais	0	5	0
Hirst, Brooke, and Hirst, Leeds	2	2	0
Hodgkinson, Charles, 127, Aldersgate Street, E.C.	0	10	6
Hodgkinson, George A., 86, Amhurst Road, Hackney, E.	0	5	0
Hodgkinson, Jno. Samuel, Matlock Bridge	0	10	6
Hodgkinson, Preston, and King, 88, Leadenhall Street, E.C.	2	2	0
Hodgkinson, Stead, and Treacher, 127, Aldersgate Street, E.C.	2	2	0
Hogarth, William, Friargate, Preston	0	10	6
Hogg, Thomas, Bideford	0	5	0
Holdsworth, Thomas William, 28, Upper Priory, Birmingham	0	10	6
Holford, Thomas, 342, High Street, Stratford, E.	0	10	6
Hollier, Elliott, Market Place, Dudley	0	10	6
Holloway, John, Finsbury Road, Wood Green	0	10	6
Holt, Richard W., Victoria Road, Seacombe	0	5	0
Hopwood, Thomas S., Richmond, Surrey	1	1	0
Hora, Henry W., 58, Minories, E.	1	1	0
Horncastle, John, 17, Craven Road, W.	0	10	6
Hough, William, 16, Corn Market, Doncaster	0	10	6
Howard, Richard, Rochester Place, Tunbridge Wells	0	10	6
Howden, Robert, 78, Gracechurch Street, E.C.	1	1	0
Howell, Maurice, 61, High Street, Peckham, S.E.	0	10	6
Hughes, James, 219, Pitt Street, Sydney	2	2	0
Hughes, Samuel, High Street, Stourbridge	0	10	6
Hughes, Thomas, Red House, Llandilo	0	10	6
Hugill, John, 147, Cannon Street, E.C.	1	1	0
Hunt, Charles, 29, Chapel Street, S.W.	0	10	6
Hunt, Thomas, Brownlow Hill, Liverpool	0	10	6
Jackson, Christopher, Church Road, Acton	0	10	6
Jackson, H., 2, Brook's Alley, Liverpool	0	10	0
Jackson, Roberts, Nottingham	0	5	0
Jackson, W. and H., 4, Cleveland Square, Liverpool	0	10	0
Jameson and Co., Hastings	0	10	0
Jarvis, John, 4, Rue Serviez, Pau	1	1	0
Jefferson, Peter, Meadow Lane, Leeds	0	10	6
Jenkins, John Thomas, New Radford, Notts	0	5	0
Jeynes, George W., 62, Princess Street, Edgware Road, W.	0	5	0
Johnson, J. B., Uttoxeter	0	10	6
Johnson, Robert D., 59, Camberwell New Road, S.E.	0	10	6
Johnson, T. S., 75, Bury New Road, Manchester	1	1	0
Joint, R. J., Chulmleigh	0	6	0
Jones, Alfred, Victoria Road, Scarborough	0	5	0
Jones, E. Powell, Rhyl	0	10	6
Jones, Frederick, 175, Kentish Town Road, N.W.	0	5	0

Jones, F. W., 11, Norton Folgate, E.	0	10	6
Jones, Humphrey, Llangollen	0	5	0
Jones, J. E., 21, West Street, Horsham	0	5	0
Jones, Owen L., 55, Brownlow Hill, Liverpool	1	1	0
Jones, Rowland G., The Lye, Stourbridge	0	5	0
Jones, William, 19, Berry Street, Liverpool	0	5	0
Jones, William, 8, Richmond Terrace, Shepherd's Bush, W.	0	5	0
Jones, Wm. J., 3, Newland Terrace, Kensington	0	10	6
Jones, W. R., 16, Jamaica Row, Birmingham	1	1	0
Jull, Thomas, 2, Moreton Street, West, S.W.	0	5	0
K. E. S.	0	10	6
Kaye, Hamor, Berry Brow, Huddersfield	0	5	0
Kellington, M. L., Brooke Street, Hull	0	10	6
Kemp, David, Portobello	0	10	6
Kendall, Charles F, 126, Clapham Road, S.W.	0	10	6
Kent, Thomas, 226, Blackfriars Road, S.E.	0	10	6
Kent, Thomas R., 103, Westminster Bridge Road, S.E.	0	10	6
King, Abraham, 1, High Street, Dunstable	0	10	6
King, Henry, 1, Churton Street, Pimlico, S.W.	1	1	0
King, James H, 389, New Chester Road, Birkenhead	0	5	0
King, William, 4, Market Place, Huddersfield	0	10	6
Kingerlee, G., Buckingham	0	10	6
Kinninmont, Alexander, 69, South Portland Street, Glasgow	0	10	6
Kirkman, Charles J., Dedham, Essex	0	5	0
Kirkpatrick, Samuel, East Street, Taunton	0	5	0
Kirton, Joseph B., 53, Savile Street, Hull	0	10	6
Knight, James, New Park Road, Brixton Hill	0	10	6
Lake, Richard, 63, Lupus Street, Pimlico, S.W.	1	1	0
Lamb, Thomas C., 137, High Street, Chatham	0	5	0
Lambert, Thomas, 10, Ashton New Road, Bradford, Manchester	2	2	0
Lang, William, Kirkdale, Upper Sydenham	0	10	6
Large, John H., 65, New North Road, N.	0	10	6
Lasham, John, William, High Street, Romford	0	10	6
Laurence, Frederick, 383, Kentish Town Road, N.W.	0	10	6
Lavers, Thomas H., 5, Montpelier Vale, Blackheath	1	1	0
Leete, William W., 282, Oxford Street, Manchester	0	10	6
Leicester, Thomas, Market Place, Burslem	0	10	6
Lescher, J. S., 60, Bartholomew Close, E.C.	1	1	0
Lewinton, A. B., 14, Cleveland Street, W.	1	1	0
Lines, George, Market Place, Hertford	0	10	6
Little, Robert, Church Street, Carlisle	0	2	6
Lloyd, J. W., 90, Oxford Street, Swansea	0	5	0
Lloyd, John, Dunraven Place, Bridgend	0	5	0
Lockyer, George, 208, High Street, Deptford, S.E.	0	10	6
Lomas, C. B., High Street, Maidenhead	0	5	0
Long, Henry, Brighton	0	10	6
Long, Henry, 90, High Street, Croydon	0	10	6
Lord, Ellis, Yorkshire Street, Rochdale	0	5	0
Loverock, Henry, Enville Street, Stourbridge	0	5	0
Lowe, Walter, 21, Rosamond Street West, Manchester	0	10	6
Luff, Richard, 1, Bute Street, South Kensington	0	10	6
McCulloch, Frederick, 13, Hart Street, Covent Garden	1	1	0
McDonald, James, Apothecaries' Company, Glasgow	1	1	0
Macfarlan and Co, 17, North Bridge, Edinburgh	2	2	0
Macfarlane, A. Y., Broughton Street, Edinburgh	0	5	0
MacGeorge, William, 346, Essex Road, N.	0	10	6
Mackay, John, 119, George Street, Edinburgh	1	1	0
McLean, Kenneth, Lofthouse	0	10	6
Maitland, John, 10, Chester Place, W.	1	1	0
Manfield, John W., 78, Bury Street, Salford, Manchester	0	5	0
Manifold, John J., Weaverham, Cheshire	0	10	6
Marlor, Jabez, 88, High Street, Lees, near Manchester	0	5	0
Marshall, Gervas, 33, Blackburn Street, Accrington	0	6	6
Marshall, J. A., Waltham Abbey	0	10	6
Marshall, John F., Market Place, Gainsborough	0	10	6
Marshall, Robert, 9, Market Place, Boston	0	5	0
Marston, J. T., 105, London Wall, E.C.	0	10	6
Martin, Henry G., St. Albans	0	10	0
Mathew, William H., 35, Fore Street, Saltash	0	5	0
Matthews, William, 12, Wigmore St., Cavendish Square, W.	0	10	6
Maunder, Robert, 714, Rochdale Road, Manchester	0	10	6
May, John, Garden Wharf, Battersea	0	10	6
Mayfield, John Thomas, 13, Mosley Street, Newcastle-on-Tyne	0	10	6
Mayger, W. D., Regent Square, Northampton	0	10	6
Mays, Robert J. J., 3, Market Place, South Shields	0	10	6
Medcalf, Benjamin, Ware	0	10	6
Mellin, Charles J., High Street, Eltham	0	5	0
Mercer, John, 63, Mandland Bank, Preston	0	5	0
Merrell, James, 1, Queen's Terrace, Camden Road	1	1	0
Merrick, Thomas J., 33, Drapery, Southampton	0	10	6
Merrikin, John B., Beaufort Buildings West, Bath	0	5	0
Middleton, Francis, 338, Oxford Street, W.	1	1	0
Miller, Cecil B., George Street, Richmond	0	5	0
Miller, Nathaniel, London Road, Preston	0	5	0
Milner, J. G., 13, Bridge Street, Hull	0	5	0
Mitchell, John, 151, Oxford Street, Manchester	0	10	6
Mitchell, John, 254, Upper Street, Islington	0	10	6
Morris, Alfred P., High Street, Stourbridge	0	10	6
Morton, Henry, 26, Harbour Street, Ramsgate	0	5	0
Mould, Samuel, 21, Moorgate Street, E.C.	0	10	6
Mumbray, H. G., 215, Great Cheetham Street, Manchester	0	10	6
Mundy, Alfred O., 11, Norton Folgate, E.	0	10	6
Murdoch, Bros., 131, Sauchiehall Street, Glasgow	0	10	6
Muskett, A. C., 64, Park Street, Southwark	0	10	6
Myers, George, 68, High Street, Hull	0	10	6
Myers L., St. Alban's	0	5	0

Neve, Francis C., St. Leonard's	0	10	6
New, Walter W., 238, Essex Road, N.	0	10	6
Newman, Robert, Bewdley	0	10	6
Newman, W. F., Market Street, Falmouth	0	5	0
Nicholson, Frederick, 216, St. Paul's Road, Highbury, N.	1	1	0
Nicholson, Henry, 38, Argyle Street, Birkenhead	0	10	6
Nind, George, Wandsworth, S.W.	0	10	6
Nobbs, W. M., 290, Euston Road, N.W.	0	10	6
Noble, Alexander, 24, North West Circus, Edinburgh	1	1	0
Noble, John, King Street, South Shields	0	5	0
North, George T., 36, High Street, Bow, E.	0	10	6
Northcroft, Jonathan, George Street, Plymouth	0	5	0
Nosworthy, Robert, 236, Clapham Road, S.W.	0	10	6
Oldfield, Herbert, Chesterfield	0	5	0
Owen, John, 51, Holloway Road, N.	1	1	0
Owen, Samuel, 2, High Street, Leominster	0	5	0
Page, Charles, High Street, Barnstaple	0	5	0
Paget, John, 9, Churchgate, Loughborough	0	5	0
Paine, Standen, Exchange Street, Manchester	0	5	0
Palmer, Charles F., Fiveways, Edgbaston, Birmingham	0	10	6
Palmer, Francis, 7, Brunswick Parade, Upper Norwood, S.E.	0	5	0
Parker, William, 4, Penny Street, Lancaster	0	5	0
Parkinson, Richard, 1, William Henry Street, Liverpool	0	10	6
Parr, Samuel, Long Row, Nottingham	0	10	6
Partridge, James, High Street, Barnstaple	0	5	0
Pass, Horatio, 245, Wandsworth Road, S.W.	0	10	6
Pattison, George, 139, St. John Street Road, E.C.	1	1	0
Pattinson, J. T., Botchergate, Carlisle	0	5	0
Pattinson, Richard J, English Street, Carlisle	0	5	0
Payne, John, 125, Elmwood Street, Leeds	0	5	0
Payne, John B., 63, Piccadilly, Manchester	0	10	0
Peake, Arthur, Earlestown, Newton-le-Willows	0	5	0
Pearce, Joseph, Crewkerne	0	5	0
Pegg, Herbert, Birmingham	0	10	6
Percy, Thomas B., Victoria Place, Truro	0	10	6
Perks, Francis, High Street, Stourbridge	0	10	6
Pertwee, Edward, Romford	0	10	6
Pettigrew, John W., 145, St. George's Road, Glasgow	0	5	0
Pheysey, Richard, Waterloo, Liverpool	1	1	0
Pierson, Clement, 174, North Street, Leeds	0	5	0
Pipe, Walter, 1, King's College Road, Hampstead	0	10	6
Pocklington, James, Sydenham	0	10	6
Pollard, Henry H., Ryde, Isle of Wight	0	10	6
Pond, George P., 68, Fleet Street, E.C.	0	5	0
Pooley, John C., 8, George Street, Bath	0	5	0
Portbury, George Henry, 20, Brittox, Devizes	0	5	0
Porter, John, Coalville	0	5	0
Powell, E. F., Fiveways, Edgbaston, Birmingham	0	10	6
Pratt, Edmund, 8, Upper Berkeley Street, W.	1	1	0
Pratt, Edward, High Cross, Barnstaple	0	5	0
Pratt, G. W., 47, Cavendish Street, Manchester	0	10	6
Prince, Henry, Fore Street, Taunton	0	10	6
Price, John M., 290, Brixton Road, S.W.	0	10	6
Pughe, R. O., Pwllheli	0	2	6
Pumphrey, John, Port Street, Bengeworth, Evesham	0	5	0
Raffle, William, Green Street, South Shields	0	10	6
Raimes, Blanshard and Co, Smith Place, Edinburgh	1	1	0
Raimes and Co., 58, Hanover Street, Liverpool	0	10	6
Rainey, Edward, Spilsby	0	10	6
Rait, Robert C., Partick	0	5	0
Rastrick and Son, King's Road, Southsea	0	10	6
Raw, J. H., Park Gate, Darlington	0	5	0
Rawdin, Joseph, Jedburgh	0	5	0
Redman, Sidney, East Street, Taunton	0	5	0
Reece, John, 239, Price Street, Birkenhead	0	5	0
Reynolds, Freshfield, 13, Briggate, Leeds	0	10	6
Reynolds, Richard, 13, Briggate, Leeds	1	1	0
Richards, James E., Boscawen Street, Truro	0	2	6
Riches, Thomas, Torquay	0	5	0
Riddle, Joseph, West Holborn, South Shields	0	10	6
Rieveley, Charles, 33, Cleveland Street, Birkenhead	0	5	0
Rippon, R. O., Great Berkhampstead	1	1	0
Robbins J., and Co., 372, Oxford Street, W.	2	2	0
Roberts, Albinus, Market Place, St. Albans	1	1	0
Robertson, James, 35, George Street, Edinburgh	1	1	0
Robinson, A. F., Northgate, Darlington	0	5	0
Robinson, Benjamin, 1, Broad Street, Pendleton	0	5	0
Robinson, Charles T., Streatham	0	10	6
Robinson, Ralph, 58, Yorkshire Street, Rochdale	0	10	6
Robinson, Joseph S., Alfreton	0	10	6
Robson, John, Scotch Street, Carlisle	0	5	0
Rogers, William, 38, High Street, Maidstone	0	10	6
Rook, Edward, Sittingbourne	0	10	6
Rossiter, Frederick, George Street, Hastings	0	5	0
Rossiter, John, Royal Melville Hospital, Chatham	1	1	0
Rowell, Robert, Green Street, South Shields	0	5	0
Rowntree, Thomas, Westbourne Road, N.	0	10	6
Rowson, Henry, 2, Chichester Street, W.	1	1	0
Ryder, John, L., 23, Deepdale Terrace, Preston	0	5	0
Sagar, Henry, Caledonian Road, Leeds	0	5	0
Samuel, Edward, 217, Edgware Road, W.	0	10	6
Sandiland, R. B. & Son, Bicester	0	10	6
Sandy, Frederick W., 390, Walworth Road, S. E.	0	10	6
Sangster, Arthur, 66, High Street, St. John's Wood, N.W.	1	1	0
Sargent, John, 5, Fore Street, Taunton	0	10	6
Saunders, David P., Bridge Street, Haverfordwest	0	10	6
Saville, John, Market Place, Howden	1	1	0
Schacht, William, 6, Finsbury Place, E. C.	0	10	6

	£	s.	d.
Seath, Alexander, Dunfermline	0	5	0
Selleck, Edward, Apothecaries' Hall, E. C.	0	10	6
Sells, Robert James, Tunbridge Wells	0	10	6
Serpell, Samuel, 10, Lemon Street, Truro	0	10	6
Severs, Joseph, 23, Stricklandgate, Kendal	0	10	6
Sharples, George, Fishergate, Preston	0	5	0
Shaw, Charles, 85, Edgware Road, W.	0	10	6
Shelley, Henry, Twickenham	0	10	6
Shepherdson, W., 23, Lowgate, Hull	0	10	6
Shields, Robert James, High Street, Mexborough	0	5	0
Shillcock, Joseph B., Bromley, Kent	0	10	6
Shipman, John J., Bridge Street, Northampton	0	10	6
Sidley, Thomas J., 9, Brunswick Terrace, Stafford	0	10	6
Simpson, Robert, 16, Henry Street, Dublin	0	5	0
Simpson, Thomas, 6, Havelock Terrace, Forest Hill, S.E.	0	5	0
Sirett, George, Buckingham	0	10	6
Sirett, George B., Buckingham	0	10	6
Slack, Joseph, Scotch Street, Carlisle	0	5	0
Slater, Jonathan, Sadler Street, Wells	0	5	0
Slipper, James, 86, Leather Lane, E. C.	0	10	6
Sloman, Richard, Torquay	0	5	0
Smith, Anthony, 69, Queen Street, Hull	0	10	6
Smith, C. S., Middlesborough	0	5	0
Smith, Edward, 8, Strand, Torquay	0	5	0
Smith, James Singer, Northfleet, Kent	0	5	0
Smith, John Francis, 1, Carr Lane, Hull	0	5	0
Smith, Percy J., Balham	1	1	0
Smith, Samuel F., 32, All Saints' Street, King's Lynn	0	2	6
Smith, William, Nottingham	0	5	0
Smith, William, 157, Friargate, Preston	0	5	0
Smith, William, 2, Alfred Terrace, South Hackney, E.	0	10	6
Smith, William, Sutton Coldfield	0	10	6
Smith, William F., 280, Walworth Road, S.E.	1	1	0
Smith, William, 83, Western Road, Brighton	0	10	6
Snape, Edward, Birmingham	0	10	0
Southall, Brothers, and Barclay, Birmingham	2	2	0
Southall, Brothers, and Barclay, Birmingham (per H. Nicholson, Birkenhead)	0	10	6
Soutter, J. S., Hedon, Hull	0	10	6
Sparrow, W. C. F., 5, Pimlico Road, S.W.	1	1	0
Stafford, William, Gloucester	0	10	6
Staning, William, 55, Cogan Street, Hull	0	5	0
Stanway, Edward T., Horseley Fields, Wolverhampton	0	10	6
Steel, F. W., 283, Liverpool Road, N.	0	10	6
Stevenson, John, Whitby	0	10	0
Steward, William, 42, High Street, Bridgnorth	0	10	6
Stewart, Edward H., Royal Infirmary, Southampton	0	5	0
Stickland and Rowe, South Kensington, S.W.	1	1	0
Stoakes, Benjamin M., 16, Whitefriargate, Hull	0	5	0
Stoneham, Philip, 45, Craven Road, W.	0	10	6
Story, H. W., 43, Fish Street Hill, E.C.	0	10	6
Streater, James H., 3, Sloane Street, S.W.	0	10	6
Street, George, 265, Whitechapel Road, E.	0	10	6
Stringer, Alfred, Homend Street, Ledbury, S.W.	0	5	0
Strongitharm, W. G., 52, Royal York Crescent, Clifton	0	5	0
Sutterby, Jonathan N., Long Sutton	1	1	0
Sutton, Francis, Bank Plain, Norwich	0	10	6
Swift, Francis, Spalding	0	10	6
Symons, William, 26, Joy Street, Barnstaple	0	5	0
Tait, William, 139, Princes Street, Edinburgh	1	1	0
Taylor and Fletcher, 160, Briggate, Leeds	1	1	0
Taylor, Edward, 24, Yorkshire Street, Rochdale	0	10	6
Taylor, George S., 13, Queen's Terrace, St. John's Wood, N.W.	1	1	0
Taylor, James, Shadwell, South Shields	0	10	6
Taylor, John, 13, Baker Street, W.	0	10	6
Taylor, John, Wakefield	0	10	6
Taylor, Matthew, 6, Rye Lane, Peckham, S.E.	0	10	6
Taylor, Nathan, Castle Street, Carlisle	0	4	0
Taylor, Richard, Pier Street, Ryde, Isle of Wight	0	10	6
Taylor, Thomas, 81, High Street, Peckham, S.E.	1	1	0
Taylor, William, Saltburn-by-the-Sea	0	5	0
Tench, Richard, Chester House, Manor Road, Holloway, N.	1	1	0
Terry, Thomas, Withington, Manchester	0	5	0
Thomas, Jonathan J., Garstang, Preston	0	5	0
Thompson, Henry A., 22, Worship Street, Finsbury, E.C.	1	1	0
Thompson, John, Thirsk	0	10	6
Thompson, John T., Market Place, Richmond, Yorks	0	5	0
Thompson, Thomas, Market Place, Richmond, Yorks	0	10	6
Thorn, John James, 338, Oxford Street, W.	0	10	6
Thursfield, Jno. T., Kettering	0	5	0
Tippett, B. M., 3, Sloane Street, Knightsbridge, S.W.	0	10	6
Todd, Joe, English Street, Carlisle	0	5	0
Todd, Levi, Fishergate, Preston	0	5	0
Tomlinson Brothers, 97, Fishergate, Preston	0	10	6
Tomlinson, Thomas, 2, Lower Seymour Street, W.	1	1	0
Toone, Joseph V., 14, New Bond Street, Bath	0	10	0
Townend, Thomas F., West Auckland	0	5	0
Townsend, Charles, Elmstone Lodge, Denmark Road, South Norwood	0	10	6
Tribe, John, 137, High Street, Chatham	0	10	6
Trist, Richard, High Street, Pinner	0	5	0
Trotman, Alfred C., 16, Cambridge Street, Hyde Park	0	10	6
Troughton, Christopher, 72, Old Hall Street, Liverpool	0	5	0
Tuck, William H., 630, Mile End Road, E.	0	10	6
Tucker, Charles, South Street, Bridport	0	10	6
Turner, C. E., 63, Great Russell Street, W.C.	0	10	6
Turner, Edward A., 118, Balls Pond Road, N.	0	10	6
Turner, Robert, Oundle	0	10	6
Turton, R. C., Lansdowne Road, South Lambeth, S.W.	0	5	0
Twaddle, Robert, 34, Maitland Street, Glasgow	0	7	6
Tylee, John P., 7, Bridge Street, Bath	0	10	6
Vaughan, David, The Cross, Oswestry	0	10	6
Wakefield, C. H., Malvern Wells	1	1	0
Walsh, Edward, 209A, York Street, Cheetham, Manchester	0	10	6
Walton, George C., Sandgate, Kent	0	10	6
Walton, Ralph, High Street, Maidenhead	0	10	6
Warburton, Thomas, Atherton	0	5	0
Ward, F. E., Witham, Essex	0	5	0
Wastie, Francis, 183, Lower Kennington Lane, S.E.	0	10	6
Waterworth, Alfred, Friargate, Preston	0	10	6
Webb, E. A., 60, Bartholomew Close, E.C.	1	1	0
Weddell, Arthur, 45, High Street, Winchester	0	5	0
Welborn, George, Finkin Street, Grantham	0	5	0
Wellington, James M., Oakham	0	10	6
Weston, Samuel J., 151, Westbourne Terrace, W.	1	1	0
Westrup, Joseph B., 76, Kensington Park Road, W.	0	10	6
Whincup, William, 404, Essex Road, N.	0	10	6
White, Frank, 8, London Road, Nottingham	0	10	6
Whittle, Elias C. C., Park House, St John's Wood, N.W.	0	5	0
Whitwell, George, High Street, Stourbridge	0	5	0
Wickham, William, 509, New Cross Road, S.E.	0	10	6
Wigg, William C., 17, High Street, King's Lynn	0	5	0
Wilkinson, George, 267, Waterloo Road, Manchester	0	10	6
Wilkinson, William, 263, Cheetham Hill, Manchester	1	1	0
Williamson, B., Market Place, South Shields	0	10	6
Williams, John T., 19, Nelson Street, Swansea	0	10	6
Williams, Joseph J., 13, Desborough Place, Harrow Rd., W.	0	10	6
Williams, Philip, 21, West Street, Horsham	1	1	0
Williams, William, Tenby	0	5	0
Williams, William J., 137, Cannon Street, E.C.	0	10	6
Williams, W. P., Long Row, Nottingham	0	10	6
Wilson, Joseph, Bath	0	5	0
Woodcock, Page D., St. Faith's, Norwich	0	10	6
Woodhouse, George, Chester Street, Shrewsbury	0	5	0
Woods, Charles, Thoroughfare, Harleston	0	5	0
Woodward, William, 69, Long Row, Nottingham	0	5	0
Wooldridge, John, 290, Euston Road, N.W.	0	10	6
Woollatt, Richard, Fore Street, Taunton	0	5	0
Woolrich, Charles J., Uttoxeter	0	10	6
Wootton, William, 33, Liverpool Road, N.	0	10	6
Worth, Edwin, Town Hall, Bournemouth	1	1	0
Wretts, John R., 338, Oxford Street, W.	0	10	6
Wright, George, 102, High Street, Burton-on-Trent	0	10	6
Wylde, George, 53, King's Road, Chelsea, S.W.	0	10	6
Yarde, Giles, 60, Lamb's Conduit Street, W.C.	1	1	0
Yates, Saml. P., Plough Court, Lombard Street, E.C.	0	5	0
Yates, Wm. L., South Brent	0	5	0
Yewdall, Edwin, 40, Wade Lane, Leeds	0	10	6
Young, George, 12, Ebenezer Terrace, Millwall	0	5	0
Young, Robert F., Station Road, New Barnet	0	10	6

Donations.

	£	s.	d.
Battley and Watts, Cripplegate, E.C.	2	2	0
British Pharmaceutical Conference, London Meeting. Balance of subscriptions to the Local Fund, per M. Carteighe, Honorary Local Secretary	66	15	4
Cole, Frederick, 186, High Street, Stoke Newington, N.	0	10	6
Executrix of the late D. J. Bailey, Halnaker	1	1	0
Schweitzer, Julius, 79, Pavilion Road, S.W.	10	10	0
Tait, William, 139, Princes Street, Edinburgh	2	2	0

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture VI.

Physical deterioration from Alcohol, continued. Influence on the vital organs. Mental phenomena induced by its use. Summary.

(*Continued from page* 999.)

Alcoholic Insomnia or Sleeplessness.

Lastly on this head, the perverted state of the vessels of the brain itself, the unnatural tension to which they are subjected from the stroke of the heart, which they are so incompetent to resist, sets up in the end one telling, and of all I have yet named most serious phenomenon, I mean *insomnia*, inability to partake of natural sleep. There is a theory held by some physiologists that sleep is induced by the natural contraction of the minute vessels of the

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

brain, and by the extrusion, through that contraction, of the blood from the brain. I am myself inclined, for reasons I need not wait to specify now, to consider this theory incorrect; but it is nevertheless true that during natural sleep the brain is receiving a reduced supply of blood; that when the vessels are filled with blood without extreme distension, the brain remains awake, and that when the vessels are engorged and over-distended, there is induced an insensibility which is not natural sleep, but which partakes of the nature of apoplexy. This sleep is attended with long and embarrassed breathing, blowing expirations, deep snoring inspirations, and uneasy movements of the body, with even convulsive motion, and from it the apparent sleeper wakes unrefreshed and unready for the labours of the day. The effect of alcohol, then, on the brain, is to maintain the relaxation of vessels, to keep the brain charged with blood, and so to hold back the natural repose. Under such form of divergence from the natural life, the sleepless man lies struggling with unruly and unconnected trains of thought. He tries to force sleep by suppressing with a great effort all thought, but in an instant wakes again. At last the more he tries the less he succeeds, until the morning dawns. By that long time the spirit that kept his cerebral vessels disabled and his heart in wild unrest having become eliminated, he is set free, and the coveted sleep follows. Or perhaps wearied of waiting for the normal results, he rises, and with an additional dose of the great disturber, or with some other tempting narcotic drug of kindred nature, such as chloral, he so intensifies the vascular paralysis as to plunge himself into the oblivion of congestion, with those attendant apoplectic phenomena, which he himself hears not, but which, to those who do hear, are alarming in what they forbode, when their full meaning is appreciated. Connected with this sleep there is engendered in some persons a form of true epilepsy, which all the skill of physic is hopeless to cure, until the cause is revealed and removed.

And now I think I have said everything that I have time to say respecting the general phenomena incident to this primary stage of slow alcoholic intoxication in those who in the world's eye, as well as in their own, are temperate individuals—individuals who enjoy the choice things of this life heartily; who understand a glass of wine, and who can take a good many glasses—or a good many little "goes" of spirit if that be all—but who are never known by friend or foe to be worse for anything they take; who grow mellow as an apple under the mellowing cheer, but never fall, or lose their power of taking less guarded companions safely home.

Organic Deteriorations.

The continuance of the effects of alcohol into a more advanced stage leads to direct disorganization of vital structures. When once this stage has been reached not one organ of the body escapes the ravage. According to the build or the hereditary construction of the individual, however, or according sometimes to what may be considered as a local accident, some particular organ undergoes a change which gives a specific character to the whole of the phenomena that are afterwards presented. We then say of the person in whom such change occurs that he is afflicted with such a particular disease, letting the general sink into the local manifestation. Many purely local modifications of structures and parts are in this manner induced in the blood; in the minute structure of the moving organs—the muscles; in the fixed vital organs, such as the brain, the lungs, the liver, the heart, the kidneys. In the blood the influence is exerted upon the plastic fibrine and upon the corpuscles, in the brain, on the membranes at first, and afterwards on the nervous matter they enclose; in the lungs, on the elastic, spongy, connective tissue, which is, strictly speaking, also membranous; in the heart, on its muscular elements and membranes; in the liver, primarily on its membranes; in the kidneys, on their connective tissues and membranes.

Special Structural Deteriorations.

The organ of the body that perhaps the most frequently undergoes structural changes from alcohol is the *liver*. The capacity of this organ for holding active substances in its cellular parts is one of its marked physiological distinctions. In instances of poisoning by arsenic, antimony, strychnine, and other poisonous compounds, we turn to the liver, in conducting our analysis, as if it were the central depôt of the foreign matter. It is, practically, the same in alcohol. The liver of the confirmed alcoholic is probably never free from the influence of the poison; it is too often saturated with it.

The effect of the alcohol upon the liver is upon the minute membranes or capsular structure of the organ upon which it acts to prevent the proper dialysis and free secretion. The organ at first becomes large from the distention of its vessels, the surcharge of fluid matter, and the thickening of tissue. After a time there follow contraction of membrane, and slow shrinking of the whole mass of the organ in its cellular parts. Then the shrunken, hardened, roughened mass is said to be "hob-nailed," a common but expressive term. By the time this change occurs, the body of him in whom it is developed is usually dropsical in its lower parts, owing to the obstruction offered to the returning blood by the veins, and his fate is sealed.

Now and then, in the progress to this extreme change and deterioration of tissue, there are intermediate changes. From the blood, rendered preternaturally fluid by the alcohol, there may transude, through the investing membrane, plastic matter which may remain, interfering with natural function, if not creating active mischief. Again, under an increase of fatty substance in the body, the structure of the liver may be charged with fatty cells, and undergo what is technically designated fatty degeneration. I touch with the lightest hand upon these deteriorations, and I omit many others. My object is gained if I but impress you with the serious nature of the changes that, in this one organ alone, follow an excessive use of alcohol.

In the course of the early stages of deterioration of function of the liver from organic change of structure, another phenomenon, leading speedily to a fatal termination, is sometimes induced. This new malady is called diabetes, and consists in the formation in enormous quantity within the body of glucose or grape sugar, which substance has to be eliminated by dialysis, through the kidneys—a fatal elimination. The injury causing this disease through the action of alcohol may possibly be traced back to an influence upon the nervous matter; but the appearance of the phenomenon is coincident with the derangement of the liver, and I therefore refer to it in this place.

The *kidney*, in like manner with the liver, suffers deterioration of structure from the continued influence of alcoholic spirit. Its minute structure undergoes fatty modifications; its vessels lose their due elasticity and power of contraction; or its membranes permit to pass through them that colloidal part of the blood which is known as albumen. This condition reached, the body loses in power as if it were being gradually drained even of its blood. For this colloidal albumen is the primitively dissolved fluid out of which all the other tissues are by dialytical processes to be elaborated. In its natural destination it has to pass into and constitute every colloidal part.

The *lungs* do not escape the evil influence that follows the persistent use of alcohol. They, indeed, probably suffer more than we at present know from the acute evils imposed by this agent. The vessels of the lungs are easily relaxed by alcohol; and as they, of all parts, are most exposed to vicissitudes of heat and cold, they are readily congested when, paralysed by the spirit, they are subjected to the effects of a sudden fall of atmospheric temperature. Thus, the suddenly fatal congestions of lungs which so readily befall the confirmed alcoholic during severe winter seasons.

Alcoholic Phthisis, or the Consumption of Drunkards.

There are yet other and more prolonged, and more certainly fatal mischiefs induced in the lungs by the persistent resort to alcohol; and to one of these I would direct special attention. It is that deterioration of lung tissue to which, in the year 1864, I gave originally the name of *alcoholic phthisis*, or the *consumption of drunkards*. The facts came before me at first in this manner. In a public hospital to which I acted as physician, I had brought before me, in the course of many years, two thousand persons who were suffering from consumption. I gathered the history of the lives of these, and of the reasons why they had passed into the all but hopeless malady from which they suffered. In my analysis of these histories I found that the causes of the malady altogether were, in the great majority of instances, predisposition from hereditary taint; exposure to impure air; want; or certain other allied causes. But the analysis being conducted rigidly, I discovered that, when every individual instance had been classified as due to the causes stated above, there remained thirty-six persons, or nearly two per cent. who were excluded from them, who appeared to suffer purely from the effects of alcohol, and in whom the consumption had been brought into existence by the use of alcohol.

The added observations of eleven years, since the abovenamed fact was recorded in the *Social Science Review*, as a new fact in the history of the disease, have only served to prove, in the minds of other men as well as my own, the truth of the record.

The persons who succumb to this deterioration of structure induced by alcohol, are not the exceedingly young, neither are they the old. They are usually over twenty-eight and under fifty-five. The average age may be taken as forty-eight. They are persons of whom it is never expected that their death will be from consumption; they are generally males. They are probably considered very healthy;—men who can endure anything, sit up late at night, run the extreme of amusements, and yet get through a large amount of business. They sleep well, eat pretty well, and drink very well. They are often men of excellent build of body, and of active minds and habits. They are not a class of drinkers of strong drinks, who sleep long, take little exercise, and grow heavy, waxy, pale—

"Sleek-headed men and such as sleep o'nights."

On the contrary they take moderate rest, and see as much as they can. Neither in the ordinary sense are they drunkards: they may never have been intoxicated in the whole course of their lives; but they partake freely of any and every alcoholic drink that comes in their way, and they bear alcohol with a tolerance that is remarkable to observers. They are hard drinkers as distinguished from sots. Beer is to them as water, wine is weak; the only thing that upsets them is stiff grog in relays, or a mixture of spirituous drinks carried to the extent of what they call in grim joke—in which death surely joins—"piling up the agony."

As a rule these cannot live in what they consider to be comfort without a daily excess of alcohol, which excess must needs be renewed on emergencies, if there be greater amount of work to be done, less sleep to be secured, or more life to be lived.

As specimens of animal build these persons are often models of organic symmetry and power. In fact they resist the enemy they court for so long a time because of the perfection of their organization. More than half of those whom I have seen stricken down with alcoholic phthisis have said that they never had a day's illness in their lives before: but questioned closely it was found that none of them had actually been quite well. Some of them had suffered from gout; others from rheumatism or neuralgia. They had felt severely any depression, such as that which arises from a cold, and if they had been subjected suddenly to causes of excitement or exhaustion, they had detected without actually realizing its full meaning, that their balance of power against weakness was reduced, that the end of the beam called strength was rising, and that an extra quantity of alcohol was required to bring back equilibrium. As a rule men of this class are thoughtless of their own health and their own prospects, for they have an abundant original store of energy. They are designated as "happy-go-lucky" men, or as men who "always fall on their feet," which truly they do, but not without injury.

The countenance of the alcoholic consumptive differs from that which is usually considered the countenance of the consumptive person, and equally from that which all the world adjudges as belonging to the man who indulges freely in strong drink. Who does not remember the wan, pale, sunken cheek of the youth on whom ordinary consumption has set its mark? And who, again, does not recall the *facies alcoholica*—the blotched skin, the purple red nose, the dull, protruding eye, the vacant stare of the confirmed sot? The alcoholic consumptive has none of these characteristics. His face is the best part of him in all his history. When his muscles have lost their power, and his clothes hang loosely on his shrunken limbs, he is still of fair proportion in the face; he has little pallor, and he is expressive of feature, so that his friends are apt to be deceived and to believe that there must be hope for his recovery, even when he is beyond every hope. I remember being actually taken aback on one occasion on finding, in a man who seemed, from his face, to be in perfect health, how completely destroyed his lungs were by the encroachments of disease; and I cannot be surprised, therefore, that others, less informed, should share in such an imperception of danger when it is close at hand. Nobody, in a word "pities the looks" of these sufferers, and good eyes are necessary to learn that pity is called for.

The phenomena are not always developed at a time when the sufferer from them is indulging most freely in alcohol. On the contrary, it is by no means uncommon that the habit of excessive indulgence has been stopped for some time previously to their development. The reasons assigned by the patients for abstinence vary. One man may have been strongly advised by his friends to desist, or may himself have undergone a certain measure of reform; another has been led by the reading or hearing of arguments on temperance; a third, by want of means to obtain the indulgence; but by far the larger number tell you that a time came when the desire for so much drink did not occur to them. They will state that they tried the round of the various spirits, but found that none agreed with them as before, so that at last they were driven to rely on beer as the only drink they cared for. We read all this off clearly enough from a physiological point of view. We see that, in fact, the body has been resisting the alcohol; that it could not do away with it as it did when all the excreting organs were in their full prime; and that those drinks only can be borne in which the amount of alcohol is least, but the sufferer does not comprehend the fact, and therefore he not unfrequently concludes that his increasing langour and debility are due to the necessary withdrawal of the stimulus on which he seems to have been actually feeding during the greater part of his life.

The signs which first indicate failure of health are usually those of acute pleurisy. There is pain in the side, quick, sharp, startling. The term "stitch" in the side is commonly applied to this pain, and is expressive enough. After a time the pain becomes continuous, and when it subsides, suppressed breathing, or difficulty of filling the chest, is at once felt and recognized. This difficulty is due to the circumstance that a portion of lung has become adherent to the inner surface of the chest. The next sign indicating that the disease (consumption) is present, is, usually, vomiting of blood. In two-thirds of the examples to which my attention has been directed this has been the sign that has first caused serious alarm. It is commonly on this event that the physician is called in, who examines the chest with the stethoscope, and finds too often a condition that is hopeless. From the appearance of that sign all is—down, down, down towards the grave.

There is no form of consumption so fatal as that from alcohol. Medicines affect the disease but little, the most judicious diet fails, and change of air accomplishes but slight real good. The sick man with this consumption may linger longer on the highway to dissolution than does his younger companion, but there is this difference between them, that the younger companion does often leave the highway to find a by-path to health, while the other never leaves it, but struggles on straight to the end. In plain terms, there is no remedy whatever for alcoholic phthisis. It may be delayed in its course, but it is never cured, and not unfrequently instead of being delayed it runs on to a fatal termination more rapidly than is common in any other type of the disorder.

The origin of this series of changes from alcohol is, as you will perceive, again on the membranes. The course of it is through the membranous tissues. The vessels give way after a severe congestive condition, and blood is exuded, or extravasated into the lung.

Alcoholic Disease of the Heart.

The heart, not less than the rest of the vital parts, is subjected to deterioration of structure from alcohol. We need not wonder at this when we recall the strain to which it is subjected by the agent, the excess of work it is made to perform. I touched on the mechanical evils that befell the heart from these circumstances in my last lecture, and the structural evils which I have now to specify are not less grave. The membranous structures which envelop and line the organ are changed in quality, are thickened, rendered cartilaginous, and even calcareous or bony. Then the valves, which are made up of folds of membrane, lose their suppleness, and what is called valvular disease is permanently established. The coats of the great blood-vessel leading from the heart, the aorta, share not unfrequently in the same changes of structure, so that the vessel loses its elasticity and its power to feed the heart by the recoil from its distention, after the heart, by its stroke, has filled it with blood.

Again, the muscular structure of the heart fails, owing to degenerative changes in its tissue. The elements of the muscular fibre are replaced by fatty cells; or if not so replaced are themselves transferred into a modified muscular texture in which the power of contraction is greatly reduced.

Those who suffer from these organic deteriorations of the central and governing organ of the circulation of the blood learn the fact so insidiously, it hardly breaks upon them until the mischief is far advanced. They are for years conscious of a central failure of power from slight causes, such as over-exertion, trouble, broken rest, or too long abstinence from food. They feel what they call "a sinking," but they know that wine or some other stimulant will at once relieve the sensation. Thus they seek to relieve it until at last they discover that the remedy fails. The jaded, over-worked, faithful heart will bear no more; it has run its course, and—the governor of the blood stream broken—the current either overflows into the tissues, gradually damming up the courses, or under some slight shock or excess of motion ceases at the centre.

(To be continued.)

QUEBEC PHARMACEUTICAL ASSOCIATION.

The Pharmaceutical Association of Quebec has now appointed the first Board of Examiners under the Pharmacy Act recently passed for that province. The examiners are Messrs. Nathan Mercer, Alexander Manson, W. E. Brunet, Henry R. Gray, J. D. L. Ambrose, H. F. Jackson, and Henry Lyman.

Parliamentary and Law Proceedings.

Pharmacy Act (Ireland) Bill.

The second reading of this Bill has been postponed from Monday, June 14, to Friday, June 20.

In the House of Commons on Monday, June 14, in answer to Dr. Playfair,

Sir M. Hicks-Beach stated that there were very few licentiates of the Apothecaries' Hall in Ireland who restricted themselves to pharmacy, and that there was no other class of chemists and druggists in that country who could legally dispense medicine according to prescription.

Since the publication of the list on p. 1000, the following petitions against the Bill have been presented. Only one petition, that from the King and Queen's College of Physicians, has yet been presented in its favour:—

Aberdeen	Mr. John Farley Leith.
Andover	Rt. Hon. Dr. Lyon Playfair.
Atherstone	Mr. C. Newdigate Newdegate.
Bangor	„ William Bulkley Hughes.
Bodmin	Hon. Edward F. Leveson Gower.
Boston	Mr. John Wingfield Malcolm.
Bradford	„ Henry William Ripley.
Brecon	Rt. Hon. Dr. Lyon Playfair.
Bridlington	Mr. Christopher Sykes.
Cambridge	„ Alfred George Marten.
Chelsea	Rt. Hon. Dr. Lyon Playfair.
Christchurch	Sir H. Drummond Wolff.
Diss	Sir Robert Jacob Buxton, Bt.
Dudley	Mr. Henry Brinsley Sheridan.
Eastbourne	„ George Burrow Gregory.
Finsbury	Sir Andrew Lusk, Bt.
Flint	Mr. Peter Ellis Eyton.
Hackney	Rt. Hon. Dr. Lyon Playfair.
Helston	Mr. Adolphus M. Young.
Inverness	„ Charles Fraser Mackintosh.
Kilmarnock	„ J. Fortescue Harrison.
Lambeth	Rt. Hon. Dr. Lyon Playfair.
Liverpool	Mr. John Torr.
London	Alderman W. J. R. Cotton.
Lymington	Lt. Col. Edmund H. Kennard.
Maidenhead	Lt.-Col. Robert J. Lloyd Lindsay.
Maidstone	Rt. Hon. Dr. Lyon Playfair.
Malmesbury	Rt. Hon. Dr. Lyon Playfair.
Marylebone (3)	Mr. William Forsyth.
Nuneaton	„ C. Newdigate Newdegate.
Paisley	„ William Holms.
Penrith	„ Wm. Nicholson Hodgson.
Portobello and Musselburgh	„ Donald R. Macgregor.
Ramsgate	„ Edward Leigh Pemberton.
Retford	Viscount Galway.
Rugby	Mr. C. Newdigate Newdegate.
St. Albans	„ Thomas Frederick Halsey.
Shoreham, New	Sir Percy Burrell, Bt.
Southwark	Colonel F. Marcus Beresford.
Stockton-on-Tees	Mr. Joseph Dodds.
Stourbridge	Rt. Hon. Dr. Lyon Playfair.
Tavistock	Rt. Hon. Dr. Lyon Playfair.
Teignmouth	Sir. Lawrence Palk, Bt.
Tower Hamlets	Mr. Joseph D'Aguila Samuda.
Tunbridge Wells	„ William Hart Dyke.
Wareham	„ John S. W. S. E. Drax.
Wednesbury	„ Alexander Brogden.
Wellington	Lt.-Col. Hon. A. W. N. Hood.
West Hartlepool	Mr. Thomas Richardson.
Westminster	Rt. Hon. Dr. Lyon Playfair.
Woodstock	Rt. Hon. Dr. Lyon Playfair.
Wrexham	Mr. George Osborne Morgan.

Petitions were also presented from the following places:—

Leek.	St. Andrews.
Margate.	St. Leonards.
Newtown.	Stoke-on-Trent.
Preston.	Whitby.

The Drugging of Animals Bill.

The second reading of this Bill, which had been deferred on Monday the 14th inst. until Wednesday the 16th, was on that date again postponed until Friday the 18th inst.

Sale of Food and Drugs Bill.

On Tuesday, the House of Lords went into Committee on this Bill.

Clauses 1 and 2 were agreed to.

On Clause 3,

The Earl of Morley moved the omission of the word "knowingly," the retention of which would, in his opinion, greatly mar the utility of the measure. How could it be proved—as it must be before a conviction could be obtained under the Bill if it became law as it stood—that a trader knew he was selling adulterated drugs or food? He believed that druggists, at all events, were perfectly competent of being aware of the quality of what they were selling. They either mixed the articles they sold for themselves or they obtained them mixed from others, and in the latter case they had a remedy against the person they purchased from under Clause 5. He had no desire to harass traders or to place undue restrictions upon trade; but to secure that the Bill should operate beneficially, he hoped the word "knowingly" would be omitted from the clause.

The Duke of Richmond said the effect of the noble earl's amendment would be to render every trader who sold adulterated drugs or food, however ignorant he might be of the fact, liable to be imprisoned for a period not exceeding six months with hard labour. A man might be perfectly innocent, and have nothing whatever to do with the articles he sold save to sell them, and yet he would be liable to imprisonment. The clause was substantially the same as that in the Act of 1872, so that the proposed legislation was not new, but proceeded on the basis of the old. He should be sorry to omit the word "knowingly," as he believed that great injustice might ensue if it were struck out.

Earl Fortescue thought that the onus should be thrown on the trader of proving his ignorance, as it would be most difficult in the case of a prosecution to prove guilty knowledge.

The Lord Chancellor said that the noble lord proposed that the question of knowledge should not enter into the offence. The Act would, therefore, impose a penalty of £50 upon a tradesman who sold a mixed article, whether he knew it to be mixed or not? Was that justice? A suggestion had been made that the onus ought to be changed, and that it should be assumed that a man was guilty until he had proved that he was innocent. In that case, however, the mouth would be stopped of the person who could give the best evidence—namely, the accused himself, and thus while there was a fair chance that the prosecutor would offer presumptive evidence in favour of a conviction, there would be no opportunity on the part of the person accused of proving his innocence.

After a short conversation their lordships divided, when there appeared for the clause:—Contents, 41; Not Contents, 23; Majority, 18.

The clause was then ordered to stand part of the Bill.

Clause 4 was also agreed to.

On Clause 5,

The Duke of Richmond said he proposed to strike out the proviso introduced in the third reading of the Bill in the House of Commons, that if a retail dealer who was fined had sold an article in the condition in which it was supplied to him by the wholesale dealer he should have a right of action against such wholesale dealer for the recovery of the penalty and costs. It seemed to him that the proviso did not afford the remedy which was intended in the case it was desired to meet, and that this could be done best in Clause 24, which provided for the acquittal of the retail dealer if he had purchased from the wholesale dealer with a written warranty.

The Earl of Morley approved the change, and remarked that at present the retail dealer was under no obligation to prosecute. It ought to be clearly understood that there was to be a prosecution of the wholesale dealer if he were to blame.

The proviso was struck out, and Clauses 5, 6, 7 and 8 were agreed to.

On Clause 9, which refers to the appointment of analysts,

The Earl of Morley urged that the appointment of analysts ought to be made compulsory, and not left optional with local authorities. Appointments had been made already in 32 out of 54 counties, and in 126 out of 171 boroughs. If the Act had done good in some places it would do good in others; and it was desirable that there should be uniformity in the administration of the law, or else adulterated articles would certainly find their way into places where no analysts had been appointed. No doubt there might be a difficulty in finding analysts, but that could be partly met by the combination of authorities and the making of appointments for larger areas, and by boroughs accepting the analysts appointed by the county authorities. Essex, Kent, and Sussex had appointed analysts in London. Up to the present time he believed the Local Government Board had not exercised the power conferred upon them to compel a local authority to appoint an analyst.

The Duke of Richmond could not assent to the suggestion. The Local Government Board already had the power to compel where they thought fit, and it might be presumed they would exercise that power where they thought it necessary. It was not desirable to make appointments more compulsory than they were at present, and there were practical difficulties in the way of boroughs combining with counties and counties combining with each other, for there was no machinery to enable them to make the necessary apportionments of the salaries of the analysts.

The Duke of Somerset thought it very desirable that the analysts should submit to some regular examination before they were appointed. The Committee had made a recommendation to that effect.

The Duke of Richmond observed that the responsibility rested with the Local Government Board, and no doubt they would satisfy themselves as to the qualifications of the analysts before they sanctioned their appointment.

Lord Aberdare suggested that, instead of "may," the word "shall" be inserted in the clause, which would go far to secure the appointment of properly-qualified analysts. The Home Office could not appoint an Inspector of Mines without his undergoing an examination.

The Duke of Somerset read an extract from the evidence given before the Committee to show that there would be no difficulty in having an examination at South Kensington. People would have more confidence in the analysts if they knew that they had been regularly examined. It would also tend to greater uniformity of opinion as to what should be considered adulteration if they passed a uniform examination.

The Earl of Morley said it was distinctly recommended by the Select Committee that the appointment of an analyst should be compulsory, and he therefore moved the substitution of the word "shall" for "may," in line 41, page 3, to carry out that object.

The amendment was negatived.

The Duke of Somerset then moved, in line 11, page 4, in the same clause, that the word "may" should be struck out and "shall" inserted before the words "require satisfactory proof of competency." The clause as it stood provided that the Local Government Board, to whose approval the appointment of the analyst was to be subject, might require satisfactory proof of the competency of the person appointed. He thought they ought to be bound to require such proof, and therefore he proposed that amendment.

The Duke of Richmond opposed the amendment, thinking they ought to place confidence in the public department, which could be trusted to see that there was satisfactory proof of competency in those cases.

After some conversation the amendment was negatived and the clause was then agreed to.

On Clause 27,

The Duke of Richmond moved that the following proviso be added:—

"Provided that in any action brought by any person for a breach of contract on the sale of any article of food or of any drug, such person may recover alone or in addition to any other damages recoverable by him the amount of any penalty in which he may have been convicted under this Act, together with the costs paid by him upon such conviction, and those incurred by him in and about his defence thereto, if he prove that the article or drug the subject of such conviction was sold to him as and for an article or drug of the same nature, substance, and quality as that which was demanded of him, and that he purchased it not knowing it to be otherwise, and afterwards sold it in the same state in which he purchased it; the defendant in such action being, nevertheless, at liberty to prove that the conviction was wrongful, or that the amount of costs awarded or claimed was unreasonable."

The motion was agreed to.

On Clause 29, which provided that tea should be examined by the Customs officers on importation,

Lord Cottesloe moved that it should be omitted, because it would be impossible for the Customs Department, with its present strength, to perform the task which the clause imposed upon it, and because there was ample reason to expect that the trading community itself would provide satisfactorily for the examination.

The Duke of Richmond regretted that he could not accept the amendment proposed by the noble lord. The committee which had sat to consider this question had recommended that the examination of the tea should be conducted by the Customs on its arrival in this country, so as to put an end to the practice of adulterating tea which prevailed in China. He had been informed by the Custom-house authorities that the examination of the tea could be made by the Custom-house officers without difficulty. The effect of the clause would be to benefit the consumer and to protect the retail dealers in this country.

The Marquis of Lansdowne viewed with some apprehension the introduction by this clause of the principle that the mere lodging merchandise in the Custom-house was a guarantee of its purity.

Lord Stanley of Alderley was of opinion that the effect of the clause would be to prevent bad teas being shipped from China.

The amendment was negatived, and the clause having been agreed to, the Bill passed through Committee.

Review.

The Chemistry of Light and Photography in its Application to Art, Science, and Industry. By Dr. Hermann Vogel, Professor in the Royal Industrial Academy of Berlin. With one hundred illustrations. Henry S. King and Co., 65, Cornhill, and 12, Paternoster Row, London. 1875.

The international scientific series of Messrs. King and Co. is at once indication and evidence of a growing desire for information regarding matters which a few years ago were considered too abstract in their nature to be either interesting or useful to the mass of readers. Volumes comprised in the series have been previously reviewed in these pages, and generally in a favourable manner. Too much credit can scarcely be given to the respective authors for the skill which has avoided the Scylla of disgust at technicalities on the one hand, and the Charybdis of misinformation through a too diluted style, on the other. If there is any subject which more than another requires dexterous treatment in popularizing, it is applied chemistry, particularly if it be attempted to explain matters which are partly theoretical; indeed, if it is not practicable to impart a logical knowledge of the elements of the science, we are persuaded that it is better to refrain from such attempts and stick to mere facts. The volume before us is excellent for the information it gives on the origin and development of photography, from the time when it was first noticed that lunar caustic darkened in sunlight, to the present day when the productions of the art are fruitful in profit to many and in delight to all. Details of the different processes are given with a particularity almost sufficient to make a photographer of every reader, and we could wish that the author, who is quite at home here, had confined himself to this part of his subject. He attempts, however, to explain to lay readers, and in simple language, the chemical changes involved in working the processes, and we fear the result is worse than non-success. We know not on what hypothesis to account for it, whether it is that the author is writing in a tongue not his own, or that he is far less of a chemist than a photographer, or that he has been handicapped with a non-professional translator, but the language of these parts of his book reminds us very forcibly of the masticated lingo which nurses and fond mammas find the best medium for articulate communication with infants. To the tyro in chemistry it is simply ridiculous; often the statements are positively erroneous; the non-chemical reader would be much less instructed after perusal than if no such explanations were vouchsafed.

It is almost needless to say that the book is admirably got up. The illustrations comprise excellent impressions of electrotypes from heliographs, and two beautiful photographs—one of the moon and one showing the effect of retouching a negative.

BOOKS, PAMPHLETS, ETC., RECEIVED.

The Potato Disease and the Curl Disease in Potatoes: their Causes and Prevention, with Strictures on the Potato Fungus (Peronospora infestans). By Eccles Haigh. London: G. Philp. 1875.

The Commercial Handbook of Chemical Analysis; or Practical Instructions for the Determination of the Intrinsic or Commercial Value of Substances used in Manufactures in Trades and in the Arts. By A. Normandy. New edition, enlarged and to a great extent rewritten. By Henry M. Noad, Ph. D., F.R.S. London: Lockwood and Co. 1875. From the Publishers.

Notes and Queries.

[441]. GINGERBREAD WORM NUTS.—Can any correspondent furnish a good form for Gingerbread Worm Nuts?—T. H. W.

PRESERVATION OF PASTE.—Mr. T. Stokoe writes:—"Though a small matter, it may be of service to some readers to know that the addition of 10 drops of common carbolic acid to a pint of flour paste, as soon as the boiling thereof is effected, will preserve it for, apparently, an indefinite time. I have just used some for labelling, which was made on May 5, and it is perfectly sweet and free from mould.

Obituary.

Notice has been received of the death of the following:—

On the 4th June, 1875, Mr. John E. H. Jennings, Pharmaceutical Chemist, of Sheffield, aged 61. Mr. Jennings had been a Member of the Pharmaceutical Society since 1844.

On the 9th June, 1875, Mr. Thomas James Smith, Pharmaceutical Chemist, of Newark, aged 23. Mr. Smith was a Member of the Pharmaceutical Society.

At the house of his brother, Alexander Gorrie, Chemist, Kirkcaldy, on the 9th inst., John P. Gorrie, Chemist and Druggist, 76, St. John Street, Perth, aged 26 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Drugging of Animals Bill.

Sir,—Your correspondent "From an Agricultural County" is quite right when he says some restriction should be put on the sale of nitrous acid, etc., and I am sure every member of our calling would agree with him if they knew, as we who carry on the drug trade in the country know, the extent to which "spicing" (as it is called) horses is carried. But it is no use passing stringent Acts to compel chemists to keep poisons books, etc., so long as little or no notice is taken of general shopkeepers in villages selling poisons. I know they cannot legally sell them, but the fact exists that they do, and I believe they are generally unaware that they are infringing the law.

Oil of vitriol is the favourite article with carters in my neighbourhood, and I make it a practice never to serve it or any other poison to a carter unless he produces an order from his master. When I have occasion to express this rule of mine, I am frequently told "Well it don't matter, I can get it at Mr. So and So's, only I thought yours might be stronger."

I for one shall hail with delight any enactment, let it entail what extra trouble it may, by way of registration of sales, etc., if the evil can be ended, and I trust sincerely Sir J. Astley will carry his Bill.

A Country Pharmaceutist.

The Major Qualification.

Sir,—It is very pleasant to hear of the existence of "T. T.," and indeed of any young man possessing his sentiments, but I fear that such are exceptions to the general rule, and hardly fair specimens of the pharmaceutical student. Would that they were! Anyhow, I congratulate Trowbridge, and only wish I could be convinced that I am wrong in my estimate of the class. They will certainly be rewarded by the acquisition of knowledge, and if their numbers sufficed for the support of the Society it would be neither necessary nor indeed desirable to run after those who lack the energy or inclination to secure for themselves the Major qualification on higher grounds than those of pecuniary advantage. That the "T. T.'s" are not in the majority seems however to be the complaint of the Council in their report, and hence my suggestion that in order to entice a greater number into the fold of Pharmaceutical Chemists, the distinctions betwixt the two grades should be made as clear as possible to the public by the simplification of pharmaceutical titles, and also the advisability of the rigid preservation of the few remaining privileges of that class.

As regards the best contraction for "Pharmaceutical Chemist," I may perhaps be here permitted to express my agreement with the opinion of Mr. Penney that "Ph.C." is preferable, and I merely followed the example of others in making use of the letters "P.C." What objection "An Old Chemist and Druggist" can have to any person, duly qualified, affixing the letters "Ph. C." or "P.C." or the words "Pharmaceutical Chemist" to his name (unless it is to be found in the fact of his being "An Old Chemist and Druggist" with a perhaps rather natural dislike for "new fangled titles") I cannot imagine, for it is most probable that he has "Chemist and Druggist" on his own labels, etc., and if so, why should not the Pharmaceutical Chemist be allowed to declare his trade in like manner, either in full or by means of the less cumbersome abbreviation. Whilst thanking him for the contributions to the facetiæ of the Journal, I fail to perceive any object in his letter except to prove, what I have always contended, that the letters "M.P.S." make a greater impression on the mind of the public than the more honourable title of "Pharmaceutical Chemist." In conclusion, I maintain that the Pharmaceutical Chemist's is a superior diploma to many of those foreign ones procured for a few shillings, or at most, pounds, which pass muster with thousands of the public and indeed place their proprietors on a level with others who have obtained the same titles after a protracted course of study at our own Universities or Colleges.

Urtica.

"*Beta Tau*"—(1) We do not quite understand your question. (2) It is no part of a chemist's business.

T. P. B.—No, the Pulv. Liquiritiæ comp. of the German Pharmacopœia contains sulphur and fennel. The formula is given on p. 660 of the present volume.

T. S. S.—Bentley and Redwood's 'Elements of Materia Medica' (Longmans), supplemented by Flückiger and Hanbury's Pharmacographia.'

G. W. W.—Yes, provided that you do not send any before you have done your utmost towards naming them correctly yourself.

F. E.—(1) Apply to the Secretary of the Royal College of Surgeons. (2 and 3) We possess no qualification for answering these questions.

"*Humilis.*"—We cannot do better than recommend you to study the opening sections of the book in which your difficulty occurs.

Oxon.—We cannot give you any information respecting the "origin" of the preparation mentioned. We are not aware that it is mentioned in any of the Continental pharmacopœias, or even that it took "its rise on the Continent."

"*Azote.*"—We presume that it would be.

R. B. H.—*Melilotus officinalis*, *Sherrardia arvensis*, *Sanicula europœa*, *Polygala vulgaris*. Bentham's 'Handbook' is a good one, but as many species of other authors are not distinguished therein it is useful to supplement it by such a manual as Babington's.

Cruciferæ.—*Rhinanthus Crista-galli.*

G. Watt.—(1) *Lychnis diurna.* (2) Probably *Galium saxatile.* (3) Probably *Fumaria muralis.* Nos. 2 and 3 must be sent in the fresh state, and in fruit for accurate determination. (4) Yes, *Lotus corniculatus.*

"*Alpha.*"—Yes, we think so.

"*Liebig.*"—(1) We are not aware that there is any patent for the preparation you mention, and if there be, the publication of a formula for such a preparation would be no infringement, neither would the use of such a formula, unless it were identical with that patented. (2) We are not aware of any special claim to the term "mustard leaves."

N. J. Lewis.—The only remedy we know of is to make the mixture fresh when it is wanted.

T. Robinson.—We believe that the poisonous ingredients are essential to the efficacy of the preparations.

J. Gray.—(*a*) *Vicia sepium*; (*b*) *Pedicularis sylvatica*; (*c*) *Lychnis diurna*; (*d*) *Trifolium minus*; (*e*) *Rumex acetosella*; (*f*) *Sison Amomum*; (*g*) *Ajuga reptans*; (*h*) *Veronica officinalis*; (*i*) *Lysimachia nemorum*; (*k*) *Polygala vulgaris*; (*m*) *Stellaria Holostea.*

E. T. Shaw.—See p. 421 of the present volume of this Journal.

A. H. P. is referred to the rule respecting anonymous communications.

E. Walsh.—We think the prefixing of your name to the title of the article would be held to imply an exclusive proprietary interest.

"*Preliminarian.*"—The information may be found in any good modern arithmetic book.

Communications, Letters, etc., have been received from Mr. A. Annette, Mr. A. P. Smith, Professor Flückiger, Messrs. Palmer and Howe, Antiseptic, A Country Druggist, G. T., G. F. K.

SOME RECENT IMPORTATIONS OF CINCHONA BARKS.

BY DAVID HOWARD, F.C.S.

The recent importations of cinchona bark from the East Indian plantations have afforded an opportunity of confirming an observation made by Dr. de Vrij (*Pharm. Journal*, 3rd series, iv., 869) of the presence of quinidine in the renewed bark of *C. succirubra*.

Samples of renewed bark have been received from three different plantations in the Neilgherries, and they all prove to contain quinidine in quantities of 0·1 to 0·2 per cent. The bark of the same species from the same plantations, grown either exposed or under moss, has in no case yielded this alkaloid when similarly tested.

It is most remarkable that the abnormal growth of the renewed bark should thus not only modify the proportions of the alkaloids found naturally in the bark, but develop another alkaloid that does not appear to exist naturally in this bark grown either in South America or in the East Indies—at any rate in appreciable quantities.

Another curious example of the effect of the circumstances of growth in modifying the production of this alkaloid is afforded by the *C. officinalis* of the same plantations; a sample of the root bark of this species gave as much as 0·8 per cent., while the stem bark of the same trees yielded only ·13 per cent.

It would have been very interesting to observe the effect of renewing the bark of the same trees from which this root bark was taken upon the production of quinidine; but, unfortunately, the experiment was not tried. A sample of renewed bark of *C. officinalis* from another plantation gave 0·2 per cent. of quinidine, the natural bark of the same plantation giving only 0·04; in this case the quinidine is increased, but not beyond the quantity found in some samples of natural crown bark.

It will be observed that both the renewed bark and the root bark show in their texture the signs of a somewhat analogous process of growth.

It is to be hoped that the influence of cultivation and of the circumstances of growth upon the development of the different alkaloids will receive all the careful study it deserves; it is evident that there is still much to be learned about this matter, and that much of the future success of the East Indian plantations depends upon careful chemical research.

SOME ADULTERATED GROUND GINGER.

BY HENRY POCKLINGTON, F.R.M.S.

The results of my recent inquiry into the genuineness of the ground pepper sold in a certain class of shops induced me to extend my inquiries further, and to test various other food accessories and food sold in the same shops.

The results are very similar to those previously described in this Journal,* and have confirmed me in the opinion that, in Leeds at all events, there is a vast amount of undetected systematic adulteration and that it is the poor who are the sufferers by it. It may, perhaps, beas well to say at once that I believe that the whole of the retailers of these adulterated articles have been innocent of all knowledge of the fraud. Here, as in most large towns, there are hundreds of small shops, dwelling-houses with a shop window and a small front room used as sale shop, and kept by the wives of mechanics and clerks with the evening assistance of their husbands, who, like themselves, are quite ignorant of the trade and entirely at the mercy of the wholesale dealer, who, possibly, himself is equally in the hands of the manufacturer.

It is against these small traders that the Adulteration Act has pressed heavily; but that they should therefore be relieved from its incidence is I think very questionable, since the non-trading public have a better right to be considered; it is, however, much too large a question to be answered or even discussed here. My object in writing these notes of certain adulterations detected is simply to call attention to the fact that there is, locally at all events, a considerable prevalence of adulteration; to put the readers of the Journal on their guard; and, as far as possible, place the means of its detection within their reach.

The first article with which I propose to deal is ground ginger. The adulteration of this is very extensive, as may be seen from the fact that five samples purchased in five shops taken seriatim on my road home one night were extensively adulterated, and that of several other samples examined, all but one, purchased in a first-class shop as an experiment, were also adulterated. These samples may be grouped in three classes, the adulterants of two of which are similar in nature to those found in the pepper previously described. There is no doubt that the adulterators are the same, and it is to be hoped that they may speedily receive the notoriety they deserve, or that, at all events, the excuse of ignorance may be taken from the wholesale and retail traders concerned.

The samples in class one were adulterated with small quantities of pea meal, large quantities of ground rice, a little wheat or barley starch and cheap damaged arrowroot. The total adulteration I estimate at 50 per cent., but in the case of ground ginger these estimates are at best but approximations more or less remote.

Class two comprises samples adulterated with ground rice, maize, and traces of other starches, but no pea meal.

The samples in class three were only two in number and were remarkable for the variety of starches they contained. They were evidently adulterated with sweepings, or a mixture of damaged arrowroot in addition to ground rice and a small quantity of what appears to be Rio arrowroot. One of these samples was given me by a pharmacist who said it was a portion of an old stock, the other was purchased in a very small shop where the sale of ground ginger must be extremely limited. The samples agreed in being heavily "limed," one contained a notable quantity of sand.

The microscopical examination of ground ginger is not very difficult, but requires the exercise of a considerable amount of care, as the starch granules of the ginger rhizome vary considerably in size and shape. With a view to rendering this article useful to such pharmacists as possess a microscope, I have had careful drawings made of the various forms assumed by ginger starch, and of a few of the more common adulterations. The drawings have been made to scale, excepting in one instance, the granules having

* *Pharm. Journ.* [3], vol. v., p. 681.

Fig. 1. Ginger starch.*

been immersed in water for a period not exceeding one hour. The power employed was $\frac{1}{5}$, giving with the eye-piece employed a power of 500.

It will be observed that the size of the granules varies considerably, but it may be noticed that in the oval granules the size of any of the numerous modifications of the oval is pretty constant. In other words, any change of shape is usually accompanied by variation in size. The size of the most commonly occurring granules, expressed in micrometric units (the most ready way for practical work, the value of the unit being stated) is as follows :—M (Jackson's micrometer, negative eye-piece and $\frac{1}{4}$ object glass) equals $\frac{1}{2100}$ of an inch. 2·5 × 1·75 ; 2 × 2 ; 2 × 1·5 ; 3 × 2 ; 2 × 1·5 ; 3·5 × 1·75 ; 2·5 × 2·5 ; 1 × 1. These are the measurements of a sample of fine Jamaica ginger. Samples of so-called African ginger furnish a starch whose granules, whilst they follow the same general characters as those of Jamaica ginger, have a larger average size, and granules of 3·75 × 2 are not uncommon.

The hilum and the concentric lines of ginger are very indistinct unless great care be taken to properly illuminate them, and it is very desirable to make use of a good achromatic condenser and radial stops.

The stellate hilum of Rio arrowroot is a striking feature in that starch, and at once distinguishes it

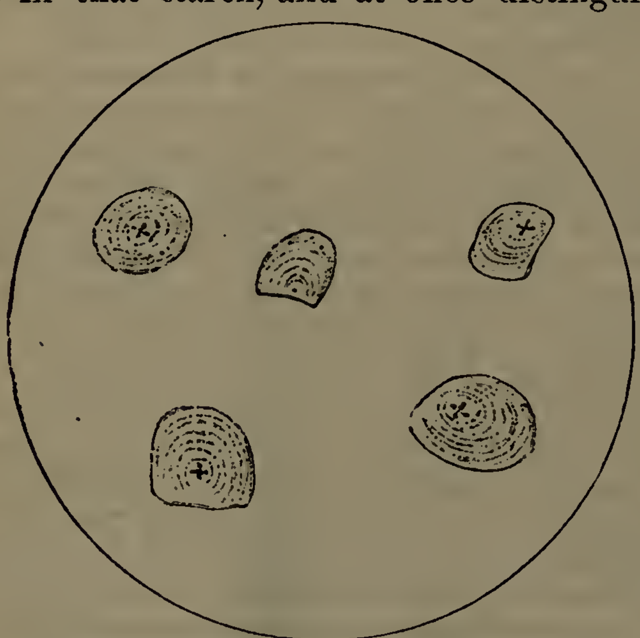


Fig. 2. Rio arrowroot (Manihot ?)

from starches of similar shape and size. Maize starch most closely resembles it, but is much more angular.

* Del. ad nat. E. J. P.

The longitudinal hilum of pea, bean, and lentil starches and their ovate shape are quite characteristic

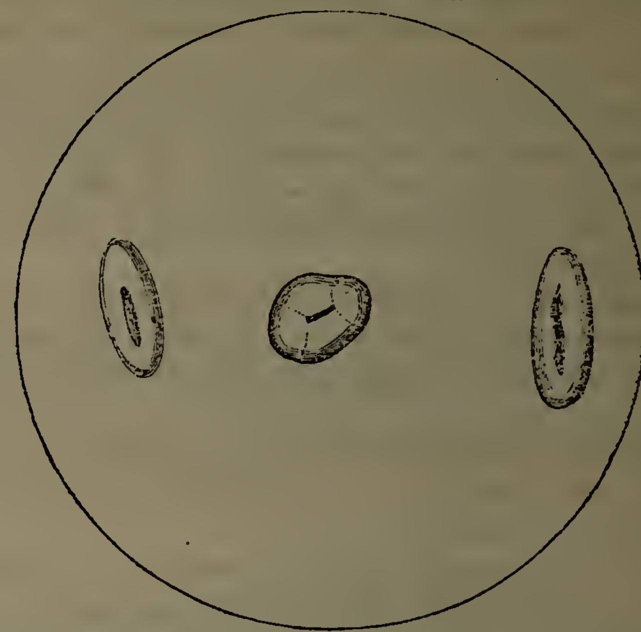


Fig. 3. Pea starch (characteristic of leguminous starches generally).

and do not require much care in their identification.

Potato starch, as pointed out by me in a paper read before the Pharmaceutical Conference at Bradford,

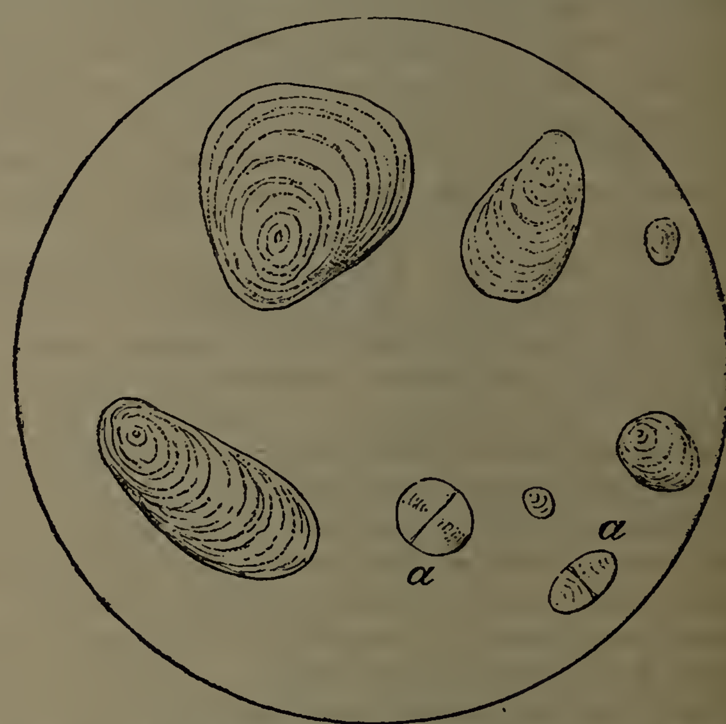


Fig. 4. Potato starch (abnormal forms shown at *a* are of frequent occurrence).

varies very much in size and shape, and is extremely difficult to identify unless present in large quantities.

Wheat starch is also very variable in size, but,

Fig 5. *aa*, Wheat starch. *b*, Altered granule. *cc*, Arrowroot used as an adulterant of pepper, ginger, etc.

when not changed by drying after being wetted, or by being heated, is very constant in shape, and assumes the form of flattened circular discs (which are capable of acting as lenses and forming a perfect image when immersed in a highly refracting medium, but other starches agree in this); when heated or dried the granules curl up, become twisted, and assumes various shapes of which the typical form is shown at *b* in fig. 5.

A cheap form of arrowroot is shown at *c* in fig. 5, and is evidently derived from a member of the ginger order. It has been largely used as an adulterant of pepper.

The small angular granules of rice starch are shown in fig. 6. The hilum is in the centre, but is not

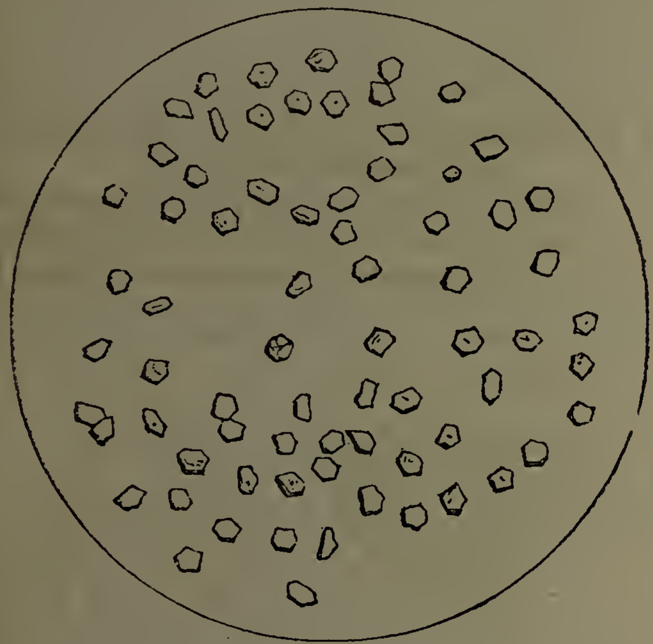


Fig. 6. Rice starch.

distinguishable without the use of a higher power than many microscopists possess.

The plan pursued in making a microscopical examination of ground ginger does not differ in any essential particular from that followed in the examination of pepper, and described in the article already referred to, but the exercise of greater care is demanded on account of the variety of shape and size of the ginger starch. It is very desirable that the analyst should make himself familiar with the structure of the rhizomes, and the examination of thin sections, and particularly with the cells containing the well-known greenish yellow colouring matter, and with such portion of the epidermal structure as may be adherent to inferior ginger. Sections may be very readily made by soaking a piece of the rhizome in water for a short time, and having fixed it in some form of section instrument,* slicing it with a good razor. Sections may be mounted in glycerine.

THE EXAMINATION OF BEER FOR ADULTERANTS.†

BY G. C. WITTSTEIN.

The author first refers to the addition of potash or soda to sour or stale beer. The presence of either can be determined by the proportion of ash yielded, which from Bavarian beer should not exceed one-half per cent. In a foot note the author observes that this percentage applies only to German beers, and especially Bavarian, since according to the experiments of T. Dickson,* English beers are much richer in ash. Simply testing the ash for the presence of potash or soda would be insufficient, since both the raw materials of beer—malt and hops—contain these alkalies. The author states that some experimenters have been betrayed into this error, and having found these alkalies have declared beer to be adulterated.

The author divides the other possible adulterants into two classes, "sweet" and "bitter." In the "sweet" class he mentions only glucose and glycerine.

The use of glucose would lead to an economy of malt, but of course it can only compensate for the malt sugar. As, however, in the course of fermentation through the formation of alcohol all or almost all the glucose would disappear, such beer would be abnormally poor in extractive. Glycerine not being capable of undergoing fermentation, Dr. Wittstein thinks that its addition does not allow of any reasonable explanation, and that the brewer who would add a sweet syrupy solution to his manufacture would prove himself to be wanting in prudence.

The substances included in the "bitter" class are—aloes, buck bean (menyanthin), gentian root (gentipicrin), colchicum root, flowers, and seeds (colchicine), colocynth (colocynthin), cocculus indicus (picrotoxin), nux vomica (brucine and strychnine), picric acid, quassia (quassiin), wormwood (absinthin). All of these substances are or contain bitter principles of so permeating and decided a nature, that smaller quantities of them than are usually used of hops impart great bitterness. They lack, however the aroma and other important ingredients in beer, such as resinous matter and tannin. Moreover, the majority of them possess poisonous properties.

As innocuous amongst these bitter substances may be reckoned buck bean, gentian, wormwood, and perhaps also quassia; more doubtful, because in small quantities violently purgative, are aloes and colocynth. The remaining four—colchicum, cocculus indicus, nux vomica, and picric acid—are decidedly dangerous, and especially the active principles of the first three—colchicine, picrotoxin, brucine and strychnine. Notwithstanding, therefore, that in the testing of beer generally the whole of the bitter substances mentioned should receive attention, the latter are the more important because of their peculiar virulence. But the author adds that up to the present time he has no knowledge of any one of them having been positively and with certainty referred to any beer; either because the beers actually examined did not contain them, or because in former years the detection of most of them was especially difficult. This difficulty, however, he considers has now been overcome through the progress made in organic chemistry.

The author does not appear to think that the use of these bitter substances in beer prevails to any great extent in Bavaria, and he considers that under ordinary conditions of price, hops are still the cheapest bitter for beer. He refers to the prevalent suspicion that cocculus indicus is added to beer by the brewer not only to increase its bitterness, but also to increase its stupefying power. He remarks that the notorious fact that a much larger quantity of cocculus indicus is imported than is used for medicinal purposes has led, as in this country, to the conclusion that the largest portion finds its way into the beer breweries. This inference, however, Dr. Wittstein considers to be a very hasty one, since the greater part is used in the extirpation of vermin and the stupefying of fish.

The author recommends the following process of testing for the above-mentioned bitter substances in beer as one that he has repeatedly proved:—

One litre of the suspected beer is evaporated by a moderate heat to the consistence of a thick syrup. This is poured into a tared glass cylinder—capable of con-

---

* A very simple, efficient, and cheap section instrument has been devised by Mr. Walter White, a pharmacist of Litcham, Norfolk, which is specially adapted for pharmaceutical work. A system of wedges advantageously replaces the usual screw in thi instrument.

† Abstract of paper in the *Archiv der Pharmacie* for January, 1875.

* *Philosophical Magazine* [3], vol. xxxiii, p. 341.

taining ten times its volume—and weighed; five times its weight of 93° to 95° alcohol is added, and the whole frequently stirred by means of a thick glass rod during twenty-four hours. By this means all the gum, dextrin, sulphates, phospates, and chlorides are separated, and a comparatively small portion is obtained in solution. After clearing, this solution is decanted, the residue is again treated with fresh alcohol, the two products mixed, filtered, and the alcohol driven off by a gentle heat.

(*a*) Of the syrupy residue left after this evaporation a small portion is diluted with three times its quantity of water; a strip of white woollen material is then allowed to lie in the solution during an hour, after which it is removed and washed repeatedly with pure water. If after this treatment the wool remains white the absence of picric acid is demonstrated; but if picric acid be present the wool will have acquired a yellow colour that cannot be removed by washing.

(*b*) The remaining largest portion of the syrup is agitated for some time with six times its weight of pure colourless benzol (boiling point 80° C); this is decanted off and the operation is repeated with fresh benzol, and the two liquors—the first of which has become yellow, the second having scarcely changed colour—are evaporated at a gentle heat. The pale yellow resinous residue thus obtained may possibly contain brucine, strychnine, colchicine, or colocynthin. To ascertain this, three portions of the resin are placed on a porcelain capsule, one is treated with nitric acid (sp. gr. 1·33 to 1·40), another with concentrated sulphuric acid, and the third, after a few morsels of red chromate of potash have been added, also with sulphuric acid. A red colour produced by the nitric acid indicates brucine with certainty, and a violet colour, colchicine. A red colour produced by sulphuric acid indicates colocynthin, and a purple violet produced by sulphuric acid and bichromate of potash reveals strychnine. Resin, in which one or other of these colorations is produced, possesses an extremely bitter taste; that in which the coloration does not take place is also bitter, but the bitterness recalls the well-known hop flavour.

(*c*) The syrup which has been treated with benzol is freed, by gently heating, from the small quantity of benzol remaining and agitated twice with pure colourless amylic alcohol (boiling point 132° C.). The first portion of the alcohol acquires a more or less wine or golden yellow colour. It would take up any picrotoxin or aloes if present, and thereby acquire a strongly bitter taste. If neither of these two substances be present, the amylic alcohol does not become bitter, because neither the hop bitter, nor the remaining four bitter principles—absinthin, gentipicrin, menyanthin, and quassiin—are soluble in it.

In order to distinguish picrotoxin from aloes a portion of the first obtained amylic alcohol solution is poured upon glass and allowed to evaporate spontaneously. If a fine white crystallization be formed picrotoxin is present; if not aloes is present, and can also be recognized by its peculiar saffron-like odour.

(*d*) The syrup which has been treated with benzol and amylic alcohol is freed by means of blotting paper from the small quantity of amylic alcohol adhering to it—evaporation by heat being impracticable in consequence of the high boiling point of the alcohol—and shaken with anhydrous ether. This takes up the hop bitter yet present and absinthin. After evaporation the latter is easily recognized through its wormwood like aroma; it also gives a reddish yellow solution with concentrated sulphuric acid which changes quickly to an indigo blue colour.

(*e*) After treating with ether the syrup has yet to be tested for gentipicrin, menyanthin and quassiin. As it is now free from the hop bitter, a decidedly bitter taste would point to one of these three substances. Any remaining ether is removed and the syrup is dissolved in water, and filtered; to one portion is added strong ammoniacal solution of silver, and it is then heated. If it remain clear quassiin would be present; if a silver mirror be formed it would originate either with gentipicrin or menyanthin. Another portion is evaporated to dryness on porcelain, and concentrated sulphuric acid added. If while cold no change of colour take place, but in heating it becomes carmine red, gentipicrin would be present; menyanthin would give a yellowish brown colour gradually changing to violet.

INDIAN MEDICINAL PLANTS.*

BY B. EVERS.

In the *Indian Medical Gazette* of February 1 and March 1, Surgeon B. Evers, civil surgeon at Seoni, has some interesting notes on certain Indian medicinal plants. He says:—My experiments with indigenous drugs were conducted chiefly with the view of finding some really useful and common antiperiodic; but other drugs attracted my attention, and so step by step I have been lured on, and now I find that a very extensive field of labour lies before all of us. For much that is contained in these papers I am indebted to the valuable works of Roxburgh, Ainslie, Lindley, Waring, Drury, and others; but at the same time I must here state that whatever confirmatory or additional information I have gained has been obtained by personal observation and experiment. I purpose to take the various medicinal plants I have to remark on, in the order in which they have been tried by me.

Michelia Champaca (Nat. Ord. Magnoliaceæ; Champa tree). I was induced to make trial of the bark of this tree as a febrifuge, from what Waring mentions. "Further trials with this bark," says he, "appear desirable." I tried a decoction of the bark in ten cases of ague, and from my own experience, I can safely state that it is invaluable as a tonic and febrifuge. Dr. H. Lolliot, of Mauritius, employed it successfully "in the treatment of the low intermittent fevers of that island." (For directions regarding its use, see Waring's 'Pharmacopœia of India,' p. 6.) The root-bark is said to be emmenagogue, but of this I have not yet had proof. "The flowers beaten up with oil are applied to fetid discharges from the nostrils." From information obtained through the Conservator of Forests, I learn that only one other member, viz., the *Michelia nilagirica*, of this family is to be found in those parts. This plant is found on the Pachmari hills near the Mahadeo cavern, but in all probability it was planted there. I have not been able to make many trials with this bark, as unfortunately it is not procurable in any considerable quantity in these parts. I leave it to others to test the value of the drug.

Carica Papaya (N.O. Papayaceæ; Pawpaw tree). The milky juice of the unripe fruit has long been known as one of the best vermifuges; and in the West Indies the seeds powdered are used for the same purpose. The seeds are said to possess emmenagogue properties also. Even the ripe fruit is said to act as an abortifacient, and pregnant women are therefore prohibited from eating it. The juice of the pulp (of the ripe fruit I imagine) removes, it is said, freckles caused by exposure to the sun. Browne, in his 'Natural History of Jamaica,' states "that water impregnated with the milky juice of this tree is thought to make all sorts of meat washed in it tender; but eight or ten minutes steeping, it is said, will make it so soft, that it will drop in pieces from the spit, or turn soon to rags in the boiling." Drury says that "this circumstance has been repeatedly confirmed, and, moreover, that old hogs and old poultry, which are fed upon the leaves and fruit, however tough the meat they afford might otherwise be, are thus rendered perfectly tender and good, if eaten as soon as killed, but that the flesh passes very soon into putridity, nay, the very vapour of the tree serves the purpose; hence, many people sus-

---

* Reprinted from the *London Medical Record* for April 28 1875.

pend the joints of meat, fowls, etc., in the upper part of the tree, in order to prepare them for the table." In Barbadoes, the farmers mix the milky juice with the drinking-water for their horses, for the purpose, as they express it, "to break down the blood; and this is a remarkable fact that the effects of this dissolving power in the fruit is not confined to muscular fibre, but acts on the circulating blood." In 1866, when I visited the island of Barbadoes, I found that the unripe fruit pickled was largely used as an article of diet. In this country it is not only eaten pickled, but also curried. I can assure my readers that the unripe fruit makes a very palatable *chijki* (vegetable curry). I have employed the milky juice of the unripe fruit in the treatment of splenic and hepatic enlargements, and with good results. I have treated sixty patients with this drug, and in thirty-nine instances a cure was effected; in eighteen cases the results were not reported; and in three cases (of enormously enlarged spleens) relief was afforded. The mode of administration is this:—About a teaspoonful of the juice is collected and mixed thoroughly with an equal quantity of sugar; this mass is divided into three boluses; one to be taken morning, noon, and evening. For children, a single drop of the juice, mixed with sugar, is sufficient. The pulp of the unripe fruit (the rind being removed) "mashed" up with hot water, might be applied as a poultice over the enlarged gland. On this external application, however, I do not place much reliance. No ill effects result from the internal application of the drug. Some of the patients treated complained of a feeling of heat in the stomach, nothing more. When symptoms of gastric or intestinal irritation occur, I have found it necessary to combine opium or hyoscyamus with the juice. The drug appears to me to act as a tonic and deobstruent. My plan for ascertaining that there has been an actual diminution in the size of the enlarged gland, was to mark off with the nitrate of silver the limits of the affected organ when the patient applied for treatment; and after about a fortnight or month, percuss and mark off again in the same way. In very bad cases I have seen a decrease of from half an inch to an inch in perpendicular dulness. Patients have told me again and again that they felt considerably lighter in the side; and that (*ab khana hazm hota*) their digestion was now good. I believe that the drug is most active in cases where the stages of ague-cake, *i,e.*, the genuine amyloid spleen, has not yet been attained—in fact, when the deposit in the gland is still albuminoid. It acts much more rapidly than the hydrochlorate of ammonia, the bromide of potassium, or the external application of the biniodide of mercury ointment. From twenty to twenty-five days is the longest time that a patient is generally kept under treatment. A nutritious and liberal diet is also an essential adjunct in these cases.

Acorus calamus (N. O. Aroideæ; Sweet-flag). Ainslie says that "it is a very favourite medicine of the Indian practitioners, and is reckoned so valuable in the indigestion, stomach-aches, and bowel affections of children, that there is a penalty incurred by any druggist who will not open his door in the middle of the night and sell it if demanded." A bath made of the infusion of the root "is regarded as an effectual remedy for epilepsy in children." "Shroder informs us that it possesses virtues in obstructions of the menses, spleen, and liver." The Egyptians regard it as a valuable aromatic and stomachic. The Turks prepare a confection of the root, and employ it "as a preventive against contagion." "European practitioners have considered the root as tonic and aromatic; and occasionally prescribe it in cases of intermittent fever and dyspepsia." Dr. A. T. Thomson recommends it as an antiperiodic; and Dr. Æ. Ross reports that it is an excellent stimulant and diaphoretic; he looks upon it "as most serviceable in atonic and choleraic diarrhœa." As an insecticide, particularly with reference to fleas, I have always found it very efficacious; but for this purpose, the root must be obtained fresh. Last year, the chief cause of mortality among the house patients of the Seoni Main Dispensary was dysentery; the gaol population also suffered very much from the same disease. The disease is most prevalent about the middle of the rainy season, that is, during the months of July and August. The disturbance probably of the water-supply, especially when this is derived from tanks and streams, and the dampness of the season are, in some measures I think, accountable for the appearance of the disease. In many of these cases, a malarial taint could be detected. Ipecacuanha does not, I regret to say, always succeed in these cases. There were no less than sixty-nine cases of dysentery treated in the Main Dispensary during the months of July and August. I found a decoction of the rhizome of the *Acorus calamus* very effectual in arresting the flux of blood, especially in the dysentery of children. The decoction is prepared thus:—Of the bruised rhizome, two ounces; coriander seed, one drachm; black pepper, half a drachm; water, one pint; boil down to twelve ounces, and set aside to cool. The dose for an adult is an ounce three times daily; for a child, one to three drachms, sweetened with sugar, two or three times a day. Astringent extracts or quinine might be added if necessary. The decoction is not only useful in dysentery and diarrhœa, but also in the bronchitic affections of children. I have often taken it myself when suffering from a bad cold in the chest. I think the drug is one well worthy of more extended trial.

Cochlospermum gossypium (N. O. Ternstrœmiaceæ). The pods contain a silk-cottony substance that might be used for stuffing pillows, etc. The bark has a faint aromatic odour, and yields on scarification a resinous exudation resembling myrrh. The natives use the branches of this tree for making torches. This plant is said, like the *Sterculia urens*, to yield a gum analogous to tragacanth. I have employed a decoction of the bark as a tonic and demulcent in cases of gonorrhœa. Of thirteen cases treated with the decoction, nine were decidedly cures, and in four the result was not known. The patients stated that after taking this medicine the scalding soon ceased. I found it necessary, however, to combine the sulphate or acetate of zinc in quarter-grain doses, to arrest altogether the discharge. The medicinal value of this plant is not, in my opinion, great.

Calosanthes Indica (N.O. Bignoniaceæ). The Gonds call this plant the "jaimangal;" and it was from a Gond that I first heard of its medicinal properties. The tree is common in Bengal, Burmah, South and Central India, Ceylon, and Java. According to Brandis, "the barks and fruit are used in tanning and dyeing, the seeds are used to line hats, and placed between two layers of wicker work to make umbrellas. Root, bark, leaves, and seeds are used in native medicine." The Gonds employ a decoction of the bark as a discutient application to rheumatic swellings. They do not, however, administer any part of the plant as an internal remedy. I have made trial of the powder and an infusion of the bark, and have found it to be most powerfully diaphoretic; the drug has slight anodyne properties; also a bath, prepared with the bark, I have frequently employed in rheumatism. Twenty-eight cases of acute rheumatism were treated with this drug, and in all the results have been most satisfactory. The dose of the powder is from 5 to 15 grains, three daily; of the infusion (1 ounce of bark to 10 ounces of boiling water) an ounce three times a day. Combined with opium, it forms a much more powerful sudorific than the compound powder of ipecacuanha. The drug does not possess any febrifuge properties. Roxburgh makes no mention of the medicinal qualities of this plant.

Pongamia glabra (N. O. Leguminosæ). The natives of the south of India thread the legumes and tie them round the necks of children suffering from whooping cough. It is said by them to be of use in these cases. Probably the friction of the legumes against the chest, or it may be, the exhalation from them, might have something to do in mitigating the distressing cough. I have employed the powder of the dried pericarps in the treatment of whooping cough (fourteen cases), and in chronic bronchitis (twenty-five cases), and must acknowledge its efficacy in these affections. Most of my patients were quite relieved in from ten to twelve days. For an adult the dose of the powder ranges from five to ten grains; for children, one to three grains, thrice daily, given with a little syrup or honey.

The oil obtained (by expression) from the seeds is employed by the natives in the treatment of "scabies, herpes, and other cutaneous diseases." It is also employed as an embrocation in rheumatic affections. According to Brandis, "the pods and the leaves are used in native medicine."

Holarrhena antidysenterica (N.O. Apocynaceæ. Seeds). —An infusion of "the oat-like seeds (Anderjun of the Taleef Shereef) is said to be effectual in arresting hæmorrhage from piles." "In the only two cases of this affection that came under my care I employed the drug with advantage. It is one well worthy of further trial. For further particulars regarding the value of this plant, I must refer my readers to Ainslie's 'Materia Medica,' vol. i., p. 88, and to Waring's 'Pharmacopœia of India,' p. 137. The bark (Conessibark) of this plant has long been held in high repute as a remedy for dysentery.

Jatropha Curcas (N.O. Euphorbiaceæ).—The juice of this plant is used by natives to arrest bleeding from wounds, etc. The seeds possess purgative properties; and the oil obtained from them is said to be useful in cutaneous affections and in chronic rheumatism. Not long since my attention was attracted to a notice of this plant in the *Indian Medical Gazette*, by Mr. Udoy Chund Dutt. He reports that the milky juice of this plant is a most powerful hæmostatic. In two cases, in which trials were made, he says that the bleeding was at once arrested; and to use his own words, '*the blood seemed to be at once curdled up.*' Before this notice appeared, I had the following case under treatment. Bugloo, aged twenty-five, was admitted into the Seoni Main Dispensary on October 3, 1874. He was suffering from a large open abscess in the heel of the right foot; the abscess had resulted from an injury. The patient stated that it was not so much the pain and swelling of the foot that caused him anxiety, but the frequent hæmorrhages from the abscess. On removing the rags, etc., that enveloped the foot, hæmorrhage (evidently venous) at once occurred. Immediately above the internal malleolus I found a pulsating tumour about the size of a pigeon's egg; pressure on the posterior tibial artery on the proximal side of the swelling at once arrested the bleeding; the superficial veins in the neighbourhood were enlarged, and a faint thrill could be detected in them. Taking into consideration the situation of the tumour, and the character of the hæmorrhage, I diagnosed the case as one of varicose aneurism. The bleeding from the tumour was easily checked by the application of the tourniquet, but the distress occasioned by the pressure of the instrument was so great, that before evening the patient begged that it might be taken off. After this, instrumental and digital pressure were resorted to alternately. In the meantime the abscess in the heel was gradually filling up. On seeing Mr. Udoy Chund Dutt's paper, I determined to give the jatropha juice a trial; and, accordingly, on October 12, I injected a drachm of the juice into the tumour by means of the hypodermic syringe. The result was astonishing; in twenty minutes time the pulsation was so faint that no non-professional person could have detected it; and by evening all pulsation had ceased, a good firm coagulum had been produced. The nozzle of the syringe was retained in the tumour for about ten minutes; and on removing the instrument just one drop of blood escaped through the puncture; a small piece of dry lint and a piece of sticking-plaster were applied to the puncture. No ill effects resulted from the injection of the juice. I was anxious to watch the result of this treatment further; but on the evening of October 16 the patient left the hospital without permission, considering that it was no longer necessary for him to stay in Seoni. People from his village inform me that the man is now (fully three months after the operation) quite well. This is only a single case it is true, but it illustrates how a very simple and speedy operation may be had recourse to in place of others more serious. We all know what a difficult thing it is to treat aneurismal affections. Holmes in his 'System of Surgery' (vol. iii., p. 512) has the following passage:—"The discovery of a fluid of great coagulating power, and devoid of irritating properties, is a desideratum in this method," *i.e.*, the treatment of aneurisms by injections.

I make no pretensions to originality, but I ask that others with better opportunities than myself may give this drug a trial. Two children were brought to me for the purpose of having the frænum of the tongue snipped, and in both these cases, after the operation, I employed jatropha juice as a styptic; there can be no doubt of the value assigned to it by natives. The *Jatropha Curcas* is a very common hedge-plant. Drury states that the juice "is of a very tenacious nature, and, if blown, forms large bubbles, probably owing to the presence of caoutchouc." "A decoction of the leaves is used in the Cape Verd Islands to excite secretion of milk in women."

Sesamum Indicum (N. O. Pedaliaceæ).—Not long ago I found in the *Pioneer* newspaper that the mucilage obtained from the leaves of this plant is considered a specific for dysentery in some parts of Australia, and this led me to make trial of the drug. Waring remarks on this subject:—"The leaves (sesami folia or Benne leaves) are officinal in the secondary list of the United States Pharmacopœia; they abound with thick viscid mucilage, which is readily imparted to water, and an infusion of them is much used in the the southern states of North America in all affections requiring demulcents. One or two full-sized fresh leaves, infused or agitated in half a pint of cold water, will soon render it sufficiently viscid for the purpose. If the dried leaves be used, hot water should be substituted for the cold. How far the leaves of the Indian-grown plant may be used in this way, remains to be determined." I have employed the mucilage, obtained from the leaves of the Indian plant, in the treatment of sixteen cases of dysentery, and in all recovery followed. From six to seven days was the time necessary for such treatment. I confess, however, that my cases were not of the virulent type seen towards the end of the rainy season. The drug acts simply as a demulcent, and does not, in my opinion, exert any specific influence on the disease; furthermore, it is necessary to combine an opiate with it, to relieve the tenesmus, so that probably the opium added has as much to do in checking the disease as the mucilage itself.

Waring again states that "the seeds have powerfully emmenagogue properties assigned to them, and it is believed by the natives and Indo-Britons that, if taken largely, they are capable of producing abortion. The alleged emmenagogue properties of these seeds deserve further investigation." In three cases of congestive dysmenorrhœa I administered the powder of the seeds in ten-grain doses, three or four times a day, with benefit. I have at the same time employed the hip-bath recommended by Waring. It is commonly believed in the south of India that the seeds, when eaten by a pregnant woman, are likely to induce abortion; but no instance of the kind has ever come under my notice, nor have I heard of any. Further trials with the drug are necessary. The seeds of this plant yield the common til or jingelly oil of commerce. The leaves of the *Pedalium murere*, another plant of the same natural order, also yield a viscid mucilage when agitated in cold water. The natives use the mucilage thus obtained as a demulcent and diuretic in the treatment of gonorrhœa, and there can be no doubt of its value in such cases. The plant is very common in the south of India.

NOTE ON DILUTED PHOSPHORIC ACID.*

BY H. H. CROFT.

Professor of Chemistry, University College, Toronto.

Some months since, a druggist of Yorkville called my attention to the fact that a white precipitate is formed on adding a solution of glacial phosphoric acid to ferric chloride (tincture of iron). Before I had leisure to make any experiments on the subject, a notice appeared in the *Canadian Pharmaceutical Journal* for April, of some investigation by Mr. L. Dohme, who arrived at the conclusion that the precipitate so formed was due to pyrophosphoric acid.

So-called glacial phosphoric acid, is, when properly prepared, metaphosphoric acid; HO PO_5, old formula; H PO_3, new empirical, $\left.\begin{matrix}PO\\H\end{matrix}\right\} O_2$ typical. When dissolved in cold water it remains unchanged, but when warmed gradually passes into pyrophosphoric acid, H_2O_2 PO_5; $H_4P_2O_7$; $\left.\begin{matrix}2\ PO\\H_4\end{matrix}\right\} O_5$, by absorption of water, and finally into common or tribasic acid, $H_3O_3PO_5$; H_3PO_4; $\left.\begin{matrix}PO\\H_3\end{matrix}\right\} O_3$, these acids being referable respectively to the types of $\left.\begin{matrix}H_2\\H_2\end{matrix}\right\} O_2$, $\left.\begin{matrix}H_5\\H_5\end{matrix}\right\} O_5$, $\left.\begin{matrix}H_3\\H_3\end{matrix}\right\} O_3$. The ordinary distinguishing tests employed are as follows, of course, for the free acids.

Tribasic phosphoric acid gives no precipitate with silver nitrate, barium chloride, or albumen.

Dibasic phosphoric acid gives a precipitate with silver nitrate and barium chloride, but none with albumen.

Monobasic phosphoric acid gives a precipitate with all three.

This latter acid is usually prepared by dissolving phosphorus in nitric acid, by long digestion, evaporating and heating so as to drive off as much water as possible; or by heating common ammonium phosphate

$$\left.\begin{matrix}PO\\(NH_4)_2H\end{matrix}\right\} O_3 - (NH_4)_2O = \left.\begin{matrix}PO\\H\end{matrix}\right\} O_2.$$

Prepared in either of these ways and dissolved in cold water, it gives an immediate whitish precipitate with ferric chloride, as also with albumen; both these precipitate even in moderately dilute solutions. Heated for some time, it loses its power of precipitating albumen, but continues to act upon ferric salt. Boiled for a long time it precipitates neither. Pyrophosphoric acid obtained by decomposition of the lead salt by hydrosulphuric acid, exhibits the same reaction as regards ferric chloride; boiled for some time it loses this power, being converted into tribasic acid.

It appears therefore that both pyrophosphoric acid (Dohme) and metaphosphoric acid possess the power of producing a precipitate in ferric chloride, I may add, insoluble in acetic acid and not very easily soluble in hydrochloric acid, and hence ferric chloride may be employed as a good test for distinguishing the phosphoric acids. I am not aware that this fact has been noticed, and we are indebted to Mr. Dohme for its discovery. The numerous experiments which have led to this paper were made for me by Mr. Cathron.

In using glacial phosphoric acid for medicinal purposes, it would therefore be well to boil the solution for some time, say half-an-hour, before adding to the solution of iron.

For convenience of students, I append formulas showing derivation of acids and salts.

$\left.\begin{matrix}PO\\H_3\end{matrix}\right\} O_3$ = Common or tribasic acid.

$\left.\begin{matrix}PO\\H_3\end{matrix}\right\} O_3 - H_2O = \left.\begin{matrix}PO\\H\end{matrix}\right\} O_2$ = Metaphosphoric or monobasic acid.

$\left.\begin{matrix}2\ PO\\H_6\end{matrix}\right\} O_6 - H_2O = \left.\begin{matrix}2\ PO\\H_4\end{matrix}\right\} O_5$ = Pyrophosphoric or tetrabasic acid.

$\left.\begin{matrix}PO\\Na_2H\end{matrix}\right\} O_3$—Common phosphate of soda.

$\left.\begin{matrix}2\ PO\\Na_2H\end{matrix}\right\} O_3 - H_2O = \left.\begin{matrix}2\ PO\\Na_4\end{matrix}\right\} O_5$ = Pyrophosphate of soda.

$\left.\begin{matrix}PO\\NaH_2\end{matrix}\right\} O_3 - H_2O = \left.\begin{matrix}PO\\Na\end{matrix}\right\} O_2$ = Metaphosphate of soda.

* From the *Canadian Pharmaceutical Journal.*

MONOBROMATED AND DIBROMATED CAMPHOR.*

BY J. DE MONTGOLFIER.

Monobromated Camphor.—The method of preparing this compound has already been described in this Journal.† The author gives the following information respecting its chemical and physical properties.

Monobromated camphor is slightly soluble in cold alcohol, very soluble in chloroform, perchloride of carbon, benzol, etc. Heated a little above its fusing point it sublimes in beautiful very slender needles, frequently several centimetres in length. It is dissolved by cold sulphuric acid and reprecipitated by water without alteration. Ordinary nitric acid has no action upon it in the cold, and when heated it does not attack it even after an ebullition of several minutes; but if the liquid be then allowed to cool it separates into two layers, one of which consists of a compound analogous to that of camphor and nitric acid. If the excess of acid be decanted the oily layer after a few days deposits the monobromated camphor in crystallized needles. Fuming nitric acid in the cold immediately forms a layer that floats on the surface. If monobromated camphor be carefully precipitated with water from its alcoholic solution it separates in slender needles several millimetres in length.

This body possesses the rotatory power; in alcoholic solution and for the ray D, the power is 139°. One of its most interesting properties is that nascent hydrogen regenerates from it the primitive camphor, the hydrogenation being rapid and easy by the action of a 2 per cent. sodium amalgam upon an alcoholic solution.

By slow crystallization, monobromated camphor is deposited from its solution in alcohol or chloroform only in very elongated and very deformed crystals. From boiling alcohol, however, it crystallizes in right prisms with a rhombic base.

Dibromated Camphor.—For the preparation of this body it has been directed to heat one equivalent of monobromated camphor with two of bromine. The author finds it more simple and rapid to heat in sealed tubes one equivalent of camphor and four of bromine. Even under considerable pressure and with thin tubes it is rarely that an explosion takes place, the product appearing to form an unstable compound with the hydrobromic acid. In whatever way it may be prepared the product is enclosed in a considerable quantity of liquid; sometimes the crystals are not deposited immediately, but if the liquor be left to itself it eventually crystallizes. The viscous liquid which remains contains less bromine than the dibromated camphor; it is a mixture and after a time becomes nearly solid. The yield of dibromated camphor is always very small.

This body does not sublime perceptibly at 100° C. It is less soluble in cold alcohol than the monobromated camphor, it is soluble in chloroform, perchloride of carbon, and benzol. It possesses nearly all the properties of monobromated camphor: sulphuric acid dissolves it without alteration, and ordinary and fuming nitric acid have the same action upon it as upon the latter. Dissolved in alcohol it is easily hydrogenated by sodium amalgam, the

* From the *Bulletin de la Société Chimique.*
† *Pharm. Journ.*, [3]., vol. v., p. 321.

primitive camphor being regenerated. Its rotatory power in alcoholic solution is 102° C. The rotatory power is therefore not sensibly modified in the passage of monobromated to dibromated camphor.

Boiling alcohol deposits this body under the form of an almost odourless crystalline powder; slow crystallization from alcohol or chloroform yields fine crystals which are right prisms with rhombic base.

The characteristic property of camphor to combine with acids and a great number of other bodies is persistent in its bromine derivatives. Thus the viscous matter obtained in the preparation of dibromated camphor is an unstable combination of that compound with hydrobromic acid, dissolved in a small quantity of carbide. This product is strongly acid, and if left to stand in a vessel slowly disengages hydrobromic acid, the dibromated camphor crystallizing at the same time. When all the hydrobromic acid is given off there remains but little of this liquid, and it proves upon analysis to contain less bromine than required by $C_{10}H_{14}Br_2O$. It is only a solution of dibromated camphor in a viscous carbide.

The action of nitric acid upon camphor is known, and the author has found that it comports itself in the presence of other acids absolutely in the same manner as its bromine derivatives. It dissolves in sulphuric and phosphoric acids. Shaken in a tube with very concentrated hydrochloric acid, it appears at first to dissolve and disappear; but it quickly separates as an oily layer on the surface as with nitric acid. Hydrobromic and hydriodic acids would probably give analogous results.

THE THERAPEUTIC ACTION OF OLEUM ALEURITIS TRILOBÆ.

BY DR. CALIXTO OXAMENDI.

In a paper published in the *Anales de Medicina de la Habana*, an abstract of which appears in the *Medical Record* for June 16, the author describes the therapeutic action of the oil of the Candleberry tree, which he considers may be used as a good substitute for castor-oil.

The *Aleuritis trilobæ*, commonly called in India "candlenut" or "candleberry" tree, is a large euphorbiaceous tree which grows in India and all intertropical countries. The oil produced from the nuts of this tree is used for different industrial purposes. The native of Ceylon calls it "kekune oil," and it is known in England under the names of "nut oil" or "artist's oil."

Very little has hitherto been said about the therapeutic properties of this plant; nothing can be found on the subject in the works treating of materia medica. A short notice is, however, given in Griffith's 'Medical Botany.' This author says:—"The nuts of the *Aleuritis triloba* are considered to be aphrodisiac when used in small quantity and in a dry state; they have laxative properties when taken in larger quantity and in a fresh state." In one of his 'Annuaires de Thérapeutique,' M. Bouchardat says that the oil of *Aleuritis triloba* has purgative properties in a dose of thirty grammes. Renato de Grosourdy expresses the same opinion in his work on medical botany, but he thinks the oil must be used in a dose of sixty grammes in order to move the bowels.

Following the indications of Bouchardat and Grosourdy, Dr. Oxamendi has employed the oil of *Aleuritis triloba*, and his results are not quite conformable with those arrived at by his predecessors. Having once given this medicine to a healthy negro woman, he obtained an effect much stronger than he expected. By subsequent experiments, he arrived at the conclusion that the oil must be employed in much smaller doses, and that half an ounce is quite sufficient to move the bowels of an adult.

The oil of *Aleuritis*, Dr. Oxamendi thinks, may be used with advantage as a substitute for other aperients. It greatly resembles castor-oil in its effects on the bowels, but it is by no means disagreeable, and has a pleasant taste of hazel nuts. It acts quickly (about three hours after its administration) and very gently, without giving pain and griping.

With respect to the physiological action of this aperient Dr. Oxamendi thinks the laxative effects are not only due to the disturbance produced in the bowels by the oil itself, but also to a special resin which irritates the intestinal mucous membrane.

The nuts of the *Aleuritis triloba* are so oleaginous that they yield nearly half their weight of oil. The dose of the oil is two drachms for a child or half an ounce for an adult. The following mixture is recommended by Dr. Oxamendi:—

℞. Olei nucis aleuritis trilobæ	℥ss
Gummi arabici	ʒiij
Aq. communis	℥iij
Sacchari albi	ʒss
M.	

Good results are also reported to have been obtained by making frictions with the following liniment over the abdomen in cases of rebellious constipation or abdominal pains:—

℞. Olei nucis aleuritis trilobæ	℥ss
Tinct. cantharid. } Ammon. carbon., aa	ʒiij
M. Linimentum.	

ANTAGONISM BETWEEN STRYCHNIA AND MONOBROMATED CAMPHOR.*

BY DR. VALENTI Y VIVO.

Dr. Valenti y Vivo has made a series of researches on the supposed antagonism between these two substances; and has arrived at the conclusion that monobromated of camphor may be considered as an antidote for strychnia. According to Dr. Valenti, the following conclusions are well established (*Siglo Medico*, April 18, 1875).

1. Twelve dogs, after taking a fatal dose of strychnia, were saved by the use of monobromated camphor. The experiments were practised in a satisfactory manner, with crucial tests.

2. The tetanic convulsions produced by strychnia may be reduced in force and frequence by the use of monobromated camphor. The action of the antidote is rapid and sure.

3. The hyposthenic action of the monobromated camphor mitigates the reflex activity of the poison. The tonic convulsions are converted into clonic.

4. The physiological antagonism is comparatively limited. A strong dose of monobromted camphor is necessary to antagonize the effects of strychnia.

5. The monobromated camphor acts on the sympathetic nerve; this is demonstrated by the myosis and the cardiac paralysis which were observed after its administration.

6. After an overdose of monobromated camphor, the united effects of the poison and the antidote produce death by syncope; when death takes place during the strychnism and without the antidote, cardiac impulses are observed *post mortem*; when it takes place after and through the use of bromide, cardiac impulses are never observed.

7. The experiments show that it is preferable to introduce the monobromated camphor by gastric ingestion, and in small and repeated doses. The subcutaneous method, employed in some experiments, has not given satisfactory results.

Dr. Valenti points out the importance of this antagonism in practical medicine. He thinks monobromated camphor may be used with advantage in cases of poisoning by strychnia, in quantity varying from four to six grammes, given in small doses.

---

* From the *Medical Record*.

The Pharmaceutical Journal.

SATURDAY, JUNE 26, 1875.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE IRISH PHARMACY BILL.

THE second reading of this Bill came on last Friday night, at a late hour, and it is with some satisfaction that we are able to state that our anticipations of last week were so far realized that Sir MICHAEL HICKS-BEACH, in proposing the second reading of the Bill, expressed himself as concurring with the objections that had been raised by the Pharmaceutical Society against the proposal that there should be entire reciprocity between the British and Irish Pharmaceutical Societies, as provided for in the 18th Clause of the Bill. In pursuance of this alteration in his views, the Chief Secretary for Ireland proposed to omit that portion of the Bill which refers to reciprocity between the British Society and the Society contemplated as being established in Ireland.

On Monday the House went into Committee *pro formâ* on the Bill, and on Monday next it will be brought before the House in its amended form.

We have on a previous occasion mentioned the opinion expressed by a medical journal, not altogether unconnected with Ireland, that the Government would pay no regard to the objections raised by the Pharmaceutical Society against the provisions of the Bill. An amusing illustration of the value attaching to the opinions thus expressed, is furnished by the announcement in the same journal this week, that Sir MICHAEL HICKS-BEACH would "stand by his measure in its integrity, even if Parliament must be kept sitting in the dog-days." As we have already stated the Chief Secretary for Ireland has formed a wiser estimate of the case. In speaking of the effect of the alteration he had adopted Sir MICHAEL admitted that, notwithstanding this omission of the provisions for reciprocity, the object which the Irish Bill has in view will be equally well met, and that so far as regards Ireland, the Bill will not be less effective without the 18th Clause than it would be if it were allowed to remain. We entirely agree with this opinion ourselves, and have no doubt that it will meet with general acquiescence.

So far then as the regulation of Pharmacy in Ireland is concerned, those who think this can be provided for better by the establishment of an independent Irish Society than by the extension of the British Society's operations to Ireland, in the same way that it already extends to Scotland, cannot have any reason to complain of the action taken by the Society in reference to the Bill. We are therefore utterly at a loss to comprehend the complaint of Mr. ERRINGTON—who may be assumed to represent the advocates of the Irish Society scheme—that the dropping out of the reciprocity clause was a mutilation of the Bill. We cannot understand why the provisions of the 18th Clause having that object in view should be so tenaciously held to by the supporter of a measure that is ostensibly intended to provide specially for the independent control of Irish pharmacy, nor can we understand why the withdrawal of this reciprocity clause should be regarded by them with so much regret as Mr. ERRINGTON took occasion to express last Friday. The reciprocity clause in fact did not in any way affect the internal regulation of pharmacy in Ireland, which is supposed by some to be so essential; it merely provided that persons having at some future time the certificates of a Society which is at present non-existent, should in virtue of those certificates have also the right to registration in Great Britain among the highest grade of pharmacists, and thereby acquire equal privileges with them. At the same time no provision was made for securing British pharmacists from such misuse of those powers as we know has been practised by certain qualifying medical bodies, with very prejudicial results not only to the profession and to the public, but also to the medical corporations themselves. It might reasonably have been expected that if reciprocity were so much desired together with independent action, the propriety of giving the British Society some control over the examinations would have been evident to the promoters of an independent Irish Pharmaceutical Society that was to enjoy the privilege of granting qualifications virtually extending to both countries.

It is from considerations such as these that it appeared at least expedient if not obligatory for the Society to oppose the Irish Pharmacy Bill. No communications had been made to the Council either by the Government or by the Irish promoters of the Bill, and though in the abstract there might not be objection to a reciprocity of privileges between Irish pharmacists and their brethren in England and Scotland, the proposition to establish such a relation was so put forward in the Bill that there was in reality no other course than opposition possible.

With the exception of the view expressed by Mr. ERRINGTON, who appears to entertain opinions in regard to pharmacy that are eminently peculiar, the only other objection to the withdrawal of the 18th Clause of the Bill was urged by Dr. WARD, and this was apparently founded on a misconception. Dr. WARD seems to have taken the 18th Clause as providing for one uniform system of examination in pharmacy, and to have regarded its omission as tending to increase the evil that has so long existed in the medical profession. He pointed out with much force that the unworthy competition between bodies empowered to grant medical qualifications had been carried so far, and in the struggle for existence the obtaining of examination fees had become so much more palpably essential for the continuance of some corporations than anything else, that a candidate rejected by one corporation had only to pack up his carpet bag and drive off to some other place, whence he would return in a few days a legally qualified medical practitioner.

That such a result as regards the practice of pharmacy in England might in some degree have followed the passing of the Irish Pharmacy Bill would not have been at all impossible, if the 18th Clause, with its reciprocity provisions, had remained; and as Dr. Ward's remarks on the Bill were directed against the favouring of such a contingency, we congratulate British pharmacists upon having in reality his support in this matter. The tendency of his argument was, in fact, very much in the same direction as the evidence given by Mr. Sandford before the Special Committee last session, when in referring to the example of the medical profession he pointed out that all practitioners in England, Ireland, and Scotland had been brought into one register, under one general medical council, with one pharmacopœia, thus ensuring greater uniformity. As a parallel case he held that in pharmacy, now the countries were so much more accessible than they used to be, it is important to have a similar system; that, in fact, reciprocity was much less desirable than union; while above all he insisted very justly, that if the establishment of a separate society and a separate board of examiners were insisted upon it would be essential to exercise great care in giving those who passed the examinations "titles which were not used by our Society in London."

This leads us to another and very important consideration as regards the Irish Pharmacy Bill, viz., the title which it proposes to introduce as the indication of having passed the examinations of the independent Pharmaceutical Society of Ireland. Why should that particular title be selected for this purpose which has been for years recognized as the exclusive right of those who voluntarily submit to an examination which has been conducted in such a manner as to ensure, for all who pass it, a very high measure of esteem among medical and scientific bodies? The want stated to exist in Ireland does not require the appropriation of this title, and in all probability that want would, so far as it exists in reality, be better considered by the adoption of the title "dispensing chemist" as the means by which the public might distinguish between the mere chemist and druggist and that "chemist" who was legally qualified to dispense physicians' prescriptions.

Moreover if we consider the very remarkable nature of the idea that seems to be entertained in Ireland of the functions of the "pharmaceutical chemist," as pointed out in our article last week, there is ample reason for alarm. So far as one may gather from the evidence of Dr. Leet and Mr. Collins—both of them connected with the practice of pharmacy, and active participators in schemes for the reform of Irish pharmacy, the "pharmaceutical chemist" is little better than a huckster, according to the Irish ideal. Hence a further very cogent reason suggests itself for objecting to share this designation with our Irish neighbours, at any rate for the present, and until such time as the arrangements for doing so can be carried out with due regard for the efforts by which a certain degree of respect has been acquired for this title, and without imperiling the maintenance of such credit as it has gained so far without any assistance from those who now desire to make use of it.

When the Irish Pharmaceutical Society shall have been in existence for some time and have demonstrated its capability of existing independently it may be well to entertain projects of co-operation and reciprocity. Whenever such a position is realized we have no doubt that the British Pharmaceutical Society will take part in such mutual arrangements as Mr. Errington referred to in his speech last Friday, and then we believe there will be more reason to anticipate that the results would be satisfactory to all parties.

We cannot leave this view of the subject without again suggesting that the appropriation of the title of pharmaceutical chemist should not be pressed by our friends in Ireland.

SERRONIA JABORANDI.

We learn from the new number of the *Zeitschrift d. allgemeinen österreichischen Apotheker-Vereines* that on the 25th of May, at a sitting of the Vienna Medical College, Professor Drasche described the results of numerous experiments on men and animals with "Serronia Jaborandi." Not only were an infusion and a tincture used, but also an alkaloid which the Professor claims to have been the first to prepare and to which he has given the name "Serronine." Of this alkaloid he reports a yield of about 1½ grains from a drachm of Serronia Jaborandi leaves. All of these preparations caused profuse sweating and excretion of saliva, and induced striking physiological symptoms generally similar to those which have been attributed to the use of the Jaborandi yielded by the genus *Pilocarpus*. But, although at present the materials for forming a judgment are very meagre, it would appear probable that what the Professor terms "Serronia Jaborandi," and which he states to have been imported from Brazil through France, is yielded by a Piperaceous plant; *Serronia Jaborandi*, Guill., being a synonym of *Piper Jaborandi*, Vell. We have seen specimens of the leaves that were imported into France, and although they present characters showing they have not been derived from *Piper Jaborandi*, they certainly have been yielded by an allied species. This similarity of name and all that is said concerning the source from which Professor Drasche obtained his supply would seem to indicate that he experimented with the leaves of a species of *Piper*. Whether, however, the alkaloid is identical with that referred to before (p. 789) under the name of Jaborandine, or whether another powerful medicinal agent has been placed at the service of medical men, can only be decided by the aid of fuller information.

A HINT FOR KEEPERS OF LEECHES.

A correspondent of the *Pharmaceutische Zeitung*, in a recent communication to that journal, makes a statement which will interest all who have been troubled by a high death-rate amongst their leeches. Being engaged in making some experiments with salicylic acid it occurred to him to try how far it could be tolerated by leeches. The first couple experimented upon fell victims to an overdose, but a third, being kept in water to which only a very small quantity of acid had been added, was lively and well at the end of a month, whilst the water did not become foul either in smell or taste. Two other leeches were then placed in 100 grams of water and four drops of an aqueous solution (1 in 300) of salicylic acid added. After remaining two months in the same water, the leeches were quite healthy and the water was fresh and clear. The next experiment was upon a hundred leeches, kept in about a litre of water. The conditions appear to have been rather unpromising; the water was already turbid, slimy, and ill-smelling, and at the bottom of the containing vessel three leeches lay dead. These were removed, thirty drops of the solution of salicylic acid added, and the vessel set aside. The next morning the foul smell of the water had entirely disappeared, and the leeches were quite lively. The water was then poured off, the vessel purified, and the leeches cleansed and placed in a litre of fresh water to which twenty drops of the salicylic acid solution had been added. Since then the leeches have been healthy, there have been no further deaths, and the water remains sweet and bright.

These experiments would appear to be worth repeating, and we should be glad to receive any fresh information upon the subject.

A MISTAKE AND ITS CONSEQUENCES.

In the month of May, according to the *Bulletin Commercial*, a prescription was presented to a certain French pharmacien ordering 2 gr. 40 cent. of carbonate of lithium to be divided into twelve packets. The pharmacien, not having any carbonate of lithium in stock, sent out for it to another pharmacien, who supplied him instead with 2 gr. 50 cent. of sulphate of atropia. The mistake was not noticed; but the powders were made up, and one of them was administered to a child, whose life was probably saved only by the violent vomiting it produced. Both pharmaciens have consequently been arraigned before the *tribunal correctionnel*, and after their characters as careful pharmacists had been allowed to have proper weight, one was fined 100 francs for making the mistake, and the other 50 francs for not detecting it. Our contemporary considerately represents the individuals concerned and the locality by initial letters.

CIVIL SERVICE SERVANTS AND CO-OPERATIVE STORES.

In the House of Commons on Monday last, Sir Thomas Chambers gave notice that, on the motion for going into Committee of Supply, he would call the attention of the House to the absence from the reports of the Civil Service Inquiry Commission of any investigation into the complaints made against the system of trading now carried on by the servants of the Crown under the guise of Co-operative Stores.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

(Session 1874—1875.)

Distribution of Prizes.

On Tuesday, 22nd June, the Council of the above Association met in the Botany class room, Free Church College, Mr. Kinninmont, Vice-President presiding in the absence of the President (Mr. Greig).

The following prizes were awarded:—

Practical Chemistry.

First Prize.—Mr. William Murdoch, 34, Virginia St.

Second Prize.—Mr. William Lawson, 140, Parliamentary Road.

Third Prize.—Mr. George B. Key, 113, Buchanan St.

Fourth Prize.—Mr. Thomas Dunlop, 270, Govan Road, Goran.

Teacher, W. Dittmar, Esq., Professor of Chemistry, Anderson's University.

Tutorial Class.

First Prize.—Mr. J. J. Cunningham, 34, Rutherglen Road.

Second Prize.—Mr. Hugh Campbell, 133, Waterloo Street.

Third Prize.—Mr. John McCallum, 2, Armadale St., Dennistown.

Fourth Prize.—Mr. Thomas Fullarton, 34, Rutherglen Road.

Teacher, Mr. R. C. Lindsay, B.Sc.

Botany Class.

First Prize.—Mr. David Curle, 15, Willowbank Street.

Second Prize.—Mr. George B. Key, 113, Buchanan Street.

Third Prize.—Mr. Andrew Young, 15, Bellfield Street.

Fourth Prize.—Mr. Thomas Dunlop, 270, Govan Road, Govan.

Teacher, Mr. William Keddie, Teacher of Science, Free Church College.

Twenty members were enrolled for the Practical Pharmaceutical Chemistry Class. Nine presented themselves for examination.

Thirty-seven members were enrolled for Tutorial Class, twenty presenting themselves for examination.

Twenty-one enrolled for Botany Class, and seven came forward for examination.

The teachers all spoke highly of the progress made by the classes generally, several of the more advanced students having already passed their respective pharmaceutical examinations.

The customary vote of thanks to teachers, donors of prizes (Messrs. Greig, Currie, and Rait), to the Secretary (Mr. Fairlie), who had provided an abundant supply of fresh plants for the use of the Botany Class each night, and to the Chairman (Mr. Kinninmont) for presiding closed the proceedings.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, June 17. Professor Abel, F.R.S., in the chair. After the usual business of the Society, seven papers were read, the first of which, "Notes on the Chemistry of Tartaric and Citric Acid," by R. Warington, gave many important particulars connected with the manufacture of these acids, and also detailed accounts of the methods of analysis—many of them novel—of the various raw materials from which they are made. After this the Secretary read a communication "On the Action of Nitric Acid on Copper, Mercury, etc., especially in the presence of Metallic Nitrates," by Mr. J. J. Ackworth. Dr. Gladstone then gave a short account of the "Decomposition of Water by the Joint Action of Aluminium and Aluminium Iodide, Bromide, and Chloride, including instances of Reverse Action," by himself and Mr. Tribe. The other papers were "On Nitrosyl Bromide, and on Sulphur Bromide," by Mr. M. M. P. Muir; "On Achrematite, a new Molybdic Arseniate of Lead from Mexico," and "On certain New Reactions of Tungsten," both by Professor J. W. Mallet; and "On the Action of Chlorine on Acetamide," by Dr. Prevost. The meeting, which was the last of the session, was then adjourned until November next.

SOCIETY OF ARTS.

Alcohol, its Action and its Uses.*

BY BENJAMIN W. RICHARDSON, M.D., F.R.S., etc.

Lecture VI.

Physical deterioration from Alcohol, continued. Influence on the vital organs. Mental phenomena induced by its use. Summary.

(*Concluded from page* 1021.)

Other Organic Changes.

In the eyeball certain colloidal changes take place from the influence of alcohol, the extent of which have as yet been hardly thought of, certainly not in any degree studied, as in future they will be. We have learned of late years that the crystalline lens, the great refracting medium of the eyeball, may, like other colloids, be rendered dense and opaque by processes which disturb the relationship of the colloidal substance and its water. By this means even the lens of the living eye can be rendered opaque, and the disease called cataract can be artificially produced. Sugar and many salts in excess, in the blood, will lead to this perversion of structure, and after long time alcohol acting in the manner of salt is capable, in excess, of causing the same modification. In the eyeball, moreover, alcohol injures the delicate nervous expanse upon which the image of all objects we looked at is first impressed. It interferes with the vascular supply of this surface, and it leads to changes of structure which are indirectly destructive to the perfect sense of sight.

In yet another mode alcohol perverts the animal mechanism. By some as yet obscurely definable interference with the natural transmutation of the colloidal substances into saline or crystalloidal, it gives rise to the production of an excess of some salines which appear in the fluid renal secretion. These saline matters accumulated in the blood from inability of the excreting organs to dispose of them, are directly injurious, and exist as possible causes for the promotion of cataractous changes in the crystalline lens, and varied changes in other of the colloidal tissues and membranes. They are also a cause of a disease local in character and produced by the very aggregation of saline products, particle by particle, into a compact mass like a stone. I refer to what is called *calculus*. In writing the history of one of the districts of England in which this disease is very prevalent, I expressed many years ago the view that alcoholic indulgence was one of the most telling agencies in the production of the malady. I have seen nothing since that would lead me to alter that statement.

Organic Nervous Lesions from Alcohol.

Lastly, the brain and spinal cord, and all the nervous matter become, under the influence of alcohol, subject, like other parts, to organic deterioration. The membranes enveloping the nervous substance undergo thickening; the blood vessels are subjected to change of structure, by which their resistance and resiliency is impaired; and the true nervous matter is sometimes modified by softening or shrinking of its texture, by degeneration of its cellular structure, or by interposition of fatty particles.

These deteriorations of celebral and spinal matter give rise to a series of derangements, which show themselves in the worst forms of nervous disease—epilepsy; paralysis, local or general; insanity.

But not a single serious nervous lesion from alcohol appears without its warning. As a man who, when drinking at the table, is warned that the wine is beginning to take decisive effect on his power of expression and motion, by certain unmistakable indications, so the slow alcoholic is duly apprised that he is in danger of a more permanent derangement. He is occasionally conscious of a failing power of speech; in writing or speaking he loses common words. He is aware that after fatigue his limbs are unnaturally weary and heavy, and he is specially conscious that a sudden fall of temperature lowers too readily his vital energies. The worst sign of impending nervous change is muscular instability, irrespective of the will; that is to say, an involuntary muscular movement whenever the will is off guard. This is occasionally evidenced by sudden muscular starts which pass almost like electrical shocks through the whole of the body; but it is more frequently and determinately shown in persistent muscular movements and starts at the time of going to sleep. The volition then is resigned to the overpowering slumber, and properly all muscular movement, except the movement of the heart and of the breathing, should rest with the will. But now this beautiful order is disturbed. In the motor centres of the nervous organization the foreign agent is creating disturbance of function. The fact is communicated to the muscles by the nervous fibres, and the active involuntary start of the lower limbs rouses the sleeper in alarm. Ignorant of the import of these messages of danger, the habituated alcoholic continues too frequently his way, until he finds the agitated limbs unsteady, wanting in power of co-ordinated movement—paralysed.

Deeply interesting as these phenomena from alcohol are, I must leave them here, omitting many others equally significant and equally plain, when they are once pointed out, even to the unprofessional mind. Let it be understood that in each description I have recorded only what alcohol can physically do to the animal economy. It is not always the cause of all or any of these phenomena. They may be induced by other influences and other agents, but it is an agency capable of effecting them, and it is actively employed in the work.

On some of the Mental Phenomena Induced by Alcohol.

The purely physical action of alcohol has been so far treated upon in the preceding pages. To that must now be added a few sentences on the influence this agent exerts over the mental functions. Of course such influence is actually manifested by and through physical means, but as yet these are not sufficiently clear to enable us to trace out the mental aberration through the physical process that has led to it. It is better therefore and simpler to treat the present subject in the mere abstract, passing from the agent to its results, without reference to the intermediate line of connection between cause and effect. These mental phenomena, in the chronic phase, correspond

* Cantor Lectures: delivered during December, 1874, and January, 1875, from the *Journal of the Society of Arts.*

to the phenomena which belong to the second and third stages of acute alcoholic intoxication.

Loss of Memory or Speech.

One of the first effects of alcohol upon the nervous system in the way of alienation from the natural mental state, is shown in loss of memory. This extends even to forgetfulness of the commonest of things; to names of familiar persons, to dates, to duties of daily life. Strangely too, this failure, like that which indicates, in the aged, the era of second childishness and mere oblivion, does not extend to the things of the past, but is confined to events that are passing. On old memories the mind retains its power; on new ones it requires constant prompting and sustainment.

If this failure of mental power progress, it is followed usually with loss of volitional power. The muscles remain ready to act, but the mind is incapable of stirring them into action. The speech fails at first, not because the mechanism of speech is deficient, but because the cerebral power is insufficient to call it forth to action. The man is reduced to the condition of the dumb animal. Aristotle says, grandly, animals have a voice; man speaks. In this case the voice remains, the speech is lost; the man sinks to the lower sphere of the living creation, over which he was bo n to ri l .

The failure of speech indicates the descent still deeper to that condition of general paralysis in which all the higher facilities of mind and will are powerless, and in which nothing remains to show the continuance of life except the parts that remain under the dominion of the chain of organic or vegetable nervous matter. Our asylums for the insane are charged with these helpless specimens of humanity. The membranes of the nervous centres of thought and volition have lost, in these, the dialysing function. In some instances, though less frequently than might be supposed, the nervous matter itself is modified visibly in texture. The result is the complete wreck of nervous action, the utter helplessness of will, the absolute dependence upon other hands for the very food that has to be borne to the mouth. The picture is one of breathing death; of final and perpetual dead drunkenness.

Dipsomania.

A second effect of alcohol on the mental organization, is the prodution of that craving for its incessant supply to which we give the name of dipsomania. In those who are affected with this form of alcoholic disease, a mixed madness and sanity is established, in which the cunning of the mind alone lives actively, with the vices that ally themselves to it. The arrest of nervous function is partial, and does not extend to the motor centres so determinately as to those of the higher reasoning faculties. But the end, though it may be slow, is certain. And the end is, as a rule, that general paralysis, which I have just described. The dipsomaniac is, however, capable of recovery, within certain limits, on one and only one condition—that the cause of his disease be totally withheld.

Mania a Potu.

The effect of alcohol on the mental functions is shown in yet another picture of modern humanity writhing under its use. I mean in the form of what may be called intermittent indulgence, to dangerous excess. This form of disease has been named the *mania a potu*, and it is one of the most desperate of the alcoholic evils. The victims of this class are not habitual drunkards or topers, but at sudden intervals they madden themselves with the spirit. They repent, reform, get a new lease of life, relapse. In intervals of repentance they are worn with remorse and regret; in the intervals of madness they are the terrible members of the community. In their final excitement they spread around their circle the darkness of desolation, fear, and despair. Their very footsteps carry dread to those who, most helpless and innocent, are under their fearful control. They strike their dearest friends; they strike themselves. Retaining sufficient nervous power to wield their limbs, yet not sufficient to guide their reason, they become the dangerous members of our community, whom our legislators, fearing to touch the cause of their malady, would fain try to cure by scourge and chain.

To us physiologists these "maniacs a potu" are men under the experiment of alcohol, with certain of their brain centres (which I could fairly define to you if the occasion were befitting) paralysed, and with a broken balance, therefore, of brain power, which we, with infinite labour and much exactitude, have learned to understand. Our remedy for such aberration of nervous function, if we were legislators, would be simple enough; we should not whip the maniac back again to the potu; we should try to break up the term by taking the potu from the maniac. But then we are only physiologists. We have nothing to do with that 117,000,000*l*. of invested capital, and we are not practical in reference to it.

Transmitted Disease.

The solemnest fact of all bearing upon these mental aberrations produced by alcohol, and upon the physical not less than the mental, is, that the mischief inflicted on man by his own act and deed cannot fail to be transferred to those who descend from him, and who are thus irresponsibly afflicted. Amongst the many inscrutable designs of nature none is more manifest than this, that physical vice, like physical feature and physical virtue, descends in line. It is, I say, a solemn reflection for every man and every woman, that whatever we do to ourselves so as to modify our own physical conformation and mental type, for good or for evil, is passed on to generations that have yet to be.

Not one of the transmitted wrongs, physical or mental, is more certainly passed on to those yet unborn than the wrongs which are inflicted by alcohol. We, therefore, who live to reform the present age in this respect, are stretching forth our powers to the next; to purify it, to beautify it, and to lead it towards that millennial happiness and blessedness, which, in the fulness of time, shall visit even the earth, making it, under an increasing light of knowledge, a garden of human delight, a Paradise regained.

Summary.

In summary of what has passed, I may be briefness itself.

This chemical substance, alcohol, an artificial product devised by man for his purposes, and in many things that lie outside his organism a useful substance, is neither a food nor a drink suitable for his natural demands. Its application as an agent that shall enter the living organization is properly limited by the learning and skill possessed by the physician, a learning that itself admits of being recast and revised in many important details, and perhaps in principles.

If this agent do really for the moment cheer the weary, and impart a flush of transient pleasure to the unwearied who crave for mirth, its influence (doubtful even in these modest and moderate degrees) is an infinitesimal advantage, by the side of an infinity of evil for which there is no compensation, and no human cure.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Action of Heat on Coloured Liquids.*

BY WALTER NOEL HARTLEY, F.C.S.

Demonstrator of Chemistry, King's College, London.

All substances whatever may be divided into two classes, the coloured and the colourless. By simple inspection it is impossible to distinguish one colourless liquid from another, but the case is very different with coloured substances. In dealing with compound substances derived from the metals, we find generally that a certain colour is characteristic of a certain metal. Thus

* Lecture delivered at the Royal Institution of Great Britain, Friday, April 30, 1875.

a blue is the tint which prevails in most compounds containing copper, while green is characteristic of nickel, and pink or red of cobalt. If we examine the colour of a metallic solution by transmitting light through it, and analysing this light with a prism, as Dr. Gladstone did in the year 1857,* we then get a spectrum which serves in some degree to identify the metal present in the solution. Taking, for example, three liquids containing the same metal—a green, a purple, and a red solution—the green chloride, the purple sulphate, and the red oxalate of chromium, we have such a diversity of behaviour with chemical reagents, and such a variety of tints, that it is not an easy matter to recognize the presence of the same base unless the light transmitted by those solutions is analysed by the prism, and if this be done in a wedge-shaped cell, we have the advantage of seeing through many different thicknesses of liquid at one glance. We then get a spectrum in each case with chromium compounds, which has a great similarity, its chief characteristic being that the red, green, and blue rays are transmitted, while all the yellow are cut out. It has long been known that certain metallic solutions darken on exposure to heat, and in this way prisoners sometimes effect a secret correspondence outside the prison walls. The method consists in writing with an invisible solution between the lines of their letters, which is afterwards developed by those who are in the secret. Such solutions have been called sympathetic inks, and one in particular, called Hellot's sympathetic ink, is the chloride of cobalt, which being of a pale pink colour, in the state of a dilute solution, on drying and heating turns a very dark blue. Writing executed with this ink is all but invisible until a hot iron be passed over it, when it appears beautifully distinct, and on cooling disappears again. The Fenian criminal, Barrett, when confined in the House of Detention, was found to have in his possession a small tube containing chloride of gold: in the woollen stockings sent to him was noticed some white powder, which could be shaken out. This was evidently for the purpose of secret correspondence. The powder was found to be sulphate of iron; writing with a dilute solution of chloride of gold would be invisible until washed over with sulphate of iron, which solution develops the characters. The blue colour of cobalt chloride (Hellot's ink) is more easily produced if the salt be mixed with calcium chloride; such a mixture is that used for the little instrument called the chameleon barometer. This, which is in reality a hygrometer, or an indicator of the amount of moisture in the air, consists simply of a piece of paper soaked in the two solutions, protected by a glass and frame. The way in which it is differently affected by dry and moist air may be easily seen. Placing two of these under different bell-jars, one containing a little vessel of oil of vitriol, which dries the air, the other a little water, which of course keeps it moist, the paper in the former will be blue, and that in the latter red; then, if their places be changed their colours change. That a solution of cobalt chloride could be turned blue by the addition of hydrochloric acid, of sulphuric acid, of alcohol, or of chloride of calcium, has for some time been known; it has also been noticed that an acid solution of chloride of cobalt, red at an ordinary temperature, becomes blue if heated, such being also the case with a dilute solution containing alcohol; furthermore, that a dilute solution, if heated under pressure in sealed tubes to a higher temperature than that of boiling water, becomes blue.

In 1871 I found that a strong perfectly neutral aqueous solution of the purest cobalt chloride, which had been prepared from Claudet's salt, changed colour with the greatest possible ease upon heating. A small tube-full held in the hand changed from deep crimson to a decided purple tint in a few minutes; a little of the solution smeared over the fingers soon became blue; and a quantity of the liquid heated in an open dish became blue at 70° C. It was noticed that a very small tube of flattened glass, containing a solution of cobalt chloride, which was perfectly transparent when cold, upon heating to 70° C. became quite opaque. It was evident that the change from red to blue noticed was not simply a difference in refrangibility of the transmitted light, but an increase in the quantity of light absorbed by the solution. Hence it appeared to be a matter of great interest to examine the change of colour by means of the spectroscope, and even to go beyond this, and examine the action of heat on all coloured liquids by the same means, but especially was it expected that the bromide and iodide of cobalt would yield intensified effects of the same kind. Observations have been made on about sixty different solutions, most of which were prepared from metallic salts. Many of these compounds had been but imperfectly examined, while others were quite new. The solutions were generally made by allowing cold water to stand for some days with the crystallized salt, giving it frequent agitation.

The examinations were made in wedge cells cut out of blocks of glass, and polished; one side of the cell was made by fixing on a piece of plate-glass by means of a screw clump. Two sizes of these hollow wedges were used to facilitate the examination of liquids of different intensities of colour. They were each of the same height, namely, three-quarters of an inch, the larger cells being at their thickest part three-quarters of an inch, diminishing to nothing; the smaller being not more than three-sixteenths of an inch thick. The refraction caused by the thick wedge of liquid was corrected by the wedge of glass which formed one side of the cell. A little copper hot-air cupboard, with two opposite sides of easily removable plates of glass, was used for heating the wedges filled with liquid. These wedges were covered with plates of glass, as far as possible to prevent evaporation. Sunlight was used when possible, and in many cases when this was impossible an argand gas burner was used, of such a construction that oxygen gas could be blown into the flame to increase the brilliancy and whiteness of the light.

The spectra of metallic solutions were noticed as being principally of three kinds: those caused by the uninterrupted transmission of certain rays, such as the blue by salts of copper and the green by nickel; those consisting of continuous spectra interrupted by sharp black bands, such as didymium and uranium salts yield; and those resulting from two groups of rays of different refrangibilities as the green and red seen in chromium salts, and the blue and red in cobalt compounds. Such spectra are those of dichroic solutions. The difference between monochroic and dichroic solutions is easily shown in the following manner, thus: when the spectrum of the electric lamp is thrown on to the screen, and a cell containing sulphate of copper or nickel is interposed, a simple green band of light appears; if, instead of a spectroscope slit, a round disc is used, only one image of this is seen; and if the image of the carbon points of the electric lamp be thrown on to the screen, when a prism is interposed containing nickel solution, one image, and that a green one, is formed. Taking a dichroic liquid such as chrome alum, we get a spectrum consisting of red and green rays, separated by a band of darkness; a disk of light becomes resolved into two, one of a rich red and the other of a green tint, both colours of great beauty; where the two disks overlap the original colour of the liquid is formed.

If we project the image of the carbon points through a hollow prism of the liquid, two images are formed, one red, the other green. Precisely the same thing occurs with cobalt chloride, but the two colours are purple and orange.

The amount of absorption of light taking place in different thicknesses of a solution is easily observed when wedge cells are used, and it is thus easy to ascertain what change will take place on diluting the liquid, provided water is without chemical action. Liquids presenting a

* 'Proceedings of the Royal Institution,' vol. ii., p. 336.

wedge-shaped spectrum alter in colour on dilution, in the ratio indicated by the relation of the angle of the wedge-shaped spectrum to that of the wedge cell. These solutions, having spectra bounded by perpendicular straight lines, are only slightly affected by dilution. Some crystallized chromate of potash was dissolved in as little water as possible, forming a beautiful canary yellow colour. This, when diluted to 12,000 times the original weight of the salt, was not greatly altered, the change being not in depth of tint but in brilliancy. Permanganate of potash shows five black lines in the green portion of the spectrum when much diluted with water, and three of these are perfectly well seen when looking through half an inch of liquid which contains only one part of the salt in 118,000 parts of water. The loss of colour caused by the dilution of ammonio-chloride of palladium is indicated by its wedge-shaped spectrum, and was illustrated by dissolving one grain weight of the salt in water and diluting the dark brown liquid till the colour disappears; a pint and a half of water was sufficient for the purpose. On repeating the experiment with permanganate of potash the liquid remained of a beautiful pink colour, even after five gallons of water had been added.

It is a remarkable fact, that although the first step in practical chemistry is the solution of a substance in water, it has hitherto not been ascertained what really takes place when this operation is performed, consequently we are in ignorance of the chemical constitution of the resulting liquid. The chief reason for undertaking this investigation was the hope that this question, to which very doubtful and unsatisfactory answers could alone be given, might be finally decided, and the work recorded has been well bestowed on the subject.

Most metallic salts form combinations with water; the ordinary carbonate of soda (washing soda) is the carbonate of the metal united with ten molecules of water, which may be separated in the form of steam by heating to 100° C. It therefore contains not far from two-thirds of its weight of water, and many other salts combine with water in the same way. Carbonate of soda, however, is colourless; but many *coloured* substances combine with different proportions of water to form compounds varying in colour; thus we see in the accompanying tabular statement the variation between the colour of the anhydrous salts and their different combinations with water are very striking. Many compounds do not lose all their combined water at 100° C., and these salts are amongst the number.

Substances Varying in Colour with their State of Hydration.

Anhydrous.	Compounds produced at 100° C. from ordinary Crystals.	Ordinary Crystals.	Colour of Solution. Strong.	Colour of Solution. Dilute.
$CuCl_2$ Yellow..	$CuCl_2 \cdot H_2O$	$CuCl_2 \cdot 2H_2O$ Blue	Grass green ..	Blue.
$CuBr_2$ Black and lustrous	$CuBr_2 \cdot H_2O$ Dark brown	$CuBr_2 \cdot 5H_2O$ Golden green ..	Red brown ..	Blue.
$CoCl_2$ Lavender; blue when hot	$CoCl_2 \cdot 2H_2O$ Purple; blue when hot	$CoCl_2 \cdot 6H_2O$ Cherry red	Deep red	Pink.
$CoBr_2$ Vivid green	$CoBr_2 \cdot 2H_2O$ Purple; blue when hot	$CoBr_2 \cdot 6H_2O$ Deep crimson ..	Deep crimson ..	Pink.
CoI_2 Lustrous intense black ..	$CoI_2 \cdot 2H_2O$ Moss-green	$CoI_2 \cdot 6H_2O$ Dusky red-brown .	Dark brown ..	Pink.
$NiBr_2$ Yellow..	($NiBr_2 \cdot H_2O$?) Dark red	$NiBr_2 \cdot 3H_2O$ Green	Madder brown..	Apple green.
NiI_2 Lustrous intense black ..	($NiI_2 \cdot 2H_2O$?) Dark brown	$NiI_2 \cdot 6H_2O$ Bluish green.. ..	Yellowish brown.	Apple green.

It is a remarkable fact the above-named substances are those which change colour most notably on heating their solutions, hence a number of conclusions have been arrived at as to the internal or molecular structure of these solutions. The spectroscope itself would be quite unavailable in giving us the desired information; but chemical research, aided by the observation of optical properties, yields what neither alone could do.

A distinct statement regarding this action of heat here follows:—

The Effect of Heat on Absorption Spectra.

When saturated solutions of coloured salts are heated to 100° C.—1st, there are few cases in which no change is noticed. 2nd, generally the amount of light transmitted is diminished to a small extent by some of the more refrangible, the less refrangible, or both kinds of rays being obstructed. 3rd, there is frequently a complete difference in the nature of the transmitted light. Anhydrous salts not decomposed, hydrated compounds not dehydrated at 100° C., and salts which do not change colour on dehydration, give little or no alteration in their spectra when heated.

Solutions of hydrated salts, and most notably those of haloid compounds, do change; and the alteration is, if not identical with, similar to that produced by dehydration and the action of dehydrating liquids, such as alcohol, acids, and glycerine, on the salts in crystals or solution.

A particularly interesting instance of the action of heat on an aqueous solution is that of cobalt chloride, which gives a different series of dark bands in the red part of the spectrum at different temperatures, ranging between 23° C. and 73° C. Band after band of shadow intercepts the red rays as the temperature rises, till finally nothing but the blue are transmitted. Drawings of six different spectra of this remarkable nature have been made. The changes are most marked between 33° and 53°, when the temperature may be told almost to a degree by noting the appearance of the spectrum. Though to the unaided eye cobalt bromide appears to undergo the same change, yet, as seen with the spectroscope, it is not of so curious a character, the bands being not so numerous.

With cobalt iodide a band of red and green rays is transmitted at low temperatures; the band of light moves towards the opposite end of the spectrum, with rise of temperature, until it is transferred to such a position that it consists of green rays only. In this instance the change to the eye is more striking when seen without the spectroscope, because the mixtures of red, yellow, and green rays, which are formed during the transition, give rise to very beautiful shades of brown and olive green. Thus a saturated solution at 16° C. was of a brown colour, at − 10° C. it became of a fiery red and crystals separated, at + 10° reddish brown, at 20° the same, at 35° vandyke brown, at 45° a cold brown tint with a tinge of yellowish green, at 55° a decidedly yellowish green in thin layers and yellow brown in thick, at 65° greenish brown, thin layers green, and at 75° olive green. This was shown by heating a little of the liquid in a globular flask while it was rapidly rotated by the hand, the liquid thus being spread in a thin layer over a large surface. An examination of this cobalt salt has shown that there are two distinct crystalline hydrates—the one, formed at high temperatures, has the formula $CoI_2 2H_2O$, and is of a dark green colour; the other, which contains a much larger proportion of crystalline water, $CoI_2 6H_2O$, is produced at a low temperature, and its colour is generally brown, in cold weather inclining to red.

The formation of the dihydrate and the anhydrous compound was beautifully shown in the following manner:—A glass plate, upon which was smeared a thin but even layer of the cobalt iodide, was held in the rays of the electric light projected on to a screen. At first nothing was to be seen, but on warming the plate a spot of greenish yellow light appeared, and this spreading in every direction showed itself to be a mass of green crystals; the application of a little more heat soon converted these into the black anhydrous compound.

In the case of didymium nitrate a new line was seen to come into existence. The instances of the third kind were frequently so altered by heat that the less refrangible group of rays was extinguished partially, if not entirely. Cobalt and chromium compounds furnish examples of this.

The formation of different hydrates of the same salt, each of which has its characteristic colour, is very strikingly shown with bromide and iodide of cobalt; thus a sketch of sea and sky is made with the former, the liquid is pink, and not strong in colour, so that very little is seen until the paper be warmed, when the most beautiful azure tints appear. If carefully managed, the green anhydrous compound may be produced, and so give a greenish tinge to the sea. The red hexahydrate of cobalt bromide is first converted into the blue dihydrate, and then into the green anhydrous compound. But an infinitely more astonishing change is that produced by warming a sketch of foliage and water made with the iodide and bromide of cobalt. It has the appearance of a warm-tinted sepia drawing, which gives the foliage quite an autumnal appearance. On warming, the blue of the sky and water, together with exquisite green tints in the foliage, appear. By varying the quantity of the cobalt iodide put on with the brush, colours varying between the most delicate green of spring-time, the full richness of summer, and all kinds of greenish brown autumnal tints, even black, may be produced. The atmospheric moisture re-forms the original hexahydrated salts, and the colours disappear when the paper gets cold again. Two sketches of this kind were exhibited which resumed their original brown colour in the course of half an hour.

It has been suggested, even quite lately, that when a salt such as a chloride is dissolved in water, it is resolved into a hydrochlorate of a metallic oxide, and that hydrated chlorides are always compounds of this kind. Hence, when cobalt chloride is dissolved in water, change from pink to blue might be owing to the alteration in the dissolved compound, from a hydrochlorate of cobalt oxide to a cobalt chloride.

The first step to be taken is the refutation of this. When a solution of cobalt chloride, bromide, or iodide is dissolved in water, and cold alkali, such as potash or soda added, the precipitate formed is not, as one would expect, a hydrate or an oxide, but an oxy-chloride, oxy-bromide, or oxy-iodide, showing that in solution the halogen is still combined with the metal, and is only partially removed by the more powerful base. Similar basic compounds are formed by precipitating other cobalt solutions, such as nitrate.

Equations I. and II. illustrate the supposed and possible decomposing action of water on cobalt chloride, while III. and IV. show the reactions with alkali which would consequently take place; but as these latter do not represent the truth, it necessarily follows that the former are incorrect.

I. $CoCl_2 + H_2O = CoO \cdot 2HCl$.
II. $CoCl_2 + H_2O = CoO + 2HCl$.
III. $CoO \cdot 2HCl + 2KHO = CoO \cdot H_2O + 2KCl + H_2O$.
IV. $CoO + 2HCl + 2KHO = CoO + 2KCl + 2H_2O$.

I. Hence we may conclude that when a salt is dissolved in water it is not decomposed into a mixture of an oxide and an acid, nor does a compound of the oxide with the acid result.

II. When a salt is dissolved in water it does not necessarily attain its maximum state of hydration.

This was long ago suspected by Dr. Gladstone, who, experimenting with cupric chloride, found that a saturated solution of a deep green colour became blue on the addition of water, and this blue became green again upon heating. Furthermore, the blue liquid could be turned to green by the addition of strong hydrochloric acid. These facts of course have been corroborated by spectroscopic observations, and I have succeeded in obtaining others in support of this. Thus the following saturated solutions change colour when diluted with from four to seven times their bulk of water:—

Saturated Solution.	Colour.	Dilute Solution—Colour.
Cupric chloride	Grass green	Blue.
,, bromide	Deep red-brown ..	Yellowish green to azure blue.
Nickel ,,	Dark madder brown	Yellowish green to apple green.
,, iodide	Yellowish brown ..	Yellowish green to apple green.

As illustrations two cylinders were taken, one containing cupric chloride, the other cupric bromide; the former grass green, and the latter deep brown. The colours were shown by swilling the liquid round the sides of the vessels; on dilution with about a quart of water clear azure blue liquids were produced.

A still more striking example is that of the cobalt iodide solution, which is formed by allowing the dihydrate, or the anhydrous salt to deliquesce; it is of a deep green, and on dilution to a very small extent becomes red.

Regnauld and also Person have shown that on diluting a saturated solution of a salt, as a rule there is an absorption of heat. The latter calls this the latent heat of dilution. The former noticed one or two cases in which heat was evolved on dilution. There is every likelihood that this phenomenon is due to the formation of a liquid hydrate. It is impossible of belief that accompanying such a circumstance there should be no measurable development of heat; and these experiments have proved that in all cases when the change of colour consequent on dilution is great, the heat disengaged is very considerable. On diluting a solution of cobalt iodide till the red colour appears, the thermal effect not only registers several degrees on an ordinary thermometer, but it may be perceived by the hand.

The author has not yet completed any exact thermal measurements bearing on this matter, though some experiments have been made in this direction.

III. When a hydrated salt is dissolved in water to form a saturated solution at the ordinary temperature its crystalline molecule remains chemically intact, except in certain exceptional cases when it appears to lose water.

The evidence bearing on this consists of the fact that most solutions of hydrated salt, if saturated, are of the same colour as the solid compound; though in the state of dilute solutions on the one hand, or of partial dehydration on the other, the colour may differ widely from this. In support of this we have the case of cobalt chloride and cobalt iodide, more especially the formation and behaviour of the green solution of the dihydrate of the latter salt. The molecule of the salt is neither hydrated nor dehydrated on solution, otherwise such salts as those named would change colour.

An exceptional phenomenon is marked when cupric chloride, cupric bromide, nickel bromide, and nickel iodide are dissolved in water to saturation. Cupric chloride is a blue salt not deliquescent or liable to absorb water from the air, but rather efflorescent—*i.e.*, apt to part with its water of crystallization; hence, when the blue crystals are dissolved in water they form a deep green liquid, which on dilution becomes azure blue, this azure blue solution by heating again becomes green. The remaining salts are of a yellowish green tint, but on dissolving in as little cold water as possible they give intensely coloured brown liquids. Cupric bromide crystals effloresce, losing 10 per cent. of water and becoming very dark brown, nearly as possible black in colour even in ordinary air, but in presence of moisture they are deliquescent.

Solution facilitates chemical change. Hence, when green cupric bromide crystals are dissolved in water the chemical attraction which binds the one molecule of metallic bromide to the five molecules of water of crystallization is so weakened that the cohesive attraction of the mass of the solvent water overcomes the chemical attraction of the crystalline water, and the resulting liquid is brown. When more water, however, is added, a reversion of this action takes place, and the brown solution becomes green or blue.

IV. When a salt forms two distinct crystalline hydrates, A and B, at temperatures below 100° C., a saturated solution of A will, on heating to 100°, become a solution of B; at intermediate temperatures, a mixture of these two compounds.

This is inferred from the similarity in change of colour of a saline solution to the change of colour in the solid when heated. Bromide and chloride of copper, and, above all, iodide of cobalt, exhibit such changes.

The behaviour of this latter salt, which has been already mentioned, cannot possibly be explained except by the assumption that the hexahydrate, $CoI_2,6H_2O$, exists in the brown solution, and the dihydrate, $CoI_2,2H_2O$, in the green liquid produced from this by heat. The action of heat on cobalt chloride is not so well defined; that it is caused by dehydration we are certain, but whether the compound in solution is the dihydrate or the anhydrous chloride is a matter undetermined. It is not at all unlikely that the blue produced by alcohol is due to the formation of an alcoholate, for the spectrum, though very similar, is not quite identical with that of the hot aqueous solution. An experiment made on the hexahydrate was incidentally confirmatory of the action of water on the cupric chloride and bromide. When this salt was dissolved nearly to saturation in absolute alcohol the liquid had the usual magnificent blue colour; it was put aside under a bell-glass for crystals to separate, these appeared at the bottom of the deep blue liquid to be also of the same colour. When removed, however, and pressed between folds of paper, they had precisely the same composition and red colour as the original salt. Hence, though water could not on solution remove the water of crystallization from the salt, yet alcohol could do this, but on crystallization the original crystalline hydrate was formed, as is the case with cupric chloride and bromide.

V. The effect of heat on what are called the purple chromium solutions is not traced to dehydration, but to a distinct chemical reaction which yields a distinct class of compounds.

The violet or purple compounds of chromium have the general formula $Cr'''R_3{\cdot}xH_2O$, or $Cr_2'''R''_3{\cdot}xH_2O$; when solutions of these in water are heated to 100° C. there is formed a class of substances which may be written thus, $Cr_2'''OR_4{\cdot}xH_2O$, and $Cr_2'''OR''_2{\cdot}xH_2O$, or the first compounds may be said to contain the metal Cr''' as the base of the compound, while the second contains the radical $Cr_2'''O$. This radical I would propose to call chromyl, just as UrO is called uranyl. And it may then be stated, that while the purple compounds are salts of chromium, the green are salts of chromyl.

This conclusion is derived more from the chemical behaviour of these solutions than from their optical properties. Thus green solutions having the same spectrum may be produced from the sulphate or nitrate—(1) by boiling a solution of the purple salt; (2) by dissolving an excess of chromic hydrate in the purple solution; (3) by neutralizing with an alkali one-third of the acid in a solution of the blue salts. 50^{cc} of a boiled solution containing half a gramme of the sulphate or nitrate of chromium will not give a precipitate if boiled with two or three litres of water; but when one third of the acid present has been previously neutralized, or when an excess of chromic hydrate is dissolved in the blue solution, a basic salt is thrown down on boiling with much water. This is exactly the behaviour characteristic of a salt described by Schrötter, to which he assigns the formula $Cr_2O_3 \cdot 2SO_3$, or which may be written $Cr_2O \cdot 2SO_4$. Lœwel describes a similar chloride, which is formed at 100° C.; this he writes thus, $Cr_2O_3 \cdot 4HCl$, and the formula may be modified in the following manner: $Cr_2O \cdot Cl_4 \cdot 2H_2O$. The modification has the following recommendation: that it explains the decomposition of the substance when heated to a high temperature, which Lœwel's formula does not. At or about 300° C. the compound is resolved into a mixture of the anhydrous violet compound of chromium and chlorine, $CrCl_3$, or Cr_2Cl_6, and the anhydrous green oxide, Cr_2O_3; if the original salt were a combination simply of hydrochloric acid with chromic oxide, heating would drive off the volatile acid and leave the oxide only, but the actual change indicates that the chromium and chlorine are in direct combination.

Parliamentary and Law Proceedings.

PHARMACY ACT (IRELAND) BILL.

Second Reading.

In the House of Commons, on Friday, June 18, upon this Bill being reached in the order of the day,—Sir Michael Hicks-Beach said: I ask the indulgence of the House to read this Bill a second time. The object of the Bill is to carry into effect the unanimous recommendations of the Select Committee who inquired into the subject during the last session of Parliament, with the view of establishing in Ireland a Pharmaceutical Society. I believe it is in accordance with the unanimous wish of the inhabitants of that country, in order to meet a crying evil—the want of qualified chemists to compound medicines by law. Objection has been taken to the present measure by the English Pharmaceutical Society on account of its proposing to create reciprocity between the two Societies. I confess that this objection seems to me to be founded on reasonable grounds, and I propose, if the House will allow me to read this Bill a second time, to omit at the next stage of its progress that portion of the Bill which refers to reciprocity between the English and Irish Pharmaceutical Societies. The object we have in view will be met perfectly well in future by leaving each to make rules for its own guidance, and that each should be left to its separate and unfettered action, and I do not believe, so far as regards Ireland, that the Bill will be less effective than at present if the 18th Clause, to which I have referred, is omitted from it. I therefore move the second reading of this Bill, and if that stage is taken now I will go into Committee, *pro formâ* on Monday, and put it in its amended shape as to that particular point, and ample time will be given to those interested to discuss the clauses of the Bill.

Dr. Ward: It seems to me that the omission of the 18th Clause does much to increase an evil that has existed for a long time in reference to the medical profession, viz., the multiplying of bodies to grant qualifications. There are at present nineteen such corporate bodies, which causes unworthy competition between them, for many of them exist only by the fees derivable from the passing of a man, in conferring degrees on candidates before them. This necessarily causes competition, and honourable members will be surprised to hear that the competition becomes so keen as this, that a man when he is rejected by one corporation, say to-day, from the want of sufficient knowledge of his business, from his competing capacity, takes his carpet bag and drives off to some other place and returns home a legal medical practitioner the same week. I have frequently known it done. The 18th Clause proposes to create another corporation—another competing body, simply for money. These corporations are living upon their fees—varying in amount—and the qualifications they give are of no protection whatever to the public, as to the real merits put forward by these corporations. Some of them, no doubt, are very strict, but some are very lax. The Government should deal with this subject as a whole—the medical profession and the branches connected with it. Many propositions have been put forward, but from the jealousy of these corporations and, with all due respect, the ignorance of this House in the matter this great question, goes on year after year without being properly considered and dealt with. We have seen the evils of such a policy in France. I would, if the profession is to continue, as at present, to regulate these matters, appoint a person to attend all these different examinations, and superintend them and see that the public are protected and that the examining boards of the different bodies did not simply pass men merely to earn money for the corporation. This was a question well worthy the attention of a Government that was not going in for learning political questions but sanitary measures. What is the use of making laws for sanitary purposes if there are no men capable of carrying them out? And unless the Government were unable to secure that at least there should be a fair amount of medical information guaranteed by the qualifications granted by these corporations in the way I have mentioned, all these sanitary laws are at least in a very doubtful position. The Government should lessen the grasping powers of these corporations and create a distinct board—a distinct examining body—not for the purpose of obtaining money, but for the protection of the public. I do not, however, oppose the second reading of the Bill.

Mr. Newdegate: On the part of the pharmaceutical chemists in the Midland Counties, I have to thank the right honourable baronet the Chief Secretary for Ireland, for omitting the 18th Clause of the Bill. If the pharmaceutical chemists of Ireland would accept the examinations of the English Pharmaceutical Society, they would be hailed with delight. I have something to do with the Royal Veterinary College. We have strenuously endeavoured to preserve, and we have adhered to the principle of preserving, an examining board for the united body of veterinary surgeons, and a very competent board exists for the purpose. In this case the Pharmaceutical Chemists desire that the same principle should prevail with regard to them, and that if an examining board is to be established for Ireland, it should be on the same terms as that for England, and that they should see what the examinations consist of before it is brought into competition with their own.

Mr. Errington: I will venture to trouble the House for a short time. It was on my motion that the Select Committee was appointed, on whose recommendation this Bill is founded and introduced, and I cannot allow it to pass this stage without acknowledging how much we are indebted to the right honourable baronet the Chief Secretary for Ireland for having framed and brought in this Bill, The Bill as introduced was a very satisfactory measure. The House will understand that this is not a startling or sensational question, but it is considered amongst the professional classes in Ireland, and a large section of the public, a question of considerable importance that this Bill should be passed into a law, as I hope it will be. It will be received in Ireland with satisfaction and pleasure, but I cannot help expressing my regret that the Government should have come to the conclusion of dropping the reciprocity clause. No doubt it is a considerable mutilation of the Bill from its original form, because I feel nothing would be easier when in Committee than to have moulded the clause so as to make it satisfactory to all parties, and especially those whose opposition to the clause has been the cause of its omission from the Bill. We who are anxious that this Bill should pass into a law are also anxious that the rights and interest of the English Pharmaceutical Society should be maintained in the fullest and most ample manner, and this not as a mere matter of policy and justice, but of expediency, because those who are anxious to promote this Bill do it for scientific advantages only and from no desire to reduce that high standard of examination which the Pharmaceutical Society of England has introduced and kept up.

The Bill was then read a second time.

Committee.

On Monday, June 21, Sir Michael Hicks-Beach moved, that the House should go into Committee *pro formâ* on this Bill, in order to allow of the introduction of amendments in accordance with the above undertaking. The Committee ordered the Bill to be reprinted with amendments, and then reported progress. The Bill is to be re-committed on Monday next.

Petitions.

The following petitions against this Bill have been presented in the House of Commons since the 16th inst.:—

Carnarvon ....Mr. William Bulkley Hughes.
Gloucester .... ,, Charles James Monk.
Hertford...............Hon. Henry Frederick Cowper.
Kendal ....Mr. John Whitwell.
Lewes .... ,, William Langham.
Northallerton ...... ,, George William Elliott.
Redditch .... ,, Thomas Eades Walker.
Skipton .... Sir Matthew Wilson, Bart.
Tonbridge .... Mr. Samuel Morley.
Westbury .... ,, Abraham Laverton.

A petition was also presented from North Shields.

CUSTOMS AND INLAND REVENUE ACT.

The Customs and Inland Revenue Act (38 Vict. c. 23), which has received the Royal assent a few days since, contains the following clauses :—

8. In lieu of the duties of excise now payable by law upon or in respect of the licences to be taken out yearly in any part of Great Britain by the owners, proprietors, makers, and compounders of, and persons uttering, vending, or exposing to sale or keeping ready for sale any medicine liable to stamp duty, there shall be paid for each such licence the duty of 5*s*.

9. A licence to a dealer in foreign wine, or to a retailer thereof, shall be granted so as to extend to the sale of any kind of sweets, or made wines, or mead, or metheglin in any quantity, without the payment of any further duty than such as is chargeable on a licence to a dealer in foreign wine, or a retailer thereof.

10. Subject to any regulations which may be from time to time made by the Commissioners of Customs and the Commissioners of Inland Revenue respectively, tinctures or medicinal spirits may be warehoused upon drawback by a licensed rectifier or compounder of spirits in any customs or excise warehouse under the like provisions under which British liqueurs may be so warehoused by virtue of section thirteen of "The Customs and Excise Warehousing Act, 1869."

BOOKS, PAMPHLETS, ETC., RECEIVED.

A DICTIONARY OF CHEMISTRY AND THE ALLIED BRANCHES OF OTHER SCIENCES. By HENRY WATTS, B.A., F.R.S., F.C.S., etc. Second Supplement. London: Longmans, Green, and Co. 1875. From the Publishers.

Notes and Queries.

[441]. GINGERBREAD WORM NUTS.—I beg to inform your correspondent, T. H. W., that I use the following receipt for making gingerbread worm nuts, and that they answer the purpose remarkably well:—

Take of—

Flour	10 ounces.
Sugar	4 ,,
Treacle	4 ,,
Butter	2 ,,
Ginger	2 drachms.
Santonine	3 ,,

Mix and divide into 2 drachm cakes. One to four to be given when fasting, according to age.—E. W. J.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Irish Pharmacy Bill.

Sir,—I read with much interest your able article on this subject in the *Pharmaceutical Journal* of last week, and I have since learned from the report of Sir Michael Hicks-Beach's speech on moving the second reading of the Bill, that he so far deferred to the objections taken by the Pharmaceutical Society of Great Britain as to abandon the 18th Clause, which would have compelled our Registrar to place the names of men who had passed the examination to be instituted in Ireland on the Register of Great Britain. I know well enough that it is the declared intention of the promoters of the separate system for Ireland to institute an examination equal to our own "Major;" but setting aside the too common fate of "good intentions," and without the smallest doubt of their genuineness, I venture to think it was rightly decided to oppose the admission of men over whose examination our Council have no control to the register of which they are the guardians. The preamble of the Bill sets forth a want of dispensers in Ireland as the ground of its necessity. This want is undisputed, and the natural fear is that to meet it candidates will not be subjected to too severe an ordeal. In justification of this fear it is scarcely necessary to look further than to the commencement of our own Society and its progress in the natural growth of its examinations from that time to the present. Under any circumstances the candidate who passes one examination, into which the whole subjects with which he is required to be conversant are condensed, cannot fairly be looked on as equal to one who has passed at intervals the "Preliminary," "Minor," and "Major." And here, sir, let it be remembered that the one examination proposed is to entitle a man to the highest grade in the business, that of "Pharmaceutical Chemist." It is this consideration which urges me to address you, and through you the pharmaceutical chemists of Great Britain, that they may be aroused to a threatened danger. The withdrawal of the reciprocity clause must, of course, remove a great objection but not the only one to the proposed measure. You very properly draw attention to the appropriation of our highest title, a title which was exclusively accorded to a certain class of men in Great Britain, and has been carefully guarded there for many years, to other men not designated by the Acts of Parliament already in existence, living side by side with us in the sister kingdom. It seems to me that notwithstanding the sea which rolls between Great Britain and Ireland, they are virtually one kingdom, and year by year distinctions which have existed between them disappear, and will, I hope, continue to disappear. Descriptive titles in the one country will be considered by the public to be of equal value in the other, and should rightly have the same value. A physician in Ireland or Scotland is a physician in England, but the medical council which registers has also the power to enforce the proper examination in the three countries, and therefore the public are justified in valuing the degrees of the three countries alike. There is really no advantage to Ireland in describing her examined men by the same title as the English. Her want is an increase of the chemists qualified to dispense medicines, and the most intelligible description of them would be "dispensing chemists." You will remark that these men will have greater advantages secured to them than we have, for no unregistered men will be allowed even to compound medicines from medical prescriptions, a concession the chemists of England vainly tried to obtain.

By the notices placed on the paper of the House of Commons, it appears that Mr. Thomas Cave intends to move the exchange of title from "Pharmaceutical Chemist" to "Dispensing Chemist," and I earnestly trust that every chemist will urge his representative in Parliament to support this amendment and thereby prevent a depreciation of the title which is the highest object of our ambition.

Ph. Chemist.

Sir,—My attention having been directed to a leading article in the *Pharmaceutical Journal* of June 12th, on the Pharmacy Act (Ireland) Bill, I beg to correct some errors which exist in it as regards the action of the King and Queen's College of Physicians, and of Sir D. J. Corrigan, with respect to the question of pharmacy in Ireland.

1. With regard to the "singular inconsistency" which you attribute to this College, in that the College has presented a petition to Parliament in favour of the Pharmacy Bill. I may state that the College has felt itself perfectly free to take such action as seemed to it best for the interests of pharmacy in Ireland, inasmuch as the Bill which the College drew up in 1874, for extending to Ireland the Pharmacy Act of 1868, did not meet with the favour or support the College had hoped for it, and inasmuch as it was reported against (as you properly state) by the Select Committee of the House.

2. Sir D. J. Corrigan in giving evidence before the Select Committee of the House of Commons on July 13th, 1874 (*vide* page 33 of the Report, queries 548, 549) stated that the Bill (of the College) represented the views of this College and his own views to a great extent.

3. Sir D. J. Corrigan is, in the article referred to, incorrectly designated as "the President of the College," whereas he was not President last year, nor is he now; he is one of the Ex-Presidents of the College, not having held that office since 1863.

J. Magee Finny, M.D.,
Fellow and Registrar.

King and Queen's College of Physicians in Ireland, Dublin, June 17, 1875.

[*** We by no means presume to dispute the perfect freedom of the King and Queen's College of Physicians to change its opinions or its action in reference to pharmacy, even to the extent of petitioning Parliament in favour of a Bill that proposes to do the very opposite of what the College not long since took much pains to prove was the proper course; but at the same time we cannot admit that in pointing out such "singular inconsistency" we are falling into error that needs correction. This inconsistency is matter of record, as will be evident on refering to the circular of the King and Queen's College (see *Pharmaceutical Journal, ante*, p. 995). As regards the position of Sir Dominic Corrigan as President of the College, and his evidence, the following quotation from the Report of the Select Committee will speak for itself, and show that he acted as the representative of the College:—

"546. I think you hold, or have held, some office in connection with the College of Physicians in Dublin?—Yes, the office of President.

"547. *And in that capacity you have taken considerable interest in the Bill which is now before the Committee?—I have.*

"548. I believe that the Bill represents the views of the College of Physicians, does it not?—It does.

"549. And your own views, I suppose?—It represents my own views to a great extent; but not altogether."

But notwithstanding this, the evidence given by Sir Dominic was totally opposed to the Bill.—Ed. Ph. Journ.]

Drugging of Animals Bill.

Sir,—Whatever may have become of Sir J. Astley's Bill before your next issue, its success at present seems desirably doubtful. Immediately upon reading its text, in common with some of my neighbours and friends (our local secretary being unfortunately confined to his bed) I communicated with three Members of Parliament, belonging to various political parties, and their opinion was unanimously against the measure, as I am persuaded the overwhelming majority of the House will be, should it ever come to a division. Indeed it is difficult to write seriously about the Bill. But as some seem to have given it serious, if modified, approval perhaps you will allow me to state one or two objections to it, which I will do as soberly as I can.

In the preamble I object to the word "whereas" which gives it a legislative form. It may be desirable to prevent the practice of administering "poisonous drugs and other compounds to horses and other animals," but the case of the assumption that an evil existing, an Act of Parliament is the remedy, is somewhat amusing. It is highly desirable to prevent a great many other things, and we are in danger of being governed overmuch. If we have a weakness for an established church, we must worship high heaven by a "Reglation Act," and while, I believe, the elevation of the "elements" above the head is illegal, I am not sure that a "priest" may not place his head below the "elements," he may "genuflect" but not kneel. To such attenuations do Acts of Parliament tend.

I entertain strong objections to the first clause because it is unnecessary and unduly stringent. The agricultural labourer and the other parties affected are servants, and as everybody in the country knows, the power of a master is sufficiently absolute already. Did any of your readers ever follow a discharged carter in search of employment? But as the countryman will take care of himself in the coming time of his enfranchisement, and as these two objections are partially political, and to that extent unsuitable for your pages, I would only remark that it cannot have escaped the notice of chemists that under this clause if they, not being M.R.C.V.S., should advise a groom, bailiff or servant to administer to a "horse or other animal" any of the poisons in the schedule—the consent of the owner being in many cases of emergency quite impossible to obtain—they will have induced such servant to commit a misdemeanour, for which his master may prosecute them or not, at will.

But the main objections of chemists lie against the third clause. The remedy is out of all proportion to the evil. The manifold uses of the "poisons" now for the first time introduced, and the impracticability of registering the sale of them, as well as of poisons in part II. of the schedule of the existing Pharmacy Act, constitute difficulties too well understood by persons engaged in business to need remark. The proposition vexatiously to interfere with the daily domestic and trade avocations of the overwhelming town population to prevent the poisoning or injury of a few agricultural horses is as ridiculous as making the roasting fire revolve around the joint. Absurd as is the suggestion, the issuing of a licence to Hodge to purchase "poisons," as we receive permits to buy S. V. M., would be simplicity in comparison.

But a stronger objection still is that the tendency of the Bill is to make chemists spies and informers, without however any efficient provision for ensuring even this result. I am not an apologist for the "Pharmacy Act," but its object, in the main, with the exception of cantharides, savin, and ergot, is to prevent innocent mistakes. The object of this Bill is to catch criminals who are produced by the Bill. Supposing the Bill passed and the "poison" duly registered, is the country "Ph. C." going to touch his hat to the squire and hand over his register on demand? Some time ago a sprig of the "upper ten" asked me if I had sold any poison lately. I said "Certainly." "To whom?" (I think he said "who to?") I declined to answer, which rather excited the young gentleman, who intimated that he should apply to the superintendent of police, whose advice I urged him to seek, with the further assurance that to neither of them would I divulge any transactions with the next door neighbour of his pigs or other "pet game," any more than I would say whether his sister bought hair dye, or himself capsules, and I have not the pain of knowing a chemist who would be less independent. But if the poison registers are to be private (without which no customer will sign them), and if there is no means of getting at their contents (as I trust there never will be), except a charge against the chemist of violating the Act, I suppose the chemist with his register is to serve the purpose in the stable to which the devil and his appliances are sometimes put in the church—to frighten Hodge into good behaviour.

Further, another class of poison vendors would be created, and that argument might have weight in some quarters. It is not proposed to confine the sale of poisons in part II. of the schedule to chemists. Personally I do not care to raise my voice against that. It requires no high qualification to retail oil of vitriol and spirit of salt, nor any great scholarship to register the transaction. I have no desire to defend exclusive privileges of any kind. And perhaps I may be allowed to wander from my subject to remark that though we may use our mystic initials to influence the public *quantum valeant*, when a man has been in business a dozen years he will have found the true contraction for "Pharmaceutical Chemist," or any other title in the estimation of the public at just about what he is worth.

The principal subject of my letter is not a great one. I have only touched it, but already I have trespassed to largely on your space.

HENRY H. POLLARD

Ryde, June 21, 1875

OFFICIAL *v.* OFFICINAL.

Sir,—It may please some of your readers to follow up the question of "Official" and "Officinal" to a classical period. I send you a few illustrations of "Officinal" (workshop) and (drug-shop) "Venenum," "Maleficum," where poison was concocted by Canidia, whom Horace so designates.

"Jam Cytherea choros ducit Venus, imminente Luna :
Junctæque Nymphis Gratiæ decentes
Alterno terram quatiunt pede, dum graves Cyclopum
Vulcanus ardens urit 'officinas.'"

Horace, Ode IV. to Sestius.

"—— Tu, donec cinis
Injuriosis aridus ventis ferar,
Cales venenis 'officina' Colchicis."

Horace, Epode 17.

JOHN FREDK. STANFORD.

* The witch (Canidia) is made herself to be a poison or drug-shop.

"*Holcus*."—*Arrhenatherum elatius, β. bulbosum* and *Glyceria fluitans*.

G. S. Druce.—(1) *Trisetum flavescens* ; (2) *Holcus mollis* ; (3) *Aira cæspitosa*.

G. Watt.—(2) *Ranunculus Flammula* ; (5) *Fumaria officinalis*. The other specimens are correctly named.

"*Beta*."—No.

H. A. K.—(1) The direction for the preliminary heating of the oil is in accordance with the result of the experiments of M. Méhu, who found that by thus previously removing water and certain unstable organic substances from the oil, a solution of phosphorus in almond oil will remain clear and unaltered. See vol. iii. of present series, p. 412. (2) No doubt "Sal aëratus" is intended.

Y. Z.—Carbonate of baryta is not included in the schedule of poisons under the Pharmacy Act.

J. Burt.—A letter addressed to the India Museum would reach the gentleman mentioned.

R. H. M.—The question has been already carefully considered, and the conclusion arrived at that such a plan as suggested by you could not be carried out satisfactorily and usefully in the columns of a weekly journal.

W. R. F.—We think that the sale of quinine wine not prepared and sold as the B. P. article, would require a sweet wine licence, or even under certain conditions might necessitate the use of a stamp. The safest plan would be to submit the question to the Inland Revenue authorities.

J. Gray.—(*a*) *Potentilla* (probably *P. recta*, but leaves are not sent), not British; (*b*) *Gladiolus communis*, not British; (*c*) *Chrysanthemum leucanthemum* ; (*d*) *Rhinanthus Crista-galli* ; (*e*) *Geranium dissectum* ; (*f*) *Stachys sylvatica* ; (*g*) *Holcus lanatus* ; (*h*) *Geranium Robertianum* ; (*i*) Too imperfect to name; (*k*) *Potentilla anserina* ; (*l*) *Matricaria Parthenium* ; (*m*) *Dactylis glomerata* ; (*n*) *Plantago lanceolata*. We cannot undertake to give the names of exotic species or varieties.

H. Stewart.—A species of *Spiræa*. It is impossible to identify it without leaves. Inflorescence a panicle.

"*Minor*" is thanked for his communication.

J. S.—The following is the formula of the Spiritus Ammoniæ Aromaticus of the U.S.P. :—

Take of Carbonate of Ammonium a troyounce ;
Water of Ammonia three fluidounces ;
Oil of Lemon two fluidrachms and a half ;
Oil of Nutmeg forty minims ;
Oil of Lavender fifteen minims ;
Alcohol a pint and a half ;
Water a sufficient quantity.

Dissolve the carbonate in the water of ammonia, previously mixed with four fluidounces of water. Dissolve the oils in the alcohol, mix the two solutions, and add sufficient water to make the whole measure two pints.

"*A Country Druggist*."—The preparation is a proprietary article.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Slater, Dr. Wright, Mr. Campbell, Mr. Lloyd, R. H. C., E. W. J., J. S., Pax Vobiscum, Senior Apprentice.

INDEX TO VOL. V.

(THIRD SERIES.)

All Letters to the Editor will be found arranged under the head of "Correspondence;" Leading Articles, etc., under the head of "Editorial Articles and Notes."

THE END.

LONDON:
STEVENS & RICHARDSON, PRINTERS, 5, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, W.C.

Supplement to the Pharmaceutical Journal and Transactions, January 23, 1875.

Pharmaceutical Society of Great Britain.

LIST OF ADDITIONS TO THE LIBRARY

To the end of December, 1874.

(*P.*), Pamphlet.

Note.—Books marked * are not circulated.
Books marked † have been presented.

ACADEMIES.

Académie des Sciences. Comptes Rendus hebdomadaires des Séances. Paris, 1874.

Kaiserliche Akademie der Wissenschaften in Wien. Anzeiger. Mathematisch-Naturwissenschaftliche Classe. Wien, 1874.†

Acids.

See Chevallier (A.), Acide Carbonique.

Gondard (O.), Acides Oxyphénylsulfureux.

Actuaries. See Institute.

Adulterations.

See Associations.

Hassall (A.H.), Food and Medicine.

Akademie. See Academies.

Analysis.

See Douglas and Prescott, Qualitative Chemical.

Fresenius (C. R.), Quantitative Chemical.

Suffolk (W. T.), Spectrum Analysis, as applied to Microscopical Observation.

Thorpe (T. E.), Quantitative Chemical.

Wanklyn (J. A.), Milk and its Derivatives.

Wanklyn and Chapman, Potable Water.

Annales.
Annals.
Annuaire. } See *Periodicals.*

Arboriculture. See Cleghorn (H.)

Armée. See Roucher (C.). De l'Autorité et de la Responsabilité médicales dans l'Armée.†

Armstrong (H. E., Ph.D.) Introduction to the Study of Organic Chemistry. The Chemistry of Carbon and its Compounds. London, 1874.

Arts. See URE (A.), Dictionary.

ASSOCIATIONS.

AMERICAN PHARMACEUTICAL ASSOCIATION. Proceedings, 1873. Philadelphia, 1874.†

ANTI-ADULTERATION ASSOCIATI O. The Anti-Adulteration Review. London, 1874.†

BRITISH MEDICAL ASSOCIATION. British Medical Journal. London, 1874.

Assurance. See INSTITUTE OF ACTUARIES.

Atlases.

See BLACK (A. and C., publishers.), General Atlas of the World.
LEWIS (S.), England, etc.

BABINGTON (C. C., M.A., F.R.S.).

Flora of Cambridgeshire. London, 1860.

Manual of British Botany. Seventh Edition. London, 1874.

BARBER (G.). The Pocket Companion to the British and London Pharmacopœias of 1851, 1864, and 1867. Fourth Edition. London, 1867.

BEALE (L. S., M.B., F.R.S.).

How to Work with the Microscope. Fourth Edition. London, 1868.

The same.†

Bioplasm: An Introduction to the Study of Physiology and Medicine. London, 1872.†

Protoplasm; or Matter and Life. With some remarks upon the "Confession" of Strauss. Third Edition. London, 1874.†

BEASLEY (H.). The Book of Prescriptions. Fourth Edition. London, 1872.

BENNETT (A. W., M.A., B.Sc.). See SAUNDERS (W.W.).

BENTLEY (R., M.R.C.S.).

A Manual of Botany. Third Edition. London, 1873.

The same.†

Bière. See DRAGENDORFF (Dr. G.), Substances Amères dans la Bière.

Bioplasm. See BEALE (L. S.).

Birmingham Free Libraries. Annual Report of the Committee. Birmingham, 1873.†

BLACK (A. and C., publishers). General Atlas of the World. Edinburgh, 1873.

BLOXAM (C. L.).

Laboratory Teaching: or Progressive Exercises in Practical Chemistry. Second edition. London, 1871.

The same. Third Edition. London, 1874.

COLLEGES (continued).

University College, London.

Calendar. London, 1873-4.†

Professional Dissertations for 1872-3. (*P.*)†

Conference, British Pharmaceutical. Year-Book of Pharmacy, with Transactions of the Conference. (Two copies). London, 1873.†

Congress, International.

Bericht über die Verhandlungen der General-Versammlung der Pharmaceutischen Gesellschaft in St. Petersburg. St. Petersburg, 1864.

Bericht über den vierten Internationalen Congress Pharmaceutischer Vereine und Gesellschaften zu St. Petersburg. 1874.†

Conspectus. See Thomson (A. T.), British Pharmacopœia.

Cooke (Dr. M. C.). Report on Gums, Resins, Oleo-Resins, and Resinous Products in the Indian Museum, or produced in India. London, 1874.†

Council, Privy. Public Health. Thirteenth Report of the Medical Officer. With Appendix. London, 1871.†

Cream. See Wanklyn (J. A.).

Cruickshank (W.). Experiments on the Insensible Perspiration of the Human Body, showing its affinity to Respiration. (*P.*). London, 1795.

Crystallography. See Mitchell (W.).

De Candolle. Prodromus Systematis Naturalis Regni Vegetabilis. Pars xvii. Parisiis, 1873.

Dental Science.

See *Periodicals.*

Sercombe (E.).

De Thiersant (D.). See Soubeiran (J. L.).

DICTIONARIES.

Arts. See Ure (A.).

Botany. See Lindley and Moore, Treasury of Botany.

Manufactures. See Ure (A.).

Mines. See Ure (A.).

Topography. See Lewis (S.), England, Guernsey, Jersey, and Man.

Dietetics. See Pavy (F. W.).

Disease. See Smee (A.); and under various Diseases.

Douglas (S. H.) and Prescott (A. B.). Qualitative Chemical Analysis. Ann Arbor, 1873.†

Dragendorff (Dr. G.).

Materialen zu einer Monographie des Inulins. (*P.*). St. Petersburg, 1870.†

HASSALL (A. H., M. D.). Adulterations Detected; or plain Instructions for the Discovery of Frauds in Food and Medicine. Second Edition. London, 1861.

Health, Public. See COUNCIL, PRIVY.

Heart, Diseases of the. See GREENHOW (E. H.), On Chronic Bronchitis.

HERVY (O.). See Chevallier (A.).

HIERN (W. P., M.A.). A Monograph of Ebenaceæ. Cambridge, 1873.†

HOGG (J.). Skin Diseases, an Inquiry into their Parasitic Origin, and Connection with Eye Affections; also the Fungoid or Germ Theory of Cholera. London, 1873.†

Hortus. See RAND (I.), Chelseianus.

HOSPITALS.

DENTAL HOSPITAL OF LONDON. See SERCOMBE (E.).

GUY'S. Reports. Third Series. Vol. xix. London, 1874.†

ST. BARTHOLOMEW'S. Statistical Tables of Patients under Treatment during 1872-3. London, 1873-4.†

See also *Pharmacopœias.*

HUSEMANN (Drs. A. and T.). Die Pflanzenstoffe in chemischer, physiologischer, pharmakologischer, und toxikologischer Hinsicht. Berlin, 1871.

Hygiène. See SOUBEIRAN (J. L.).

India.

See COOKE (M. C.), Gums, Resins, Oleo-Resins, and Resinous Products.

DRURY (H.), Useful Plants.

Exhibition, Vienna.

FLÜCKIGER and HANBURY, Drugs.

WIGHT (R.), Icones Plantarum Indiæ Orientalis.

INSTITUTES or INSTITUTIONS.

INSTITUTE OF ACTUARIES. Journal of the Institute, and Assurance Magazine. London, 1874.†

ROYAL INSTITUTION OF GREAT BRITAIN.

Notices of the Proceedings. London, 1873-4.†

Additions to the Library, 1873-4.†

SMITHSONIAN INSTITUTION. Annual Report of the Board of Regents, 1871-2. Washington, 1873.†

Inulins. See DRAGENDORFF (G.).

Jahresbericht. See *Periodicals.*

Mycology. See SAUNDERS, SMITH, and BENNETT.

Natural Philosophy. See *Physics.*
Nature. See *Periodicals.*
NOTCUTT (W. L.). Handbook of British Plants. New Edition. Revised by R. Hogg, LL.D. London, 1870.

Oleo-Resins, Indian. See COOKE (M. C.).
Ostréiculture. See SOUBEIRAN (J. L.).
OTTO (Dr. E.).
French Conversation-Grammar. Fifth Edition. Heidelberg, 1874.
German Conversation-Grammar. Fourteenth Edition. Heidelberg, 1874.
Oxyphénylsulfites. See GONDARD (O.).

PARRISH (E.). A Treatise on Pharmacy. Fourth Edition. By T. S. Wiegand. Philadelphia, 1874.
PAVY (F. W., M.D., F.R.S.). A Treatise on Food and Dietetics. London, 1874.
PEREIRA (J., M.D., F.R.S.) Elements of Materia Medica and Therapeutics. With Appendix containing the new Medicines included in the Additions to the British Pharmacopœia of 1867. Edited by Robert Bentley, M.R.C.S., and T. Redwood, Ph.D. London, 1874.
Periodicals.
See also under ACADEMIES, ASSOCIATIONS, COLLEGES, CONFERENCE, HOSPITALS, INSTITUTIONS, SOCIETIES, etc.
Annales de Chimie et de Physique. Paris, 1874.
Annales des Sciences Naturelles. Paris, 1874.
Annales and Magazine of Natural History, including Zoology, Botany, and Geology. London, 1874.
Annuaire Pharmaceutique. Paris, 1874.
Athenæum. London, 1874.
British and Foreign Medico-Chirurgical Review. London, 1874.
British Journal of Dental Science. London, 1874.†
Canadian Illustrated News Portfolio and Dominion Guide for 1873. Montreal, 1873.†
Canadian Illustrated News. Vol. vii., nos. viii. and xiii. Montreal, 1873.†
Chemical News and Journal of Physical Science. London, 1874.†
Chemist and Druggist. London, 1874.†
Grevillea, a Monthly Record of Cryptogamic Botany. London, 1874.

Periodicals (continued).

The preceding work is continued as—

Grevillea, a Quarterly Record of Cryptogamic Botany. London, 1874.

Hardwicke's Science Gossip. London, 1874.

Jahresbericht über die Fortschritte der Pharmacognosie, Pharmacie und Toxicologie, 1872-3. Göttingen, 1873-4.

Journal de Pharmacie et de Chimie. Paris, 1874.

Journal of Botany, British and Foreign. London, 1874.

Lancet. London, 1874.

London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science. London, 1874.

Medical Times and Gazette. London, 1874.

Nature. London, 1874.

Quarterly Journal of Microscopical Science. London, 1874.

Year-Book of Therapeutics, Pharmacy, and Allied Sciences. New York, 1872.

Zoologist. London, 1874.

Perspiration. See Cruickshank (W.).

Pettigrew (J. B., M.D., F.R.S.). The Physiology of the Circulation in Plants, in the lower Animals, and in Man. London, 1874.

Pflanzenstoffe. See Husemann (A. and T.).

Pharmacie. See *Pharmacy.*

Pharmacognosie. See *Periodicals*, Jahresbericht.

Pharmacographia. See Flückiger and Hanbury.

Pharmacopœias.

Pharmacopœia Augustana. See Zwelfer (J.).

British Pharmacopœia.

Additions to the British Pharmacopœia of 1867. (Five copies.) London, 1874.

See also—

Barber (G.), Pocket Companion.

Squire (P.), Companion.

Thomson (A. T.), Conspectus.

Pharmacopœa Germanica.

See Buchner (L. A.).

Mohr (F.).

Hospital Pharmacopœias.

Pharmacopœia of the Hospital for Diseases of the Throat. Edited by M. Mackenzie, M.D. Second Edition. London, 1873.

The same.†

Pharmacopœia in usum Noscomii Londinensis Sancti Georgii. Londini, 1768.†

Pharmacopœia Londinensis. See Barber (G.), Pocket Companion.

Veterinary Pharmacopœia. See Tuson (R. V.).

SOCIETIES (continued).

Linnean Society of London.

Journal:

Proceedings, 1873-4.†

Zoology. London, 1874.†

Botany. London, 1873-4.†

Additions to the Library, 1869-74.†

Literary and Philosophical Society of Manchester.

Memoirs. Vol. xxiv. London, 1871.†

Proceedings. Manchester, 1874.†

Newcastle-upon-Tyne Chemical Society. Proceedings. 1874.†

Pharmaceutical Society of Great Britain.

Pharmaceutical Journal and Transactions. (Two copies). London, 1874.

Calendar. London, 1874.

List of Specimens in the Museum of the North British Branch. Edinburgh, 1870.

The Registers of Pharmaceutical Chemists and Chemists and Druggists. London, 1874.

See also *Examinations.*

Philosophical Society of Glasgow. Proceedings. Vol. ix., part i. Glasgow, 1874.†

Photographic Society. Journal and Transactions. London, 1874.†

Royal Medical and Chirurgical Society of London.

Medico-Chirurgical Transactions. Vol. lvi.-lvii. London, 1873-4.†

Proceedings. London, 1874.†

Royal Society of London.

Philosophical Transactions. London, 1873-4.

Proceedings. London, 1874.†

Scottish Arboricultural Society. See Cleghorn (H.).

Sociedad de Farmacia Argentina.

Revista Farmacéutica. Buenos Ayres, 1873-4.†

Tarifa Farmacéutica. (*P.*). Buenos Ayres, 1873.†

Societas Pharmaceutica Londinensis. See Rand (I.).

Société Botanique de France. Bulletin. Paris, 1873-4.†

Société de Pharmacie d'Anvers. Journal de Pharmacie. Bruxelles, 1874.

Zoological Society of Philadelphia. Second Annual Report of the Board of Managers. With Appendix, containing the First Annual Report, etc. (*P.*) Philadelphia, 1874.†

Soubeiran (Dr. J. L.).

De l'Ostréiculture. (*P.*) Bordeaux, 1872.†

Hygiène Élémentaire. Paris 1873.†

THORPE (T. E., Ph.D., F.R.S.E.). Quantitative Chemical Analysis. London, 1873.

Throat, Diseases of the. See *Pharmacopœias.*

TODD (Rev. J.). The Student's Manual. New Edition. London.†

Topography. See LEWIS (S.), Dictionary of England, Guernsey, Jersey, and Man.

Toxicologie. See *Periodicals,* Jahresbericht.

Transactions. See CONFERENCE, etc.

TUSON (R. V.). Pharmacopœia, including the Outlines of Materia Medica and Therapeutics, for the use of Practitioners and Students of Veterinary Medicine. Second Edition. London, 1874.

TYNDALL (J., LL.D., F.R.S.). Six Lectures on Light, delivered in America in 1872-3. London, 1873.

UNIVERSITIES.

DURHAM. Calendar. Durham, 1874.†

EDINBURGH. Calendar. Edinburgh, 1874.†

GLASGOW. Calendar. Glasgow, 1874.†.

LONDON. Calendar. London, 1874.†

URE (A., M.D., F.R.S.). Dictionary of Arts, Manufactures, and Mines. Edited by R. Hunt, F.R.S. Sixth Edition. 3 vol. London, 1872.

VEREINE.

ALLGEMEINE ÖSTERREICHISCHE APOTHEKER-VEREINE. Zeitschrift Wien, 1873.†

See also CONGRESS.

VERNE (C.). Étude sur la Boldo. (*P.*) Paris, 1874.†

Veterinary Materia Medica, Pharmacopœia, and Therapeutics. See TUSON (R. V.).

Vegetable Kingdom.

See *Botany.*

LINDLEY and MOORE, Dictionary.

WANKLYN (J. A., M.R.C.S.). Milk Analysis. A Practical Treatise on the Examination of Milk and its derivatives, Cream, Butter, and Cheese. London, 1873.

WANKLYN (J. A., M.R.C.S.) and CHAPMAN (E. T.). Water Analysis: A Practical Treatise on the Examination of Potable Water. Third Edition. By J. A. WANKLYN. London, 1874.

WARING (E. J., M.D.). A Manual of Practical Therapeutics. Third Edition. London, 1871.

8

LONDON
STEVENS AND RICHARDSON, PRINTERS, 5, GREAT QUEEN STREET
LINCOLN'S INN FIELDS, W.C.